

# The Second Mediterranean Symposium on Medicinal and Aromatic Plants

## ABSTRACT BOOK

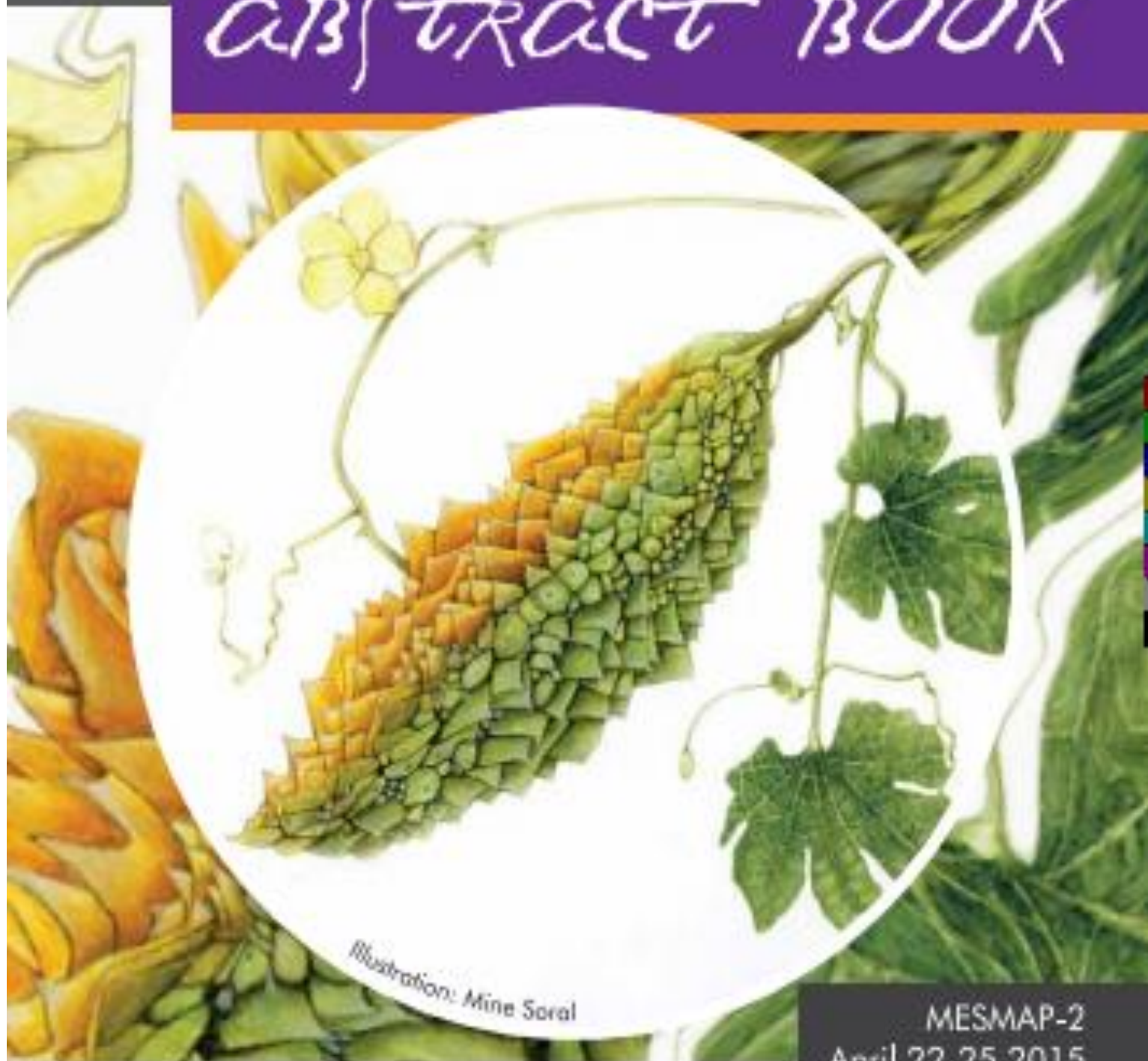


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MESMAP-2  
April 22-25, 2015



MESMAP-2 ABSTRACTS  
April 22-25<sup>th</sup>, 2015 / Antalya - TURKEY

**The Second Mediterranean Symposium on  
Medicinal and Aromatic Plants**

**MESMAP - 2**  
**ABSTRACT BOOK**

**April 22<sup>nd</sup> – 25<sup>th</sup>, 2015**

**Antalya - TURKEY**

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*Dear colleagues,*

*Having respected scientific board and organizing committee members from all over the world, MESMAP Symposium series started in 2013. The first Mediterranean Symposium on Medicinal and Aromatic Plants (MESMAP-2013) was held on April 17-20, 2013 in Gazimagosa (Famagusta), Turkish Republic of Northern Cyprus (TRNC), which was organized by Faculty of Pharmacy, Eastern Mediterranean University (EMU) joint with AMAPMED (Association of Medicinal and Aromatic Plants of the Mediterranean).*

*In that scientific event, more than 300 participants from 35 different countries presented about 300 scientific works. MESMAP-2 Symposium is the second scientific event of MESMAP symposium series on Medicinal and Aromatic Plants. All the related disciplines with MAPs from nature to laboratory basis will meet in this distinguished event near the Mediterranean Sea under the Turkish Hospitality umbrella in Antalya, Turkey. MESMAP Symposiums provide a platform for herbal medicines, botany, plant biotechnology, ethnobotany, phytopharmacology, pharmacognosy, food, agriculture and forestry, plant biology, phytochemistry and aromatherapy. You can find abstracts of all the scientific works presented in MESMAP-2 in this ABSTRACT BOOK. We are proud to announce that INDUSTRIAL CROPS AND PRODUCTS JOURNAL with high impact factor from ELSEVIER group will publish some of the full papers after scientific evaluation in a special issue.*

*We would like to thank for their sincere supports of Turkish Ministry of Food, Agriculture and Livestock, Turkish Ministry of Forestry and Water Affairs and Turkish Airlines. Moreover, organizing committee members would like to thank you all the participants their valuable scientific participation.*

*MESMAP-2 Symposium will provide all the participants to meet respected scientists more than thirty countries and plan further collaborations with each other. In addition to the scientific activities, rich social programs throughout the symposium will be provided for informal interactions, which include welcome reception, gala dinner, congress tour, and closing ceremony.*

*MESMAP-2 Symposium was held on April 22-25, 2015 in Antalya – TURKEY, which will be organized by academicians from Gazi University (TURKEY), Gaziantep University (TURKEY), Kilis 7 Aralık University (TURKEY), Yüzüncü Yıl University (TURKEY), Association of Pharmaceutical Teachers of India (APTI – INDIA) joint with AMAPMED (Association of Medicinal and Aromatic Plants of the Mediterranean).*

*Organizing Committee hope that MESMAP-2 Symposium participants would have an amazing experience and unforgettable memories to take back their homes, and would like to thanks for all MESMAP-2 participants for their valuable contributions. We would like to remind you that MESMAP Symposium series will be organized every two year. Hope to meet you in the third meeting series of MESMAP in 2017 spring.*

*Best regards,*

*Symposium Chairman,*

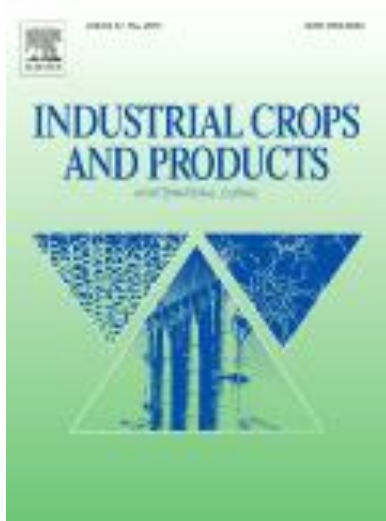
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## **MESMAP - 2**

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"A Special Issue from oral papers presented at MESMAP-2 is under consideration in **Industrial Crops and Products, an International ELSEVIER Journal**  
After the symposium there will be a deadline for submission of full papers that will be reviewed following the standard procedure for the Journal prior to acceptance"



**MESMAP – 2**  
**SCIENTIFIC ORAL / POSTER PROGRAM**

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<b>23 APRIL 2015, THURSDAY</b>		
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CHAIRPERSONS: Zora Dajic Stevanovic & Nouredine Djebli		
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# **MESMAP – 2 PRESENTATIONS**

# **INVITED LECTURES**

## **(1 – 10)**

**KEYNOTE LECTURE**

**CURRENT TRENDS IN THE PRODUCTION AND UTILIZATION OF MEDICINAL AND AROMATIC PLANTS**

Ákos Máthé

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The long history of Medicinal and Aromatic Plants (MAPs) overarches the time span of human civilizations. Remarkably, according to a WHO estimate, even today, 80 % of the world's population relies chiefly on traditional medicine, a major part of which involves the use of plant extracts or their active ingredients (Akerele, 1992).

MAPs can positively contribute to ensuring sustainable livelihoods for the rural populations. Until recently, MAP resources were exploited nearly without any major limitations. The overexploitation of natural resources threatens with the loss of several valuable species, endangering valuable incomes for rural households, especially in developing countries. New production (collection, cultivation, processing, and manufacturing) and trade models (including FairTrade and certification) are needed to ensure fair return to gatherers and producers of medical plants.

MAPs have become industrial products. They are used globally according to new concepts e.g. as ingredients of nutraceuticals, cosmeceuticals, phytotherapeutic and aromatherapeutic preparations, etc. While still used in traditional medications, MAP use is shifting to include wellness promoting products. The wellness industry has become a lucrative market for MAPs. Its drivers include: the needs of aging societies, the emphasis to control healthcare costs, and/or the increasing awareness of the side effect of synthetic drugs.

The most frequent forms of therapeutic uses of MAPs comprise traditional medicine, phytotherapy, aromatherapy, homeopathy and balneology. People use herbal medicines to try to maintain or improve their health. Animal health and welfare have also become important domains for MAP use. Sales of herbal products/medicines are booming. Herbal pharmaceuticals are subjected to clinical trials before registration as HMPs by regulatory authorities.

Irrespective of the regulatory pathway to access the market, the quality of herbal medicinal products must be demonstrated. The safety of application should be guaranteed along with their reliable good quality (Good Agricultural Practice = GAP, Good Manufacturing Practice = GMP, Good Laboratory Practice = GLP, etc.).

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As the majority of these MAPs is collected from the wild, owing to both destructive collection and over-harvesting, hundreds of species are now threatened with extinction. The new scope of utilization of MAPs calls for new added dimensions in preventing extinction and to expedite conservation measures.

At a time of increased demands and overexploited natural resources, due to its relevant advantages, MAP cultivation should be given priority over wild-crafting.

Comprehensive strategic development projects, farther national legislation, the implementation of international trade regulations, as well as international harmonization are needed to meet the market demands on reliably sourced, good quality MAPs.

**INVITED LECTURE - I**

**BIOACTIVE CYCLIC PENTAPETIDES FROM PLANTS AND FUNGI:  
IDENTIFICATION AND BIOSYNTHETIC PATHWAYS**

Linda Jahn<sup>1</sup>, Thomas Schafhauser<sup>2</sup>, David Fewer<sup>3</sup>, Philippe Jacques<sup>4</sup>, Kaarina Sivonen<sup>3</sup>, Willem van Berkel<sup>5</sup>, Karl-Heinz van Peé<sup>1</sup>, Tilman Weber<sup>6</sup>, Wolfgang Wohlleben<sup>2</sup>, Jutta Ludwig-Müller<sup>1</sup>

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Astins are bioactive chlorinated cyclic pentapeptides from the Siberian plant *Aster tataricus*. The roots of *Aster tataricus* are traditionally used in Chinese medicinal herb teas or cough remedies due to the antibacterial and antiviral activities of compounds present in these roots. In addition, astins have been shown to have anti-tumour activity indicating a possible future use in cancer therapy. While its reported anticancerogenic activity is promising for pharmaceutical use, it takes high amounts of plant material to isolate only small amounts of the compounds. It is also difficult to synthesise them chemically without environmental impacts. We have therefore set out to identify genes that could encode putative biosynthetic enzymes from the biosynthetic pathway. Structurally similar cyclic pentapeptides called cyclochlorotines have been isolated from a fungus, *Penicillium islandicum*, but these have been reported to show antimicrobial potential. It will be interesting to determine which structural features could be responsible for the different bioactivities. Ultimately, the research aims at understanding the structural diversity and bioactivity of these classes of natural compounds from unrelated organisms and to use their potential in the future.

**INVITED LECTURE - II**

**RARE MEDICINAL PLANT INVENTORY USING GEOGRAPHICAL INFORMATION SYSTEM (GIS) AND THE LINKAGE OF MIGRATION ROUTES OF HUMAN HAPLOGROUPS**

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Recently, due to over exploitation of the natural resources in the Himalayas, the overall existence of local inhabitants of the area has been endangered. The situation is compounded with the ever-increasing pollution. At the same time, the lack of awareness of the people about biodiversity, conservation, sustainable use, *etc.* makes it difficult to stop this non-repairable loss. Himalayas is among one of the hotspot of environment degradation. The locals are poor and have to use the resources having no alternative. Therefore, efforts are needed to use resource the sustainably. We have supported the projects for medicinal plant cultivation and preservation in Nepal and Pakistan along with the documentation of Medicinal Plants of Nepal Himalaya.<sup>1,2)</sup> We have been conducting plant inventory research referring “Lupines”, as name for Local Useful Plants with Intelligent Networks of Exploring Surface since 2010 as Integrated base information system which utilizes both database of plant resources and geographic information system (GIS) technology based on a result of the framework of Strategic Information and Communications R&D Promotion Programme (SCOPE). For example, basic research for clarifying correlation about the growth environment and the hereditary characteristic was performed for “Lokti” (*Diplomorpha canescens*), a main source of “Nepali Kagaj” and “Ganpi” (*Diplomorpha sikokiana*) and “Kiganpi” (*Diplomorpha trichotoma*); the main sources of Japanese traditional paper “Washi” whose origin belongs to same genus. Although the morphological differences among those leaves were examined about the geographical variation of the “Lokti” used as paper materials, it turned out clearly that both “Kozo” and “Hime-kozo” are superior genetic resources according to the usage by the characteristic results of investigation. Furthermore, while analyzing about the distribution of Lokti and Ganpi *in situ*, the inventory about the total amount drawn theoretically to continuous utilization of Washi culture as forest resources was also performed.

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**INVITED LECTURE - III**

**CGMP, PRODUCTIVITY, SAFETY AND VALIDATION IMPORTANT FACTORS TO BUILD QUALITY IN PHARMACEUTICALS**

Dr.Mahesh Burande

President APTI  
Pharma consultant and Trainer

To build quality in Pharmaceuticals many resources should be utilized and at every stage critical parameters are established. Resources include Men, Material Machine, Money, Maintenance, Method, Management and Motivation. Current Good Manufacturing Practices are emphasized utilizing all resources and meticulous training is given to all people. All critical processes should be validated, instruments are calibrated and most important thing is building attitude in people to follow the systems, respect the systems, reporting deviations through training should be established. This will build the Quality in Pharmaceuticals to serve the humanity.

**INVITED LECTURE - IV**

**HEALTH BENEFITS OF HERBAL TEAS**

I. Irem Tatli

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Plants have been used for centuries to prevent and /or treat a variety of medical illnesses. About 80% of the world's population uses herbal medicine and herbal teas today as part of health care. Many of the uses have come from folklore or cultural traditions. Different cultures use herbs located in their geographical locations for curing common illnesses. Traditional medicinal plants also play an important role in Turkey. Turkey is a transitional region between three phyto-geographical regions, which are Irano-Turanian, Mediterranean and European-Siberian regions and has a rich flora as well as a cultural accumulation. Therefore, it is an important resource for the ethnobotanical studies.

Infusion and decoction are the methods mostly used for the preparation of herbal teas. In most cases, herbal tea is nothing more than the mixture of dried fruits or herbs with boiling water. Medicinally, herbal teas have a reputation for being drunk mainly due to the properties of sedation, relaxation and stimulation, etc. The benefits of herbal tea are derived from the different phytochemicals within the herbs. These substances are typically found in the leaves, flowers, stems, roots, bark and fruits of plants.

The plants are mostly used for kidney stones, ulcer, hemorrhoids, rheumatism, cold, diuretic and carminative. Some adverse effects were also recorded from patients and healers. Here in the presentation more than 15 common herbal tea preparations and their effectiveness to treat certain ailments will be reviewed<sup>1-6</sup>.

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**INVITED LECTURE - V**

**CAN NEURODEGENERATIVE DISEASES BE DEFEATED  
NATURALLY?**

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Neurodegenerative disorders are a major cause of mortality and disability and as a result of increasing life spans represent one of the key medical research challenges. Neurodegenerative diseases of the human brain comprise a variety of disorders that affect an increasing percentage of the population. Some of these are age dependent (e.g. Alzheimer's and Parkinson's diseases) and some are infection dependent, e.g. human immunodeficiency virus (HIV/AIDS). Neurodegenerative disease like Alzheimer is the sixth leading cause of death in the world. Alzheimer association reported that an estimated 5.2 million American of all ages have Alzheimer disease in 2014 and unless a cure is found, more than **13 million** Americans will have the disease by 2050.

Antioxidants neutralize free radicals and are effective in suppressing or preventing these disorders. Medicinal plants play fundamental role in traditional knowledge. There are more than thousands of medicinal plants to be examined for neuroprotective potential. These approaches can promise for the treatment of various neurological disorders like Alzheimer, depression, stroke etc. There are still a large number of plants that need to be examined for their potential neuroprotective properties. This will greatly help in identifying more active compounds with potential application for human. These approaches hold promise for the treatment of various disorders.

It has been proved that consumption of antioxidant rich diet may reduce lipid peroxide and increase antioxidant levels in plasma. This will greatly help in identifying more potent compounds with potential applications in prevention of human ailments.

**INVITED LECTURE - VI**

**CHINESE AND BOTANICAL MEDICINES: MYTH OR TREASURE?**

Ray Cooper

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There is a need to improve and promote the scientific inquiry on the study and use of botanicals, natural products and Chinese Medicine, in order to secure global acceptance. Although there is an enormous history of use of Chinese medicines a better understanding of these preparations and formulae within the scientific and international community is needed. The aim is to present case studies on select botanicals and natural products to provide scientific data that could substantiate the health claims. In particular, one example is the inhibition of ENOX2 (tNOX), a molecular target to examine anticancer activity of green tea catechins.

The relation between green tea catechins and cell protection through a cell surface protein, ENOX2 has been identified. When the ENOX2 of cells is inhibited, the cells fail to enlarge after division, cease to divide, and after a few days undergo apoptosis. To date, EGCg in green tea is the most effective polyphenol ENOX2 blocker found without any adverse effects on normal cells. Synergistic combinations of green tea concentrate and powdered Capsicum reduces oxidative stress as an approach to elimination of malignant cells in both cancer (HeLa) and non-cancer (MCF-10A) cells. Some preliminary data on green tea and other examples of well-known botanical medicines described in Chinese folklore will be presented.

**INVITED LECTURE - VII**

**CONSERVATION OF ENDANGERED MEDICINAL PLANTS THROUGH PLANT TISSUE CULTURE AND ITS APPLICATION IN WORLD ECONOMICS**

Raman DANG

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Plant tissue culture is an integral part of the plant biotechnology and is an alternative to conventional methods of propagation. The importance of plant tissue culture is in the improvement of useful aromatic and medicinal plants and also the way in which it is beneficial to mankind. It plays a vital role in Biodiversity Conservation and Economic Development globally. Mainly in India, rich biodiversity has been seriously affected with the increasing human population and reckless use of natural plants. Thus public awareness towards the value of conserving biodiversity for sustained development has increased considerably in all the sectors.

Broadly it is the technique of in vitro aseptic culture of any kind of plant cells, tissues and organs to procure excess amount of secondary metabolites. Several new approaches for genetically altering plants are time-saving and precise as compared to conventional plant breeding methods. Recent trend of the herbal remedies for health management is growing in popularity, as in food industries, germplasm conservation and cosmetic industries. The value of all the components is getting commercially viable when the raw materials are supplied in pure form which is only possible with the plant tissue culture. By focusing on different uses, the topic explains elaborately about the recent advancement for conservation of germplasm, endangered plant species and its application in the world market.

**INVITED LECTURE - VIII**

**THE RESOURCE POTENTIAL OF THE FLORA OF RUSSIA AS A SOURCE OF MAP. ETHNOBOTANY ASPECTS FOR COLLECTION NEW DATA AND SAVING INFORMATION ABOUT MAP**

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Flora of Russia is richest. There are 21 000 species of vascular plants in it. For example, modern scientific (official) medicine using not more than 200-250 species, but Russian folk medicine using approximately 2 000-2 500 species. And now we losing a lot of information about using plants for human so quickly, because new time developing so fast and information field spread so widely (mainstream).

Analyze some new publications and books shown that in flora of Russia have a potential on next families. For example: in Asperaceae family can be using 465 species from 110 genus, in Poaceae family – 99 species from 56 genus; in Orchidaceae family – 50 species from 23 genus; in Cyperaceae family – 64 species from 8 genus; in Lamiaceae family – 187 species from 39 genus; in Scrophulariaceae family – 160 species from 31 genus; in Boraginaceae family – 58 species from 29 genus. And also in present time very actually prolongation active investigation with species from next families: Actinidiaceae, Araliaceae, Berberidaceae, Cucurbitaceae, Euphorbiaceae, Crassulaceae, Valerianaceae, Rosaceae, Rubiaceae, Solanaceae, Gentianaceae, Asclepiadaceae, Caryophyllaceae. In some families need pay more attention on some genus. For example in Fabaceae family on genus *Astragalus*, *Hedysarum*, *Oxytropis*, *Glyzyrrhiza*, *Sophora*, *Pueraria*, *Maackia*, *Galega*; in Apiaceae family on genus *Angelica*, *Heracleum*, *Lazer*, *Ferula*, etc.

In Asperaceae family need pay now more attention on next genus: *Artemisia* (80 species), *Senecio* (24 species), *Inula* (12 species), *Serratula* (11 species), *Ligularia* (9 species), *Lactuca* (7 species), *Bidens*, *Arctium*, *Tanacetum*, and some species: *Silybum marianum*, *Xanthium strumarium*, *Petasites hybridus*, species which belong to genus *Leuzea* = *Rhaponticum* = *Stemmacantha*.

In Lamiaceae family need pay more attention on next genus: *Panzerina*, *Teucrium*, *Dracocephalum*, *Ziziphora*, *Thymus*, *Ajuga*, *Hyssopus*, *Nepeta*, *Mentha*, *Scutellaria baicalensis* etc.

In Crassulaceae family more important genus is *Sedum* and *Rhodiola*.

From another families and genus now we have interest for next genus (and species which they including): *Viola*, *Tribulus*, *Alisma*, *Dianthus*, *Oberna*, *Silene*, *Maianthemum bifolium*, *Acorus calamus*, *Platycodon grandiflorus*, *Sparganium coreanum*, *Dioscorea caucasica*, *Dioscorea nipponica*.

It is good and right now all over the world in different countries is beginning to more actively and more widely to study all different kinds of ferns (different species from Pteridaceae family and Pteridophytes in general) as sources of biologically active substances and promising drugs.

The direction for new investigation not new. As important is anticancer (*Sedum*, *Panzerina*, *Teucrium*), antiviruses (*Sedum*, *Ziziphora*, *Thymus*, *Origanum*, *Mentha*), anti-inflammatory and wound healing, adaptogens and means of enhancing male sexual activity (*Ajuga*, *Epimedium*, *Rhaponticum*, *Tribulus*, *Oberna*, *Silene*), anti-TB drugs (*Hyssopus*, *Nepeta*, *Mentha*, *Ziziphora*, *Thymus*, *Origanum*, *Sedum*) and cardiovascular (*Mentha*, *Rhodiola*), etc.

Special task it is program for grown clearing medicinal and aromatic plants on a field without pesticides etc. The World GAP Program must be using as a main direction for farmers.

Special attention for folk medicine. As soon as possible need collect original information (data) about plants using especially for small nationalities.

For the formation of sound scientific search for new resource types, as well as promising sources of bioactive substances of plant origin in different regions of our country must be able to analyze the data on the use and application of plants for different needs, especially their use in different regions of different peoples.

At present, the collection of baseline data ethnobotanical is of particular importance, as modern technology wider and deeper into our lives, and lead to a rapid loss of traditional knowledge about the plant world and its role in people's lives. Everything is quickly erased the memory of the use of different kinds of plants to treat diseases, using them as amulets, and their role in many ceremonies. Collect and preserve, compile and analyze this knowledge - one of the central problems of modern investigation of plants resources. And to solve these problems is very important to work with the merger of plants resource and ethnobotanical investigations.

On a sample collecting and studding materials for a number of ethnobotanical Finnic peoples of the north European part of Russia (Veps, Karelians, Izhora, Vodes, Seto-Estonians), Komi-Zyrian, Saami and Russian, with which almost all of these people have long live in more or less close geographical and cultural contact were shown that different Finnish peoples of the north European part of Russia, even close to living one kind of plants (and parts thereof) are not always the same. Even one people, but living in a geographic location, so do not always use the same one vegetable raw material. Russian penetration into the habitat of indigenous peoples does not always lead to the fact that they are all used for the same purposes also plant material.

Collection and analysis of flue original ethnobotanical data allows not only better characterize the different peoples, but to preserve the existing empirical folk knowledge.

**INVITED LECTURE - IX**

**CONSERVATION AND SUSTAINABLE USE OF MEDICINAL AND AROMATIC PLANTS' GENETIC RESOURCES FOR WORLDWIDE HUMAN WELFARE**

Ana Maria Barata<sup>1</sup>, Filomena Rocha<sup>1</sup>, Violeta Lopes<sup>1</sup>, Ana Maria Carvalho<sup>2</sup>

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Plants have been used since ancient times to heal and cure diseases and to improve health and wellbeing of the populations. Medicinal and aromatic plants (MAPs) still form the basis of traditional or indigenous health systems of the populations in most of the developing countries, as reported by the World Health Organization (WHO).

At present, eighty percent of the population in those countries largely relies on plant based drugs for their health care needs and it is estimated that in the next decades a similar percentage of the world population may still rely on plant-based medicines. Between 50,000 and 70,000 plant species are known to be used in traditional and modern medicinal systems throughout the world. There has been a substantial growth in herb and herbal product markets across the world in the last three decades. Rapidly rising exports of medicinal plants during the last decennium attests to worldwide interest in these products, as thirty percent of the drugs sold worldwide contain compounds derived from plant material.

As a result of the expanding interest in medicinal and aromatic plants, new income generating opportunities are opening up for rural populations. With many of the MAPs gathered from the wild, the recollection and sale of MAPs is providing a complementary source of income for many poor rural households. However, despite the fact that the products recollected may have very high value in the final product, the collectors typically receive only a small share of the final value, either because they are unaware of the real value, or are unable to market it in the form wanted by buyers or even are unable to market to those buyers. In Europe, at least 2,000 MAP species are used on a commercial basis, of which 1,200 – 1,300 are native to Europe. The growing global interest in the use of MAPs and the increasing demand on raw materials by the different processing industries (pharmaceutical, food, cosmetic, perfume, etc.) have resulted in an expanding market.

Relatively few MAP species are cultivated being the great majority provided by recollection from the wild and this trend is likely to continue over the long term due to numerous factors, namely: most medicinal plants are traded locally and regionally rather than internationally; the costs of domestication and cultivation are high and; land for cultivation of non-food crops is limited in some countries. Currently, we are facing an incomparably growing pressure on plant populations in the wild due to the increasing commercial recollection, largely unmonitored trade, and habitat loss. A profound knowledge of the features of the international trade in botanicals (size, structure, streams, commodities, traded quantities and their origin) is (1) essential for assessing the trade's impact on the plant populations concerned; and (2) required for conservation concepts and measures which have to meet future supply and the provisions of species conservation.

So, complementary conservation strategies (*in situ* and *ex situ* conservation - field, seed and *in vitro* collections), are being implemented in Europe and other regions for plant genetic resources in general, and MAP species in particular. Recognizing the importance of MAPs conservation, the Steering Committee of the European Cooperative Programme for Plant Genetic Resources (ECPGR), during its eighth meeting, in October 2001, agreed on the establishment of the Medicinal and Aromatic Plants Working Group (MAPWG). The main objectives of the MAPWG are: Conservation of MAP species in Europe; Characterization and Evaluation of MAPs; Development of descriptors at genus level; Development of a central crops database.

Being a repository of unforeseen potentialities, MAPs genetic resources should be studied and conserved for the benefit of present and future generations as they are crucial to support human wellbeing contributing also to increasing and diversification of income of the rural populations.

**INVITED LECTURE - X**

**PHYTOTHERAPY IN EXPERIMENTAL DIABETES AND HYPERCHOLESTEROLEMIA**

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Diabetes mellitus and hypercholesterolemia are well-established risk factors of cardiovascular diseases and several laboratory and animal studies mostly used plant extracts in traditional medicine or bioactive compounds to prevent hyperglycemia and dyslipidemia. This study has been conducted with the purpose to provide information on mechanisms implicated in the antihyperglycemic and antihyperlipemic effects of *Ajuga* and *Globularia* species extracts or bioactive compounds based on relevant research articles collected from medical journals. In diabetic rat models, type 1 diabetes was induced by a higher dose of streptozotocine (55-65 mg/Kg PC) and in type 2 by a low dose of STZ (35-50 mg/Kg BW) or by a feeding excessively high levels of fructose (60–70% of total energy intake).

Hypercholesterolemia in rat models was induced by feeding cholesterol-enriched diet (1-2%). Results from scientific research indicates that polyphenols are good antioxidants and are effective in preventing cardiovascular and inflammatory diseases. The genus *Ajuga* (Lamiaceae) and *Globularia* (Plantaginaceae) are used as medicinal plant in traditional medicine of several Mediterranean countries as for wound healing for hyperglycemia and hyperlipemia. Literature reports have indicated that plant leaves are more favorable for storing bioactive compounds, as compared to other parts of these two species. Also, the findings reveal that most of the research are focused on the beneficial effects of *Ajuga* and *Globularia* species on glucose metabolism, lipid profile and peroxidation, redox and inflammatory status.



**ORAL  
PRESENTATIONS  
(1 – 131)**

**ORAL PRESENTATION - 1**

**ESSENTIAL OIL OF THE HALOPHYTE *ARTEMISIA SANTONICUM*:  
TISSUE LOCALIZATION, CHEMICAL CHARACTERIZATION AND  
BIOLOGICAL ACTIVITY**

Zora Dajic Stevanovic<sup>1</sup>, Dejan Pljevljakusic<sup>2</sup>, Marina Sokovic<sup>3</sup>, Jasmina Glamoclija<sup>3</sup>, Milan Stankovic<sup>4</sup>, Dragana Rancic<sup>1</sup>, Ivana Todorovic<sup>1</sup>, Milica Petrovic<sup>5</sup>, Milan Gavrilovic<sup>6</sup>, Pedja Janjackovic<sup>6</sup>

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*Artemisia santonicum* L. is a Eurasian perennial, semi-dwarf species, mostly presented on saline and arid alkaline habitats, steppes and sea seashores. In Serbia, the herb is exclusively linked to saline habitats, mostly of solonetz and solonchak soil types, and it's typical for building of a specific type of vegetation, known as "saline steppe". Five populations of the species were studied in term of characterization of leaf secretory structures responsible for essential oil secretion, the chemical composition of essential oil and its biological activity. Leaf glandular trichomes were observed using light, fluorescent and scanning electron microscopy. Essential oils were isolated by hydrodistillation using Clevenger-type apparatus; chemical composition was determined by GC/MS and Raman spectroscopy. The antibacterial assay was carried out by a microdilution method on gram positive and gram negative bacteria. Streptomycin and Ampicillin were used as controls.

Antifungal activity was tested on eight fungi using modified microdilution technique, whereas standard fungicides were used as control. Antioxidant activity was performed on essential oils diluted in 1 ml MeOH (in series from  $10 \cdot 10^{-3}$  to  $0.078 \cdot 10^{-3}$ ) through modified DPPH test. In *A. santonicum*, the essential oils are synthesized and accumulated in long, multicellular trichomes. Tested oils differed much in yield (up to 0,3%) and less in composition, whereas 1,8 cineole, cis-thujone, linalool, chrysanthenone,  $\alpha$ -ylangene and sabina ketone were the most presented. Monoterpenes (70,95-87,39%) and sesquiterpenes (9,49-24,55%) dominated in the spectrum of identified compounds (up to 64). Essential oils exhibited strong antibacterial activity, especially against *Staphylococcus aureus* and *Salmonella typhimurium*, which in some oils was even better than effect of Streptomycin and Ampicillin, respectively. Antifungal activity was obtained in the MIC range of 0.056-3.750 mg/ml and MFC range of 0.09-7.50 mg/ml. Antioxidant activity was particularly high, with the best IC<sub>50</sub> (%) values of  $0,1 \cdot 10^{-3}$ , indicating potential for commercial use of essential oil of *A. santonicum*.

**ORAL PRESENTATION - 2**

**ISOLATION OF NATURAL PREPARATIONS FROM THE MEDICINAL PLANTS**

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The very interesting and profitable area is the isolation of pure natural (herbal) substances by pharmaceutical, cosmetics and food companies. The mentioned natural products use as pharmaceutical preparations for antitumor, sedative, UV-protection treatments. Of course, many natural substances have been replaced by synthetic materials in contemporary chemical technologies. Our long tradition in the Slovak pharmaceutical industry is the isolation and manufacture of pure morphine from poppy (*Papaver somniferum* L.), silymarine from milk thistle (*Sylibum marianum* L.),  $\beta$ -naphthoquinone from henna (*Lawsonia inermis* L.),  $\beta$ -escine from horse chestnut (*Aesculus hippocastanum* L.),  $\beta$ -ecdysterone from leuzea (*Rhaponticum carthamoides* /Willd./Iljin) etc.. Herbal substances are all mainly whole, fragmented or cut plants, plant parts in an unprocessed, usually dried form but sometimes fresh. Herbal substances are precisely defined by the plant part used and the botanical name according to the binomial system (genus, species, variety and author). Herbal preparations are obtained by subjecting herbal substances to treatments such as distillation, extraction and freeze-drying. All these large-scale methods for the isolation of natural preparations from the medicinal plants are described in regard to pharmaceutical companies in Slovakia.

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**ORAL PRESENTATION - 3**

**THE POTENTIAL HEPATOPROTECTIVE AND ANTIOXIDANT ACTIVITIES OF *ASTRAGALUS SUBROBUSTUS* AND *ASTRAGALUS WORONOWII* ETHANOLIC EXTRACTS AGAINST PARACETAMOL INDUCED LIVER DAMAGE IN RATS**

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Liver is prone to injury due to the chronic exposure to drugs and environmental toxicants. The aim of this study was to investigate the potential hepatoprotective and antioxidant activities of *Astragalus subrobustus* Boiss. (*A. subrobustus*) and *Astragalus woronowii* Bornm. (*A. woronowii*) in a rat model of paracetamol (PCM) induced liver damage. A total of 42 adult male Wistar rats were equally divided into 7 groups. Groups I (normal control) and II (PCM- intoxicated control) received the vehicle at 1 mL/kg. Group III (reference) received silymarin (50 mg/kg). Groups IV and V received *A. subrobustus* extract (200 and 400mg/kg, respectively). Groups VI and VII received *A. woronowii* extract (200 and 400mg/kg, respectively). The vehicle, silymarin and extracts were administered orally, once daily for 7 days. On the 7th day, PCM suspension was given orally (2g/kg b.wt), to all rats except those in Group I. After 48 h of PCM dosing, all rats were sacrificed by cervical decapitation, blood samples were collected and serum was separated and analyzed for various biochemical parameters. Livers were dissected out for determination of their antioxidant status and histopathological examination.

PCM administration caused severe hepatic damage in rats as evidenced by elevated serum activities of aspartate aminotransferase (AST), alanine aminotransferase (ALT), alkaline phosphatase (ALP),  $\gamma$ -glutamyl transferase ( $\gamma$ -GT) and serum level of total bilirubin (BIL), while decreased serum level of total protein (TP). In liver homogenates, PCM elevated malondialdehyde (MDA) but decreased glutathione (GSH) level as well as glutathione peroxidase (GPx), superoxide dismutase (SOD) and catalase (CAT) activities. Administration of *A. subrobustus* and *A. woronowii* extracts (200 and 400mg/kg) for 7 days before PCM inhibited the acute elevation of the serum activities of AST, ALT, ALP and  $\gamma$ -GT enzymes and serum level of BIL. They elevated the serum level of TP. PCM-induced lipid peroxidation was likewise attenuated by both extracts. Similarly, both extracts increased the activities of the antioxidant enzymes (GPx, SOD and CAT) in the liver homogenates and reduced GSH concentration. Results of histopathological studies supported the biochemical findings. The results of the in vitro antioxidant effect revealed considerable antioxidant activity for both extracts. It was concluded that *A. subrobustus* and *A. woronowii* possess hepatoprotective activities that could be partly attributed to their antioxidant effects.

**ORAL PRESENTATION - 4**

**VERNODALIN INDUCE APOPTOSIS IN BREAST CANCER CELLS THROUGH ACTIVATION OF FORKHEAD BOX TRANSCRIPTION FACTOR, FOXO3A**

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The aim of our present study is to investigate the anticancer effect of vernodalin, isolated from *Centratherrum anthelminticum* linn seeds, in breast carcinoma models. Method: Human breast carcinoma cell lines (MCF-7 and MDA-MB231) were treated with vernodalin and activity of FOXO3a was examined. For in vivo study, we used rat mammary tumor cells (LA7) to induce tumors in the rats.

Results: During vernodalin treatment, we observed increased expression of FOXO3a. Furthermore, vernodalin reduced phosphorylation of FOXO3a at Ser253, and induced higher nuclear localisation. Moreover, silencing experiments with FOXO3a siRNA further confirmed the involvement of FOXO3a during vernodalin treatment. In vivo studies showed that vernodalin reduced proliferative markers in breast tumors. Summary: Our results implicate FOXO3a/PI3K-Akt pathway as a critical mediator of vernodalin-induced cytotoxicity and further supporting its potential as a chemotherapeutic agent for breast cancer.

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**ORAL PRESENTATION - 5**

**PHYTOCHEMICAL INVESTIGATION AND IN VITRO PRELIMINARY ANTIMITOTIC STUDIES ON ETHANOLIC EXTRACT (EtOH) OF AERIAL PARTS OF LEUCAS DIFFUSA.BENTH.**

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Lucas Diffusa commonly known as Thumbai (Tamil) decumbent herb is widely distributed in Asian countries and some places in India. The objective of present study was to investigate the presence of various phytochemical constituents and preliminary antimutagenic screening for ethanolic extract. The crude EtOH extract of aerial plant of *Leucas diffusa* were taken under phytochemical investigation revealed the presence of steroids, triterpenoids, flavanoids and carbohydrates. The extract was fractionated and isolated from n-Hexane, Ethylacetate, and Chloroform partitionates by using column chromatography and preparative TLC techniques. The IR spectra of the EtOH extract indicated the presence of OH, C=O, C-H, C-O-C and NH. Cytotoxic properties of plant extracts being developed for cancer treatment are usually evaluated by a variety of in vivo and in vitro tests carried out in animal or plant based models. In the present study we have evaluated the possibility of using plant model the germinating Mung beans (*Vigna radiata*), for rapid and inexpensive screening of extract exhibiting cytotoxic properties. The EtOH extract showed strong inhibitory effect on seed germination at 100µg/mL, 250µg/mL and 500µg/mL. Our study shows that germinating *V. radiata* beans could be used as a convenient model for the preliminary screening of drugs exhibiting cytotoxic properties

**ORAL PRESENTATION - 6**

**EFFECT OF CEROTONIA SILIQUA AND PEGANUM HARMALA EXTRACTS ON BLOOD GLUCOSE LEVEL OF NORMAL AND DIABETIC RATS**

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Diabetes mellitus is a global chronic metabolic disease that is associated with reduces quality of life. Many of the current oral anti-hyperglycemic have some serious adverse effects. Therefore herbal medicine attracts many diabetic patients. The purpose of this study was to evaluate the antihyperglycemic effect of Cerotonia Siliqua and Peganum harmala extracts in normal and diabetic rats. Diabetes was induced by feeding the rats with high fat diet (25% of calories as fat) for two weeks then rats were injected with streptozotocin (35 mg/kg IP). Three days later, blood samples were collected and rats with plasma glucose level  $\geq 300$ mg/dl were considered diabetic. Oral glucose tolerance test (OGTT) was applied to normal and diabetic rats. Rat received Cerotonia Siliqua (100mg/kg) and Peganum harmala (100 mg/kg), then thirty minutes later, glucose (1 g/kg bw) was orally administrated. Blood samples (0.1 ml) were collected from the tail vein into heparinized hematocrit at 0, 30, 60, and 120 min after glucose administration. Cerotonia Siliqua (100mg/kg) was significantly ( $p \leq 0.05$ ) reduced the blood glucose level at 30 minute from the glucose administration for both normal and diabetic rats. Whereas Peganum harmala (100 mg/kg) showed toxicity similar to those of organophosphate toxicity includes muscle tremors and twitching, paresis progressing to paralysis, erected hair and soft feces. Atropine reversed the signs of toxicity and cholinesterase assay confirmed that Peganum harmala inhibits cholinesterase enzyme and therefore acetylcholine was responsible for these signs Peganum harmala at a dose level of 3 mg/kg did not cause toxicity and was significantly ( $p \leq 0.05$ ) reduced the blood glucose level at 30 minute from the glucose administration to both normal and diabetic rat. Repeated administrations of both extracts were applied for 28 days, blood samples were collected at day 1, 5, 11, 17, 23 and 28. Cerotonia Siliqua (100mg/kg) and Peganum harmala (3 mg/kg) did not reduce blood glucose level in normal rat. However, both extract were significantly ( $p \leq 0.05$ ) reduced the blood glucose level in diabetic rat. Peganum significantly increased insulin secretion from Rin cells in a dose-dependent manner by 1.4, 2.2 and 4.3 folds at 10, 30 and 100  $\mu$ g/ml, respectively. Whereas, cerotonia mildly increased insulin secretion ( $\square 1.5$  folds) with no clear dose-dependent effect. Both herbs increased insulin secretion from normal perfused rat pancreas with superior insulin secretion capacity to Peganum harmala when compared to Cerotonia Siliqua. Further work on identification and purification of different components are needed.

**ORAL PRESENTATION - 7**

**TRADITIONAL MEDICINE IN ETHNIC COMMUNITIES IN ISRAEL:  
THE EFFECT OF GEOGRAPHY AND CULTURE**

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Many diverse communities have come together in the land of Israel, each with its own distinctive culture and lifestyle. They bring with them their traditional medicine, as well as their traditional medications and medicinal plants. (Whenever it is possible!). Three such important communities live now in Israel, namely the Bedouins, the Ethiopian and the Yemenites. The Bedouins are desert dwellers in the middle-east since ancient times<sup>1</sup>. The community of Yemenite Jews immigrated to Israel some 200 years ago<sup>2</sup> and the Ethiopians are relatively new comers<sup>3</sup>. There are many great similarities in Ethnic Medicine and traditions among these ethnic groups. The purpose of this paper is to highlight the similarities and emphasize the unique common traditions of these groups in view of culture and geography. Important points: 1. The belief in the origin of disease. 2. The role of healers. 3. Traditions of preventive medicine. 4. Geological and climatic factors. 5. Mainly oral traditions. 6. Similar major medicinal plants are used for healing. 7. Healing traditions include ceremonies and supernatural practices. 8. Finally-Similar elements of diet are used. The effect of assimilation process in the "new" country will be evaluated.

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**ORAL PRESENTATION - 8**

**MEDITERRANEAN MEDICAL PLANTS USED IN ETHNOVETERINARY MEDICINE IN TURKEY**

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By the 18th century according to the development of chemistry, synthetic or semisynthetic substances although replaced of plants that used as drug materials mostly, the use of drugs obtained from natural sources has become popular again due to emerged of side effects of modern medicine in recent years. Acquired information by the uses of plants through trial and error for medicinal purposes reaching up to the present by transferred from generation to generation for centuries and science of ‘‘Ethnobotany’’ which is scientifically accepted worldwide and comprise significant scientific researches is born.

By the present study, the ethnobotanical knowledge of the random sampled 60 participants was tried determined by face-to-face survey who living in the Mediterranean region where is an important place in terms of diversity of medicinal aromatic plants in Turkey. 72 plants referred 180 times for medical uses of 21 human and 17 animal diseases. *L. nobilis*, (6.67%), *Mentha* spp. and *U. urens* (3.89%) are the most referred plants. And the most adverse effects have been reported on gastrointestinal system (34.19%).

Despite etnomedicine and ethno-veterinary medicine practices are widely and successfully used until today, stored ethnopharmacology information on this field has been inadequate in Turkey and many other countries. The information about species of mediterranean medical plants and how to used in which diseases in etnomedicine and ethno-veterinary medicine has been presented wiht this study.

**ORAL PRESENTATION - 9**

**A NEED FOR HAVING A RE-LOOK AT THE TERMS OF QUALITY ASSESSMENT OF AYURVEDIC MEDICINES**

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One of the major issues that is preventing Ayurveda to contribute to the healthcare needs of the world is the expectation that Ayurvedic medicinal preparations must adhere to the western standards of pharmaceutical parameters.

The aim of this communication is to make the policy makers understand the problems that could be solved by simple understanding of the differences in epistemology. Further, this specifically points at the need for the acceptance of Ayurvedic epistemology by the western governments. It also emphasizes the need for tackling the main issue of raw material quality control at the pristine stages of product generation.

Ayurveda and Western medical system have dissimilar ideas of institutionalization. The definition of standardization is not restricted to the chemical composition of the drug. Rather, the disease identification in Ayurveda occurs through the study of patient's bodily constitution and the problems expressed by the patient. Hence, we have a patient-specific strategy of healing and treatment therefore, is personalized.

Now, what is required is that we have to bridge the gap between Ayurveda and the current sciences and bring up adequate appreciation for the epistemological principles and construct an environment that takes us more close to the commonsense and wisdom of Ayurveda.

**ORAL PRESENTATION – 10**

**CROATIAN FOLK MEDICINE BOOKS IN MODERN PHYTOPHARMACY**

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Folk-medicine records in Croatia are founded in folk-medicine books (so-called Ljekaruše) which are sources of European medieval monastic medicine. Ljekaruše are collections of recipes from the traditional folk medicine which contain instructions for preparing remedies and their use in the healing of human and animal diseases. They were written in the period from the 14th to 20th centuries. They were written in old Slavic alphabet glagoljica, Latin script and old Croatian script poljička bosančica and rely on Slavic, Roman, Greek, Arab, Byzantine and medieval Salerno tradition. Herbal manuals are important sources of information for historians of medicine and pharmacy because they contain the names of folk diseases, herbal drugs as well as the technology for ethno-pharmaceutical preparations. They are an interesting source of information on the treatment of those medicinal plants which are neglected or unknown today in official medicine, although they have medicinal properties.

In the article were compared some of the most commonly used herbal drugs mentioned in the *Materia medica* of several Croatian folk-medicine books (Books of medicine, *Libar od likarij* by Don Petar Kaštelan and The Great Folk-medicine manuscript from Sinj) which still have an important place in contemporary phytopharmacy.

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**ORAL PRESENTATION - 11**

**CHEMICAL ANALYSIS, ANTIMICROBIAL ACTIVITY & ETHNOPHARMACOLOGY OF LEBANESE CONIFERS**

Fahed Layal<sup>1,2</sup>, El Beyrouthy Marc<sup>1</sup>, Ouaini Naim<sup>1</sup>, Eparvier Veronique<sup>2</sup>, Didier Stien<sup>2</sup>

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Five genera comprising ten species of conifers are found as wild populations in Lebanon. *Abies cilicica* (Antoine & Kotschy) Carrière is endemic to Asian Turkey, Syria and Lebanon where it is traditionally used against microbes, rheumatism and lumbago. *Cupressus sempervirens* L. f. *horizontalis* (Mill.) Voss and *Cupressus macrocarpa* "Goldcrest", a cultivated species, are reported to treat many ailments. Thus we were interested in studying their antimicrobial activity.

The plants essential oils were analyzed by GC and GC/MS and their minimal inhibitory concentrations (MICs) against several microorganisms were determined. In order to elucidate the origin of activity, seven main components of *C. macrocarpa* were tested separately as well as a synthetic reconstructed EO against a dermatophyte.

A potential antifungal activity of the EOs was revealed. Among the major constituents of *C. macrocarpa* (Sabinene, 4-Terpineole, Citronellol,  $\gamma$ -Terpinene, Citronellal,  $\alpha$ -Terpinene, and Camphor), 4-Terpineole was the most active against *Trycophyton rubrum* (MIC of 64  $\mu$ g/ml) while the others showed moderate activity (MICs from 256 to 512  $\mu$ g/ml). It seems that it contributes strongly to the total activity. The synthetic reconstructed EO (74.4%) was less active than the natural one (MIC of 256 vs 64  $\mu$ g/ml). We can then suppose that minor components play a non-negligible role in the antimicrobial potential.

**ORAL PRESENTATION - 12**

**LONG TERM CONSERVATION OF MEDICINAL AND AROMATIC PLANTS IN LITHUANIA**

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The Lithuanian flora contains 1334 plant species. There are more than 460 species, which are used in folk and traditional medicine in Lithuania. 33 species of medicinal plants are included in the Red Data Book of Lithuania. The gathering and utilization of medicinal plants is an age-old tradition in Lithuania, especially in forested areas of the country. The investigations into medicinal plants in Lithuania were commenced in the 18th century, when Botanical Garden of Vilnius University had been established. The conservation of wild plant species and their resources is regulated by the Law on Wild Vegetation (1999), Law on Protected Areas (1993, 2001), Law on National Plant Genetic Resources (2001) and supplementary legal acts.

The seeds of medicinal plants are stored in long term storage in the Plant Gene Bank in Dotnuva. The long-term seed storage was established in 1997 in the National Plant Genetic Resources Coordinating Centre. The Nordic Gene Bank provided all necessary facilities. Seed samples are cleaned, dried, packed in airtight aluminium foil bags and stored at -18C°. Long-term storage conditions guarantee the seed survival for decades as only very limited metabolism can occur there. At the present time seeds of 220 accessions representing 72 species of medicinal and aromatic plants are put in long-term storage in the Plant Gene Bank. The majority of the accessions are of Lithuanian origin with rare exceptions of some foreign accessions of special value to Lithuanian growing conditions. The long-term seed storage is annually supplemented with new accessions.

**ORAL PRESENTATION - 13**

**GALBANIC ACID-LOADED SOLID LIPID NANOPARTICLES: PREPARATION, CHARACTERIZATION AND IN VITRO ANTI-TUMOR ACTIVITY EVALUATION**

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Solid lipid nanoparticles (SLNs) have been proposed as suitable colloidal carriers for delivery of lipophilic drugs. Galbanic acid (GBA) is a lipophilic sesquiterpen coumarin properties comes from some *Ferula* (Apiaceae) species, which showed anti-cancer activities. To enhance GBA anti-proliferation properties it was successfully formulated in SLNs using glyceryl palmitostearate. The nanoparticles were characterized, and bioactivities of SLNs and intact GBA were evaluated in A549 and HUVEC cells. Particle size analysis showed the mean size of 92 nm and zeta potential of -23.39 mV. Scanning electron microscopy images showed spherical SLNs in the nanometer range confirming the obtained results from size analyzer. High drug encapsulation efficiency (more than 98%) was achieved, and long-term in vitro release of the GBA was approved. Physical stability of formulated SLNs in aqueous dispersion was assessed in terms of size, PI and entrapment efficiency. The results showed that both intact and GBA-loaded SLNs exerted anti-proliferation effects in A549 cells, but not in HUVEC cells. The cytotoxic impact of GBA nanoparticles was significantly higher than intact GBA after 48 h. Our results demonstrated that induction of apoptosis was a dominant mechanism in growth inhibitory of GBA against A549 cells as approved by comet, Annexin V and DNA fragmentation assays. This was further confirmed by Quantitative PCR showing up-regulation of Casp 9 and down-regulation of Bcl-xL in A549 cells. Collectively, our data confirmed that SLNs could be exploited for sustained GBA delivery, in which it may be accumulated in tumor site due to deviant tumor pathology, as depicted by enhanced permeability and retention (EPR) effect.

**ORAL PRESENTATION - 14**

**OPTIMIZATION OF USING DIFFERENT ANTIMICROBIAL SUSCEPTIBILITY AND CYTOTOXICITY ASSAYS HAS SIGNIFICANT EVALUATION OF NEW SCAFFOLD DRUG FOR MEDICINAL AROMATIC PLANT RESEARCH**

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The genus *Khaya senegalensis* (Desr.) A. Juss. (Meliaceae) is represented as the flora of Sudan. Species of *senegalensis*, locally named as “Dryzone-mahogany” in Khartoum, has been known to be used to treat jaundice, dermatophytosis, malaria, hookworm infection and other infections, colorectal cancer Sudanese folk medicine. In the present work, we have aimed to investigate antimicrobial activities of *Khaya senegalensis* (bark), the fractionation of these plant extracts was carried out by sequential use of solvents from high to low polarity, which result in the separation of the high-polar from less-polar constituents were used against *M. tuberculosis* strains H37Ra and H37Rv (American Type Culture Collection) harboring the pSMT1 plasmid, which carry the gene for *Vibrio harveyi* Luciferase (Mtb H37Ra-lux/Mtb H37Rv-lux), were grown at 37 °C for one week before experiment in Middlebrook 7H9 broth supplemented with albumin dextrose catalase (ADC, Becton Dickinson), 0.05% Tween 80 and 100 µg/ml hygromycin as selection antibiotic and also to test their antimicrobial selectivity against gram-positive and negative bacteria was conducted by using luminescent-assay. Furthermore, cytotoxicity effects were examined by using MTT and Calcein-assay using much different type of cells was tested. The chloroform fraction of *K.senegalensis* bark was evaluated by aforementioned assays, at the initial screening doses (125 and 6.25µg/ml). The chloroform fraction of *K.senegalensis* bark was found to inhibit growth of *M. tuberculosis* significantly ( $p < 0.001$ ). CFU plating and MGIT were performed as an alternative method to confirm this result. Cytotoxicity assays revealed that none of the examined active fraction possessed toxicity to human monocyte-derived macrophages or other cell types at the concentrations used.

In conclusion, these results encourage further investigations to identify the active compound(s) within the chloroform fraction of *K.senegalensis* bark towards *Mycobacterium tuberculosis*. We herein report the first study on afore-mentioned bioactivities of this genus against *Mycobacterium tuberculosis*.

**ORAL PRESENTATION - 15**

**DEVELOPMENT OF A CHRONOTHERAPEUTIC DRUG DELIVERY SYSTEM OF GYMNEMA SYLVESTRE AND ITS PRE-CLINICAL EVALUATION**

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*Gymnema sylvestre* is a potent antidiabetic plant used in folk, ayurvedic and homeopathic systems of medicine. It targets several of the etiological factors connected with diabetes and can combat both diabetes and obesity simultaneously. The objective of the current study is to apply technological advances in drug delivery to traditional medicine to synergize and hence maximize the benefits of both. The chronotherapeutic drug delivery is selected for “*gymnema sylvestre*” as diabetes requires a pulse of therapeutic concentration which will coincide with high blood sugar levels after taking circadian rhythms into consideration.

Several chronotherapeutic formulations were developed and optimized. The best drug loaded formulation was evaluated in the indigenously developed obese diabetic rat model. The biochemical parameters for diabetes and obesity viz fasting blood glucose level, serum insulin, glycosylated hemoglobin levels, cholesterol, triglycerides, LDL and VLDL were measured in accordance with standard protocol. Results showed that the therapeutic efficacy of the developed formulation was similar to the standard drug. Additionally the developed formulation when compared with the standard drug exhibited a curative action evidenced by the control of the blood sugar level even after stopping the drug administration. Further the developed formulation was therapeutically superior when compared to pure extract.

From the results it could be inferred that the chronotherapeutic drug delivery system of *Gymnema sylvestre* has a potential to control diabetes and obesity simultaneously with an additional advantage of patient compliance.



**ORAL PRESENTATION - 16**

**PANCREATIC LIPASE INHIBITORY CONSTITUENTS FROM *Morus alba* LEAVES AND OPTIMIZATION FOR EXTRACTION CONDITIONS**

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The leaves of *Morus alba* (Moraceae) have been traditionally used for the treatment of metabolic diseases including diabetes and hyperlipidemia. Thus, Inhibitory effect on lipid absorption and their active constituents of *M. alba* leaves were investigated in this study. Twenty phenolic compounds including ten flavonoids, eight benzofurans, one stilbene and one chalcones were isolated from the leaves of *M. alba*. Among the isolated compounds, morachalcone A (20) exerted strong pancreatic lipase inhibition IC<sub>50</sub> value of 6.2  $\mu$ M. Phenolic compounds containing a prenyl group showed moderate pancreatic lipase inhibition with IC<sub>50</sub> value of <50  $\mu$ M. Next, extraction conditions with maximum pancreatic lipase inhibition and phenolic content were optimized using response surface methodology with three-level-three-factor Box-Behnken design. Our results suggested the optimized extraction condition for maximum pancreatic lipase inhibition and phenolic content as ethanol concentration, 74.9%; temperature 57.4 °C and sample/solvent ratio, 1/10. The pancreatic lipase inhibition and total phenolic content under optimized condition were found to be 58.5% and 26.2  $\mu$ g GAE/mg extract, respectively, which were well matched with the predicted value.

In conclusion, phenolic constituents from *M. alba* leaves are effective in the regulation of fat absorption. In addition, optimization of extraction condition using response surface methodology suggested the great effect of ethanol concentration for maximum pancreatic lipase inhibition and phenolic content of *M. alba* leaves.

**ORAL PRESENTATION - 17**

**BIOASSAY-DIRECTED ISOLATION OF HYPOTENSIVE ALKALOIDS  
FROM HOLARRHENA PUBESCENS**

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Holarrhena pubescens belongs to the family Apocynacea, commonly known as “kurchi” is highly reputed in traditional medicine as a remedy for amoebic dysentery and other intestinal ailment. Bioassay-directed fractionation<sup>1</sup> of the ethanolic extract of Holarrhena pubescens resulted in the isolation of steroidal alkaloids (Holamide and Pubscinine).

In anaesthetized rats, the Holamide and Pubscinine caused a fall in blood pressure in a dose-dependent manner. Pretreatment of animals Atropine completely abolished the hypotensive response of Acetylcholine; whereas hypotensive effect of Holamide and Pubscinine were not modified by Atropine<sup>1</sup>. Similarly Acetylcholine produced contractile effect in guinea-pig ileum, which was antagonized by atropine, however both (Holamide and Pubscinine) failed to produced any stimulant response on guinea-pig ileum. These data indicate that the steroidal alkaloids i.e. Holamide and Pubscinine from Holarrhena pubescens mediated hypotensive response through a mechanism different to that of Acetylcholine.

**References**

<sup>1</sup>Aftab, K., Shaheen, F., Mohammad, F. V., Noorwala, M., Ahmed, V. U. Phyto-pharmacology of saponins from Symphytum officinale, AdvExp Med Biol 1996; 404: 429-442.

**ORAL PRESENTATION - 18**

**VEGETAL EXTRACTS INFLUENCE IN VITRO CELL-MEDIATED IMMUNITY IN CARNIVORES DEPENDING ON HEALTH STATUS, TARGET SPECIES AND PLANT TAXONOMY**

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Impaired immune response in individuals subjected to various stress factors lead to disease or low protective responses following vaccination, therefore modern immunology is seeking for alternative immune stimulating compounds for which plants could represent a source. The aim of this study was to establish the influence of several ethanolic vegetal extracts on in vitro cell-mediated reactivity in wild (mink, n=70, silver foxes, n=22) and domestic (dogs, n=32) carnivores and compare the responsiveness of these species under physiological (antigen-primed) and pathophysiological (aleutian disease of mink) conditions. Mink and foxes were primed with a 5% SRBC suspension (0.5 and 1 ml respectively), twice, 7 days apart and blood was sampled on days 0 and 14, while untreated dogs were sampled only once. Ethanolic extracts of *Calendula officinalis*, *Symphytum officinale*, *Arnica montana*, *Echinacea angustifolia* and *Echinacea purpurea* were tested for immune activity in whole blood cultures by the use of the in vitro blast transformation test, where cell growth was monitored spectrophotometrically, by the glucose consumption test and stimulation/inhibition indices (S/I) were calculated.

*E. angustifolia* acted stimulating in Aleutian disease positive (S/I SRBC primed 76.75±12.52%, non-primed 19.58±18.07) and foxes (S/I primed 20.28±21.27%, non-primed 20.13±13.10), while *S. officinale* was most stimulating (3.85±1.37%) in dogs in a statistically supported manner ( $p<0.01$ - $p<0.001$ ).

In conclusion, the results indicated the need of individualized immune stimulating therapies, based on species and health status in the studied species, with the prior identification of the most appropriate plant alcoholic extract for each species.

**ORAL PRESENTATION - 19**

**ROLE OF MEDICINAL PLANTS AND POPLAR BASED AGROFORESTRY IN IMPROVEMENT OF SOIL/CLIMATE AND SOCIOECONOMIC STATUS OF GROWERS**

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An experiment was conducted in a poplar based agroforestry system for working out the feasibility of growing medicinal plants as intercrops in semiarid condition of Northwestern India, also to ascertain the overall impact of the silvo-medicinal system on the climate improvement in terms of carbon dioxide fixation. Four shade loving, perennial medicinal plants were selected for the present investigation viz. *Glycirrhiza glabra* (mulathi), *Aloe vera* (gwarpatha), *Tinospora cordifolia* (giloe) and *Asparagus racemosus* (shatawari). Poplar was planted during 2007 in three different spatial arrangements i.e. 5x4 m, 10x2 m and 18x2x2 m. The medicinal crops grew significantly better, in closer spacings of poplar i.e. 5x4 & 10x2 m as compared to the wider spacing of 18x2x2 m and control.

Yield of all four crops was also maximum in 5x4 m spacing (65t/ha in aloe, .54t/ha in mulathi, .75t/ha in shatawari and .55t/ha in giloe) and decreased significantly in wider spacing and control. Quality parameters such as the total crude glycyrrhizin content for shatawari, the mucilage % and aloin content of aloe, the total bitter content for giloe and Saponin content for shatawari was more in 5x4m spacing of poplar and decreased significantly in wider spacing's and control.

Cultivation of shatawari was found to be most profitable (Rs. 113500/ha/yr), followed by aloe (Rs. 66000/ha/yr), mulathi (Rs. 20000/ha/yr).

Total carbon storage (t/ha) in poplar based Silvo-medicinal system and sole medicinal crop i.e. mulathi and aloe was maximum in 5x4 m spacing (111.6 t/ha), followed by 109 t/ha in 10x2 m, 93.4 t/ha in 18x2x2 m and 65.3 t/ha in control, after four years of plantation. The pH and electrical conductivity of soil decreased significantly irrespective of any spacing, showing the ameliorative effect of the silvo-medicinal system.

**ORAL PRESENTATION - 20**

**DOES FERTILIZER TYPE AND METHOD OF APPLICATION CAUSE SIGNIFICANT DIFFERENCES IN ESSENTIAL OIL YIELD AND COMPOSITION IN ROSEMARY (*Rosmarinus officinalis* L.)?**

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Seaweed extract is an organic fertilizer with potential beneficial effects on many crop plants. Here we investigate the impact of organic fertilizer on *Rosmarinus officinalis* measured by both yield and oil quality. Plants grown in a temperature-controlled greenhouse with a natural photoperiod and a controlled irrigation system were treated with seaweed fertilizer and an inorganic fertilizer of matching mineral composition. Treatments were either by spraying on to the foliage or watering direct to the compost. The essential oil was extracted by hydro-distillation with Clevenger apparatus and analysed by gas-chromatography mass-spectrometry (GC-MS) and NMR. The chemical compositions of the plants were compared.

Qualitative differences were found between fertilizer treatments and application methods. Sprayed seaweed fertilizer showed a significantly higher percentage of  $\beta$ -pinene, eucalyptol,  $\alpha$ -phellandrene,  $\alpha$ -terpinene (monoterpenes) and 3-methylenecycloheptene than other treatments. Italicene,  $\alpha$ -bisabolol (sesquiterpenes),  $\alpha$ -thujene, and E-isocitral (monoterpenes) occurred in significantly by higher percentage under treatment of watered in seaweed extract. Each was significantly different to the inorganic fertilizer and to controls. The seaweed treatments caused a significant increase in oil amount and leaf area as compared with inorganic treatments and control regardless of application method. The increased growth and oil yield are consistent with crop improvement in *Rosmarinus officinalis*.

**ORAL PRESENTATION - 21**

**MORPHOLOGICAL AND PHYSIOLOGICAL ANALYSIS OF STRAINS  
*CHLORELLA VULGARIS*, A PRODUCER OF RESINOID**

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The previously carried out comparative estimation of lichens and microalgae biochemical composition has shown that phenolic substances of these organisms are close. Therefore, the microalgae might be a source of resinoids, which are used as fixatives, odorants and colorants in food, cosmetic, fragrance goods. The main aim of the research was to investigate *Chlorella vulgaris* Beyerinck strains, which are perspective for biomass accumulation, and to analyze an innovative fragrant product in comparison with functional standards. The suspension cultures of *Chlorella vulgaris* Beyerinck strains IFR S-66, IFR S-11 and BIN were studied. The biomasses of these 3 strains in dynamics were studied. The methods common for the analysis of suspension microalgal cultures and fragrant products were used.

It was revealed the *Chlorella vulgaris* Beyerinck strain BIN has the highest biosynthetical activity as during its cultivation under the laboratory conditions it accumulates the biomass in 2-4 times quicker than strains IFR S-66, IFR S-111. The complex analysis of fragrant products is evidence of the possibility of the oakmoss resinoid replacement by the chlorella resinoid on all current directions of its usage.

**ORAL PRESENTATION - 22**

**CHEMICAL AND BIOLOGICAL EVALUATION OF TANNINS CONTENT OF TWO ARID BY-PRODUCTS: RACEMES AND DRIED PALM LEAVES**

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The aim of the present study is to evaluate chemically and biologically the tannins content of two arid by-products widely used by local farmers. The feedstuffs evaluated include racemes and leaves. Firstly, secondary metabolites (phenols, tannins, saponins and steroids) are qualitatively determinate. In the second time, tannin content of the two by-products is quantitatively evaluated by classical and biological methods. In the last procedure, the effect of polyethylene glycol (PEG, binding agent of tannins) is investigated on in vitro gas production, estimated in vitro organic matter digestibility (OMD) and metabolisable energy (EM). At same, the capacity of tannins to precipitate protein is measured in vitro.

Phytochemical analysis showed that feedstuffs don't contain steroids and saponins. However, they are rich in tannins. This result is corroborated to quantitative analysis, which shows that date palm leaves had the highest concentration of extractable phenols, total and condensed tannins; 61.8, 49.1 and 36.2 g/kg DM, respectively. The same trend is observed in protein precipitation test, the highest value is noted for date palm leaves (55.45 mm<sup>2</sup>/g DM) and the lowest for racemes (32.25 mm<sup>2</sup>/g DM). For both substrates, addition of polyethylene glycol (PEG) increased gas production. The best improvement was observed for racemes (30.6 units). At same, the inclusion of PEG ameliorate in vitro organic matter digestibility and also the high increment was noted for racemes (25.7 units). However, partitioning factor is reduced in presence of PEG.

These results indicate that the tannins content of these feedstuffs affected enzymatic activity of ruminale microbiata which limits their utilization by ruminants. Besides, this study demonstrated that the in vitro fermentation of these substrates was not only associated to the quality and proportion of tannin, but other plant factors also affect in vitro gas production and mask the effect of phenolic compounds in the bioassay test

**ORAL PRESENTATION - 23**

**PLANT GROWTH REGULATORS IMPROVE THE GROWTH POTENTIAL, NUTRITIONAL QUALITY AND ANTIOXIDANT SYSTEM OF *MORINGA OLEIFERA* L. UNDER DROUGHT CONDITIONS**

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The present study was conducted to induce drought tolerance in *Moringa oleifera* L. plants by applying foliar application of plant growth regulators (PGR). Benzylaminopurine (BAP; 50 mg L<sup>-1</sup>), ascorbate (50 mg L<sup>-1</sup>) and moringa leaf extract (MLE, 3%) were exogenously applied to moringa plants being grown at 100, 50 and 25% field capacity (FC) levels. It was recorded that moringa plants grew well at 50% FC exhibiting maximum shoot and root lengths and number of leaves while maximum roots were found at 25% FC. Moringa plants showed retarded growth at 25% FC while an improvement was observed when these were subjected to BAP and MLE foliar applications. Similar trend was recorded in chlorophyll and total phenolics contents i.e., BAP and MLE were statistically similar with each other followed by ascorbate. It is interesting to note here that moringa seedlings performed well at 50% FC while a reduced growth and nutritional quality was observed at 100% FC. A significant increase in antioxidant activities was exhibited by moringa plants with decrease in FC which was further improved by foliar applications of PGR. Maximum catalase and superoxide dismutase activities were recorded in BAP and MLE applied moringa plants at 50% FC while peroxidase activity was maximally recorded at 25% FC. An increase in crude protein (CP) and mineral contents (Ca, Mg, K and P) was recorded in moringa leaves subjected with foliar application of PGR under drought conditions. CP, Mg and K contents were maximally improved by MLE application followed by BAP while these both applications were statistically at par with each other to improve Ca and P contents. The present study concludes that moringa plants grows well at 50% FC and even can survive at 25% FC by applying PGR i.e., BAP and MLE.



**ORAL PRESENTATION - 24**

**ROSEMARY (*Rosmarinus officinalis* L.) CULTIVATION STUDIES UNDER ANKARA ECOLOGICAL CONDITIONS**

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*Rosmarinus officinalis* L. (rosemary), Lamiaceae, is an evergreen perennial bush native to Mediterranean coastal in Turkey. It has more than 20 varieties and different types having upright, creeper or twisted growth habit. The plant can be used as carminative, stimulant, cholagogue, digestant, diuretic, emmenagogue and laxative. The common traditional use of this plant is to manage with migraine, tiredness, defective memory and menstrual complaints. This research was conducted to select the rosemary lines having high biomass and essential oil content with wide adaptability to Central Anatolian climatic conditions. Plant materials were collected from six different provinces (Izmir, Aydin, Antalya, Mersin, Adana and Hatay) from western and southern coastal belts of Turkey. The rooted cuttings were planted and grown to an experimental field of Ankara University, in 2012. The plantation was established with augmented-design trial technique with three references. The observations and measurements were taken from 48 lines, one-year old plantation, in 2013.

The results were as follows; the plant height ranged from 11.0 to 17.9 cm, the number of branch was 9.6-20.3, the fresh herb yield per plant was between 201.7 - 421.5 g and the dry herb yield was 59.5 -137.6 g. The green leaf yield ranged from 151.0 g to 317.0 g and the dry leaf yield was 41.5-97.0 g. The leaf ratio was recorded as 70.8-82.3% and the essential oil content was 0.35-2.08%. Wide variation was observed among the lines considered into their biomass and essential oil yield. Line 7, Izmir origin, has the highest essential oil yield.

**ORAL PRESENTATION - 25**

**THE EXTRACT OF *SIDERITIS SCARDICA* GRISEB. EXERTS ANTIPROLIFERATIVE ACTIVITY IN HUMAN COLORECTAL CARCINOMA CELLS**

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The genus *Sideritis* (Lamiaceae) includes more than 150 plant species found in the Balkans, Mediterranean region, Madeira and Canary islands. *Sideritis scardica* Griseb. is Balkan endemic plant species, grown already in experimental fields in Sofia with seeds from the Pirin Mountain, Bulgaria. Our study is aimed at the determination of new antiproliferative activity of *S. scardica* extract in HCT-116 human colorectal carcinoma cells. In order to evaluate the quality of the extract, the total content of phenolic compounds was estimated by the Folin-Ciocalteu method. *S. scardica* (aerial parts) extract contained 198±11 mg GAE/g extract that confirmed high quality of the extract. After that, the antiproliferative activity of *S. scardica* was analyzed in human colorectal carcinoma cells by the sulforhodamine B (SRB) colorimetric assay. After the treatment of HCT-116 cells for 48 hrs with *S. scardica* extract at a concentration of 50 µg/mL the cell viability decreased to 53%, and after 72 hrs cell death occurred in 68% of the cells (the values are average of 2 experiments made in 6 replicas).

Our results suggest that *Sideritis scardica* Griseb. is medicinal plant species with antiproliferative properties that are perspective to be studied in the future for the prevention of the colon cancer.

L.N. Evstatieva and K.I. Alipieva (2012). Conservation and sustainable use of threatened medicinal plant *Sideritis scardica* in Bulgaria. *Acta Hort.* 955, 89-92.

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**ORAL PRESENTATION - 26**

**IN-VITRO MECHANISM OF METHANOL EXTRACTS OF LEAVES OF FICUS SPECIES AS ANTI-DIABETIC POTENTIALS**

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The objective of the present study was to evaluate in vitro anti-diabetic potentials of methanol extracts of leaves of *Ficus microcarpa*, *Ficus hispida* and *Ficus mollis*. The methanol extracts of *F. microcarpa* (FMcME), *F. hispida* (FMHE) and *F. mollis* (FMoME) have been studied for in-vitro  $\alpha$ -glucosidase and  $\alpha$ -amylase inhibitory assays. In vitro  $\alpha$ -glucosidase extracted from the intestine homogenate of mouse was used for  $\alpha$ -glucosidase inhibitor assay and pancreatic amylase enzyme was used for in vitro  $\alpha$ -amylase assay. The half maximal inhibitory concentration (IC<sub>50</sub>) values were calculated in both the methods. The methanol extracts were also studied using in vitro glucose uptake by isolated rat hemidiaphragm model. All the three methanol extracts were found to be effective in inhibiting the activities of  $\alpha$ -glucosidase and  $\alpha$ -amylase with good IC<sub>50</sub> values and the effect was comparable to positive control groups (Acarbose and Nojirimycin respectively). In other method in vitro glucose uptake by isolated rat hemidiaphragm model, the methanol extracts were significantly increased glucose utilization by skeletal muscle and the effect was comparable to insulin treated group. The results obtained in the present study suggest that methanol extracts of *Ficus microcarpa*, *Ficus hispida* and *Ficus mollis* possess significant of  $\alpha$ -glucosidase and  $\alpha$ -amylase (carbohydrate digestive enzymes) inhibitory activities which can help to reduce postprandial blood glucose. The methanol extracts were also increased the peripheral uptake of glucose by hemidiaphragm muscle which can reduce insulin resistance. This study endorses the use of the plants for further studies with respect to the isolated compounds which involved in these mechanisms and to determine their potential for managing type II diabetes.

**ORAL PRESENTATION - 27**

**PHYSICOCHEMICAL AND ANTIOXIDANT STUDY OF BLACK MULBERRY FRUITS (*MORUS NIGRA*) IN THE REGION OF TIARET (ALGERIA)**

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The purpose of this study was to determine the physicochemical parameters and the antioxidant activity of the fruits of black mulberry (*Morus nigra*) in the region of Tiaret. Physicochemical analyzes revealed that these fruits are rich in water (47.58%), soluble solids (20%), total polyphenols (197.57 mg GAE / g extract) , total and reducing sugars (8.13%, 5.18% ), dietary fibers (4.13%) and ash (0.99%). However, they are low in fat (0.625%) and pectin (0.35%). Their pH is around 5.23 corresponding to a titratable acidity of 2.38%.

The antioxidant activity of the methanol extract of the fruit measured by the method of FRAP (Ferric Reducing Antioxidant Power) showed a significant antioxidant potential which is 4.16 mg AAE / 100g.

The methanol fraction presented an interesting antioxidant activity (IC 50 = 0.44 mg EAA / ml of extract) and is similar to the ability of DPPH radical scavenging of ascorbic acid whose CI = 0.46 mg / ml.

**ORAL PRESENTATION - 28**

**ESSENTIAL OILS FROM APIACEAE AS VALUABLE RESOURCES IN NEUROLOGICAL DISORDERS**

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Among many species that contain essential oils, the plants from Apiaceae family are also used as spices in food. Besides their use in food industry, some Apiaceae were proven to be pharmacologically active as raw material, special extracts (phytocomplex) or isolated substances. Due to the increase number of neurological disorders the scientific trend is currently oriented in finding new resources and methods to prevent or treat such health problems (Alzheimer, Parkinson etc.). Within our recent research we used rodent models with induces Alzheimer to establish the antidementive and antioxidant effect of some essential oils isolated from *Coriandrum vulgare* var. *microcarpon*, *Pimpinella anthriscus* and *Foeniculum vulgare*. Our results indicated that analyzed volatiles administered by inhalation to white male Wistar rats with beta amyloid induced Alzheimer have notable anxiolytic and antidepressant effects, as well as a good antioxidant potential both in vitro and *in-vivo*.

In conclusion, the investigated volatiles used frequently might develop important pharmacological effects. Therefore, the co-existence of anxiolytic, antidepressant-like effects plus antioxidant properties suggest that volatiles obtained from the investigated plants might be used to prevent and treat minor to mild neurological disorders.

**ORAL PRESENTATION - 29**

**SESQUITERPENOIDS FROM *NECTANDRA MEGAPOTAMICA* (LAURACEAE) FROM RIO GRANDE DO SUL, BRAZIL**

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The *Nectandra* Rol. ex Rottb is among the most important genera of the Lauraceae family in number of species. This genus is restricted to tropical and subtropical America and it is represented by 114 species recognized to date being 43 native to Brazil.<sup>1,2</sup> Continuing in our studies of active metabolites of native plants of Rio Grande do Sul, Brazil, in this paper we present five new sesquiterpenoids oxides, called nectandrene A,-B, -C, -D and E (1-5), isolated from the essential oil of the leaves of *Nectandra megapotamica*. Their structures were elucidated by spectroscopic analysis, and the relative stereochemistry of 1-5 was proposed by its NOESY spectrum. The isolated compounds, 1, 2, and 5 displayed significant antimicrobial activity, being compound 2 the most active with MIC values between 6.25 and 25.0  $\mu\text{g mL}^{-1}$  against some tested bacteria, and antifungal activity with MIC values between 12.5 and 25.0  $\mu\text{g mL}^{-1}$ .

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**ORAL PRESENTATION - 30**

**THE MIDDLE EASTERN MEDICINAL PLANT PROJECT (MEMP):  
PRESERVING KNOWLEDGE, CONSERVING SPECIES, RE-  
INTRODUCING EXTINCT FLORA & DEVELOPING NEW MEDICINES**

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**Aims** Constructing an ethno-botanical database of Israeli flora, domesticating medicinal and other important economic Middle-Eastern flora, evaluating selected plants for activity using focused screening and reintroducing extinct species through germination experiments.

**Methods** An ethno-botanical database constructed from an archival collection of local medicinal plant use, in conjunction with other historical source material was used to select species for focused screening. Plants were derived from a domestication program at Kibbutz Ketura and from wild sources. Ancient seeds obtained from archaeological sites were used in germination experiments with radiocarbon dating of seed fragments.

**Results** From 1995, 500 local species were added to the database and over 200 plants, shrubs and trees domesticated at the experimental cultivation site including rare/ endangered species. Based on historical use screening of some 200 plants demonstrated significant activity in selected species against cancer<sup>1</sup>, Alzheimer's and viral, bacterial and fungal infections (human and veterinary). Growth of a 2000 year old date seed enabled re-introduction of the ancient Judean date palm extinct for a 1000 years.<sup>2</sup>

**Conclusion** By preserving traditional knowledge, domesticating selected species and focused screening, MEMP provides a valuable tool for conservation and the development of potentially important economic species for medicine, veterinary and agricultural purposes.

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**ORAL PRESENTATION - 31**

**SURVEY OF SOME IMPORTANT NEPALESE ANTI-DIABETIC HERBS**

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Diabetes has posed a great threat to the human health worldwide, both in developed and developing countries. The diseases has basically the root on the dramatically changed way of living of the present day human civilization as our living has deviated from what the nature has adapted us for. In this context, due to availability of wide range of climatic condition and hence the wide spectrum of biodiversity, Nepal is blessed with a valuable reservoir of medicinal herbs. These assets have been utilized and developed through time practices in traditional medicines and Ayurvedic way of treatment over several thousand years in the region. It has been established since ancient time that each and every plant has a specific medicinal value. There are many plants' products which have been utilized in Ayurvedic medicine for the effective treatment of diabetes. The medicaments are less expensive and pose practically no side effects. In this work, we report a general survey of anti-diabetic properties of some medicinal herbs with pronounced effects and their applications. The plants covered in this study are originate from far western region of Nepal and include *Ficus racemosa*, *Momordica charantia*, *Azadirachta indica*, *Helicteres isora*, *Saraca asoca*, *Ichnocarpus frutescens*, *Tinospora sinensis*, *Commiphora mukul*, *Coccinia grandis*, and *Hippophae salicifolia*.



**ORAL PRESENTATION - 32**

**GENETIC DIVERSITY AND CONSERVATION MEASUREMENTS OF THE MEDICINAL PLANT HAWTHORN (*CRATAEGUS* L. - ROSACEAE) IN THE SW ASIAN REGION**

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The SW Asian region is one of the most important hot spots in respect of plant diversity. *Crataegus* L. (Rosaceae) is represented in extensive diversity at specific, infraspecific and population levels in this region. Hawthorns are widely used as medicinal plants as well as food plants by local peoples. The leaves, flowers and immature fruits have been used for the treatments of various kinds of heart problems by local people or traditional healers. Hence, many of the species are subject to extensive scientific research for flavonoids and anthocyanin activities or measuring amounts of the active compounds.

The genus is represented by c. 40 species in the SW Asian region (including Turkey, the Caucasus, Iran, and the Middle East). Turkey is the richest country among them by having 27 *Crataegus* species seven of which are endemic to Turkey at species level. Among them, *C. turcicus* Dönmez is in CR category, *C. peshmenii* Dönmez and *C. christensenii* Dönmez are at EN, *C. yaltirikii* (Dönmez) Dönmez is at NT and *C. tanacetifolia* (Poir.) Pers., *C. × bornmuelleri* Zabel ex K.I.Chr. & Ziel. are at LC threat categories according to the IUCN threat categories. Based on the extensive field surveys in Turkey, Iran and the countries in the Middle East, and herbarium studies, the species have been evaluated in respect of actual threats, and the measurements have been also proposed for conserving them.

**ORAL PRESENTATION - 33**

**INTRODUCTION OF NEW ANALYTICAL AND QUANTITATIVE APPROACHES FOR THE PRODUCTION AND CONSERVATION OF MEDICINAL AND AROMATIC PLANTS FOR ECONOMIC DEVELOPMENT OF PAKISTAN**

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This study examined opportunities to maximize farm income through introduction of high value medicinal and aromatic plants (MAPs) in the war-stricken district of Swat. The hypothesis is that establishment of ex-situ experimental production plots will lead to the development of skills in horticultural production and marketing among people in the valley and help rebuild commercial connections between this region and the rest of Pakistan. The project involves a substantial agricultural extension component with farmers in three villages. The project has covered a range of interventions such as local awareness campaigns, capacity-building training, and community mobilization for conservation of threatened species, formation of MAPs. Producer Associations who are directly linked to big buyers for maximizing their net income. Moreover, the project has also establish demonstration plots of the selected high value MAPs for economic analysis/feasibility (in terms of cost comparisons/opportunity cost between cultivation of cereal/cash crops and the selected high value MAPs and regular monitoring and evaluation of the adoption by farmers of improved agricultural practices. Additional emphasis has been placed on developing reliable marketing channels. The study has incorporated evaluation of its performance in introducing standardized production technology and appropriate post-harvest management, which represent the prime ‘engines of growth’ for the local economy. These strategic economic development areas are entirely based upon, and closely interlinked, with the management and conservation practices of high value MAPs, and intact landscapes.

**ORAL PRESENTATION - 34**

**AN OVERVIEW ON PLANTS USED AS MEDICINE BY MOROCCAN SOCIETY TO CURE DIFFERENT AILMENTS: ETHNOBOTANICOPHARMACOLOGICAL APPROACH**

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In recent years there has been a great surge of public interest in the use of herbs and plants. Some scientists have viewed this phenomenon as a modern “herbal renaissance”. As scientific approach, the ethnopharmacological investigation remains the principal way to improve, evaluate, and increase the odds of finding of biologically active compounds derived from medicinal plants.

The objectives of the present study are twofold: first, to highlight the state of the medicinal plants used by Moroccan people. Second, is to assess and correlate the levels of knowledge of the local medicinal flora to the research on medicinal plants to attempt to build capacity for research within Moroccan Scientific community at rate of developing country

**Methodology:** In this retrospective work, we analysis 26 relevant ethnopharmacological studies carried out in different region of Morocco. The most illnesses and medicinal plants used to treat these problem healths have been gathered. A statistical method (AFC: Analysis factorial Component) have been applied to analyze in-depth the results. Quantitative comparative analyses were accomplished through informant consensus factor (ICF), Knowledge Richness Index (KRI) and Knowledge sharing Index (KSI).

The results indicate that more than 623 medicinal plant species commonly used by Moroccan people have been inventoried. More than 4000 ethnomedicinal practices have been recorded.

**Conclusion:** this first synoptically examined the medicinal plants used by population in different region of Morocco with cross-cultural consensus. The analysis of the data suggest that while large numbers of plants are used medicinally in each area, there is a low inter regional consensus and high variation between medicinal plants used in different region of Morocco.

**ORAL PRESENTATION - 35**

**SELECTIVE EXTRACTION OF PHYTOCONSTITUENT FROM PLANT EXTRACT USING HUMAN SERUM ALBUMIN FUNCTIONALIZED MAGNETIC NANOPARTICLES**

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Human serum albumin (HSA) functionalized magnetic nanoparticles (MNPs) were prepared to selectively extract, isolate and identify bioactive saponin ligands that bind to HSA in herbal extract of *Tribulus terrestris*. Preparations made from extract of *Tribulus terrestris* have been used for long time to prevent and treat urinary tract infection/partial obstruction. A group of steroidal saponin, Terrestrosin A-E, Terrestrosin F-K, Neotigogenin, and Diosgenin present in the plant are believed to be the main active constituents. Magnetic nano-particles (MNP) were prepared using co-precipitation method. MNP are silica coated with tetraethyl orthosilicate. The silica coated MNPs were amino functionalized by APTES (aminopropyltriethoxysilane) and human serum albumin was immobilized on APTES modified Fe<sub>3</sub>O<sub>4</sub>@SiO<sub>2</sub>. The prepared particles were characterized by microscopic, particle size, FTIR and thermal analysis. The objective is to develop biofingerprint chromatogram of the extract of *Tribulus terrestris* using prepared HAS functionalized MNPs.

**ORAL PRESENTATION - 36**

**AMELIORATING YIELD AND THE COMPOSITION OF ESSENTIAL OIL OF *EUCALYPTUS CITRIODORA* HOOK. USING RADIOLYTICALLY DEPOLYMERISED SODIUM ALGINATE**

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*Eucalyptus citriodora* is highly valued for its citronellal-rich essential oil (EO) extracted from its leaves. Citronellal is mainly used for synthetic production of menthol and citronellol. *Eucalyptus* oil is widely used in many perfumery and pharmaceutical formulations. Hence, escalated oil production of Eucalyptus is the need of hour. We developed a new agricultural technique to achieve the goal. Application of biologically active oligosaccharides, derived from gamma irradiated polysaccharides, such as sodium alginate (SA), proved to be potent plant growth promoters. Gel-Permeation-Chromatography of SA was performed after irradiating it using Co-60 gamma rays at 520KGy. A pot experiment was conducted to study the effect of foliar application of irradiated SA (ISA) on active constituents and growth, biochemical and yield parameters of Eucalyptus. ISA sprays were started at 6 months old plants. Totally, 5 sprays were carried out with an interval of ten days. The treatments were: deionized water (control), unirradiated SA 30, ISA 30, 60, 120 and 240 mg L<sup>-1</sup>. Eucalyptus EO was analyzed using GLC. Treatment 60 mg L<sup>-1</sup> (ISA-60) showed the highest value for most of the parameters studied. It increased the EO content (33.3%), EO yield (33.5%), citronellal content (35.0%) and citronellal yield (167.7%) as compared to control.

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**ORAL PRESENTATION - 37**

**NOVEL OPHTHALMIC DRUG DELIVERY SYSTEM FOR FORSKOLIN**

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Forskolin, a major diterpenoid from the indian plant *Coleus forskolii* is reported to be useful in glaucoma. The aim of this research work was to isolate forskolin and formulate a novel ophthalmic drug delivery system of the same. Forskolin was isolated using simple liquid extraction method and purified by column chromatography.

Ocuserts were prepared using different polymers such as cellulose acetate, hydroxy propyl methyl cellulose, carboxy methyl cellulose sodium and pluronic in concentrations of 1%, 2% and 5 %. 2% polymer concentration was found to be satisfactory.

Forskolin solution was added to the polymer solution and casted on to a smooth stainless steel trough to obtain films from which circular patches of 7 mm were cut and packed in a poly glassine foil of 80 GSM and sterilized using radiation at 25,000 rads. Each ocusert contained 2 mg of forskolin.

The ocuserts showed sustained release in vitro. Cellulose acetate ocuserts showed a release up to 7.5 hrs. Rabbits were used as the animal model to study the anti-glaucoma activity. The anti- glaucoma activity of forskolin ocuserts were compared with timolol eye drops as a standard and found that they exhibited prolonged activity for a period of over 24 hrs and unilateral reduction of IOP whereas timolol eye drops showed activity for 6 hrs and bilateral reduction in IOP.

In conclusion, Forskolin ocuserts were promising as novel drug delivery systems to treat glaucoma and can be further investigated.

**ORAL PRESENTATION - 38**

**A CALIBRATION FOR FAST SPECTRAL ASSESSMENT OF LAUREL (*Laurus nobilis* L.) POPULATION FOR SELECTION BREEDING USING FT-NIRS**

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Using of the genetic resources is needed to know what variation exists in gene banks for improvement the utilization of the valuable features. That's why definition and the characterization of the populations via different techniques is the first step of the selection breeding. The proportion and also the components of the active ingredients of medicinal and aromatic plants is an important selection criteria. However, this requires too much labor and time for a huge natural population. Laurel which is one of the most important medicinal plant of Mediterranean flora is counted about 1.5 million only in Hatay province. Near infrared reflectance spectroscopy (NIRS) is a nondestructive, advanced and environmentally friendly system which can predict numbers of properties of the samples only in minutes with a small amount of samples without spoiling. Dried and grounded Bay Laurel leaf samples from different locations were scanned on a Fourier-Transform near infrared (FT-NIR) spectrophotometer. The measurements were performed in a glass petri dishes containing about 10-15 gr of homogenized sample for 12 individuals. Absorbance points were obtained with the electromagnetic scan on the reflectance mode from 4000 to 10000 cm<sup>-1</sup> wavelength with a spectral resolution of 4 cm<sup>-1</sup>. The essential oil of the samples was obtained by hydro distillation of dried leaves for 3 h using a Clevenger-type apparatus. GC-MS analysis was performed for the components of essential oil on a Thermo Scientific ISQ instrument. The chemometric software NIRCal was used to create models. Partial least squares (PLS) regression of NIR spectra combined with these analytical reference data yield the development of calibration models for prediction the contents. The performance of the calibration was expressed in terms of coefficient of determination (R<sup>2</sup> CAL), root mean square error of calibration (RMSEC). The overall error between the modelled and reference values was assessed by the root mean error of prediction (RMSEP).

**ORAL PRESENTATION - 39**

**STABILITY AND PHYSICO-CHEMICAL CHANGE OF OLIVE OILS  
FLAVOURED BY AROMATIC PLANTS CASE: *Ocimum basilicum* and  
*Origanum vulgare***

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Changes in the physico-chemical parameters and heat stability of olive oil flavoured by two aromatic species plants (*Ocimum basilicum* and *Origanum vulgare*) were investigated. The aerial parts of dried plants were added during crushing and after crunching olive oils at a rate of 5% (w/w). Likewise the phenolic extracts for *Origanum vulgare* were added to olive oils at the same concentration (equivalent to 5% of the plant). The samples (150 ml of olive oil) were taken every three hours (3h) at the first twenty-four hours (24h) and every twelve hours (12h) beyond twenty-four hours (24 hours) up to seventy two hours (72h). The resistance to oxidation of selected flavored oils was compared to a control samples by measuring free acidity, peroxide value (PV), specific extinction values (K232 and K270), color measurement, viscosity and phenol contents. The results show that the addition of aromatic plants causes some a slight increase in free acidity, peroxide value and phenol contents. Heat stability results shows that the oils flavored after crunching by aromatic plants or phenol extracts from *Origanum vulgare* seem better protected against oxidation reactions.



**ORAL PRESENTATION - 40**

**MORPHOLOGICAL AND ECOPHYSIOLOGICAL CHARACTERIZATION TO STUDY THE GENETIC DIVERSITY OF DIFFERENT POPULATIONS OF CORK OAK (*QUERCUS SUBER*) IN TUNISIA**

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The determination of the diversity of Cork oak tree (*Quercus suber* L.) could be a key factor in understanding the response to climate change. This experiment was carried out on 16 stands of Cork oak. Two areas were identified: The Kroumirie and Relicts areas. We try to understand through this study how these populations persist under adverse conditions (water and temperature stress) to provide valuable background information for the development of appropriate strategies for their conservation and management and to estimate the spatial variability of population growth of Cork oak belonging to two different areas. The climate effect study on leaf mass per area (LMA), dendrometric parameter (diameters in 1,30m (DBH) and height) and nitrogen content (N%) were considered. We observed a significant differences in LMA according to altitude and temperature, highest values were obtained in the sites with a high altitude and low temperatures. There are also a significant correlation between dendrometric parameters and LMA. For nitrogen content, we found negative correlations with LMA values, they are lower in drier and colder sites.

**ORAL PRESENTATION - 41**

**EFFECT OF SEAWEED EXTRACTS ON GROWTH PARAMETERS AND PEROXIDATION ACTIVITY IN AERIAL PARTS OF *SALVIA OFFICINALIS* L.**

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*Salvia officinalis* L. is a medicinal plant containing several compounds with important pharmacological activity. The leaves of sage (*Salvia officinalis* L., Lamiaceae) are reported to have a wide range of biological activities, such as anti-bacterial, fungistatic, virustatic effects. In this study, we investigated the effects of seaweed liquid extracts of *Fucus spiralis* and *Ulva rigida* on *Salvia* plants submitted or not to water stress (moderate and severe stress). The low concentration of *U. rigida* and *F. spiralis* extracts offered the better result on plant aerial development, photosynthetic pigment concentration such as chlorophyll 'a', chlorophyll 'b', total chlorophyll and the dry weight compared to other concentrations. Hence, plant height increased by 40% and 15% respectively compared to control after application of *Ulva rigida* 50% and *Fucus spiralis* 25% algal extracts. Total chlorophyll amount was doubled when the plants were sprayed with *Ulva rigida* (50) % and *Fucus spiralis* (25%) respectively.

Water deficit effect on *S. officinalis* L. was notably reduced by the application of seaweed extracts. Thus, under moderate stress, the plant showed an important reduction of total chlorophyll (55.34%) compared to plant treated with *U. rigida* extract (32%) and *F. spiralis* (33%). The lipid peroxidation was low pronounced in plants stressed and treated by seaweed extract. Hence, low content of malondialdehyde (MDA) (7.30  $\mu\text{M g}^{-1}$  FW. and 5.7  $\mu\text{M g}^{-1}$  FW.) was exhibited in plant stressed and treated with 50% of *U. rigida* extract and 25% of *F. spiralis* extract, respectively, compared to plant controls (13.99  $\mu\text{M g}^{-1}$  FW).

In conclusion, Seaweed extracts applied at *Salvia* plants showed higher vegetative growth, reduced the water deficit effect and enhanced the antioxidant activities which protected the plant against peroxidation imposed by water stress. These data suggests that seaweed extract can be applied as natural fertilizer in agricultural sector.

**ORAL PRESENTATION - 42**

**MORPHOLOGICAL AND CHEMICAL DIVERSITY USING THE HPTLC FINGERPRINTING OF THE WILD AROMATIC APIACEAE *MAGYDARIS PASTINACEAE* (SYN. *TOMENTOSA*) L. GROWING IN NORTH OF TUNISIA**

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*Magydaris pastinaceae* (Desf.) DC. [syn. *M. tomentosa*] belongs to the Apiaceae. A biannual plant which originated from Mediterranean region which is valued for its aroma, medicinal and therapeutic properties. A little knowledge is available about its chemical composition. The analysis of morphological and chemical diversity of this species can help in its conservation, sustainable use and possibly its culture.

In this research a morphological study based on morphologic descriptors such as: size, number of umbels, number of rays, number of leaves etc. The chemical study focus to reveal the influence of genetic and environmental factors on the production of secondary metabolites in *M.pastinaceae* such as polyphenols, flavonoids and coumarins. All analyses were made from plants. Fresh plant material were collected in the same season and sampled in 12 Tunisian different geographical sites in the Northern part. The HPTLC (A high-performance thin-layer chromatography) method was developed using a suitable mobile phase to detect the polyphenols on methanolic extracts and coumarins on heptanic extracts.

In Conclusion, HPTLC fingerprint showed a great variability in the number of bands for each accession and between samples in the same accession for the both extracts especially in fruits and leaves. The number of bands is generally homogenous in the flowers and in the roots. We can report utility of the high-performance thin-layer chromatography fingerprint in determination of different populations of the same species and of different drugs of the same plant. The study of the intraspecific variability was evaluated in the aromatic apiaceae *Magydaris pastinaceae* for the first time.

**ORAL PRESENTATION - 43**

**ETHNOBOTANICAL STUDY AMONG THE POPULATION OF THE FAR NORTH EAST OF ALGERIA: THE MUNICIPALITIES OF EL KALA'S NATIONAL PARK (NPEK)**

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As part of the promotion of medicinal plants, an ethnobotanical study was conducted among 600 herbalists of the National Park of El Kala, Wilaya of El Tarf, a forest area where plants are frequently used in traditional medicine.

The survey was conducted during the period 2011 to 2014, 40 plants has been identified, used in the treatment of various diseases by the local NPEK population, which are mainly collected in spring.

Our study showed that the leaves are the most used part of the plant; the majority of therapeutic recipes are prepared as an infusion.

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**ORAL PRESENTATION - 44**

**ROLE OF ULVA RIGIDA AND FUCUS SPIRALIS EXTRACT IN ALLEVIATION OF SALINITY STRESS**

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Seaweeds are potentially excellent sources of highly bioactive materials that could represent useful leads in the alleviation of salinity stress (Wael M. Ibrahim and al, 2014). Our objective was to evaluate the potential of two macroalgae species *Ulva rigida* and *Fucus spiralis* collected from the coastal area of Morocco in order to improve growth plant. The proximate composition, proteins, lipids, polyphenol, mineral element, pigments, amino acid contents were determined.

The result showed that protein content of *F. spiralis* (10.96 % DW) was significantly higher than that of *U. rigida* (9.28 % DW). The two seaweed species contained lipid at a rate of (2.54–2.83% DW) and total phenol (0.78 – 0.99 % DW) respectively. They were also rich in Mg, K, Ca and Aspartic acid but low in Na and Cl. Carotenoid quantities was significantly higher in *U. rigida* (92.9 mg/g DW) compared to *F. spiralis* (83.6mg/g DW).

In conclusion the bioactive components in *U. rigida* and *F. spiralis* extract such as betaine and proline could potentially participate in the alleviation of salinity stress. Therefore, algal foliar application is proved to be an effective technique to improve the growth of bean, tomato and wheat seedlings under salt stress conditions.

**ORAL PRESENTATION - 45**

**IN VITRO AND IN SILICO ANTICANCER ACTIVITY OF AMMONIUM GLYCYRRHIZINATE ISOLATED FROM ROOTS OF GLYCYRRHIZA GLABRA LINN.**

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*Glycyrrhiza glabra* Linn.[ Fabaceae], commonly known as yashtimadhu, mulhatti, is used as medicine for treatment of various ailments in Traditional System of Medicine fairly throughout the greater part of India. In the present study we have evaluated anticancer activity of Ammonium glycyrrhizinate by in vitro and in silico method. Ammonium glycyrrhizinate was isolated from roots of *G.glabra* and was characterized by UV,IR, <sup>1</sup>H-NMR, <sup>13</sup>C-NMR and Mass spectrum. In vitro anticancer activity was done using HeLa cell lines by MTT assay at different concentrations ranging from 20-100 µg/ml using microtitre plate assays by ELISA and in silico docking studies using enzyme EGFR tyrosine kinase. The IC<sub>50</sub> value was found to be 282.45 µg/ml in in vitro anticancer activity in HeLa Cell lines. Ammonium glycyrrhizinate was subjected to molecular docking studies for the inhibition of the enzyme EGFR tyrosine kinase, which is one of the targets for inhibition of cancer cells. It has shown -11.03 kJ mol<sup>-1</sup> binding and -12.47 kJ mol<sup>-1</sup> docking energy with five hydrogen bonds. We can conclude that ammonium glycyrrhizinate has shown to possess anticancer activity both in vitro and in silico studies.

**ORAL PRESENTATION - 46**

**PHYTOCHEMICAL AND BIOLOGICAL STUDY OF *HYPERICUM SINAICUM* HOCHST**

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The antioxidant and antimicrobial potentials of petroleum ether extract (PEE) and methanolic extract (ME) of *Hypericum sinaicum* Hochst. were evaluated and their chemical composition were identified. GC/MS analysis of the PEE (0.4% w/w) revealed the presence of 17 compounds, eugenyl acetate (32.90%) was the major component. HPLC/MS analysis of the phenolic acid fraction of ME revealed the presence of 14 phenolic acids; p-hydroxy benzoic and chlorogenic acids were the major constituents (75.22, 70.27 mg/ 100 g dry sample, respectively). HPLC/MS analysis of flavonoid contents of ME revealed the presence of five flavonoid compounds, apigenin and quercetin 3-O- galactoside were the major constituents (120.25 mg/ 100 g dry sample and 88.48 mg/ 100 g dry sample, respectively). The antioxidant activities of PEE, phenolic acids and flavonoid fractions were evaluated using DPPH assay<sup>1</sup>, and total antioxidant capacity was determined in terms of GAE (gallic acid equivalents). The antimicrobial activities of PEE, phenolic acids and flavonoid fractions were examined by means of the disk diffusion method and MICs were determined by broth dilution method<sup>2</sup>. Petroleum ether extract, phenolic acids and flavonoid fractions of aerial parts of *Hypericum sinaicum* Hochst. exhibited significant antioxidant activity and antimicrobial effect against the selected microorganisms.

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**ORAL PRESENTATION - 47**

**PHYTOCHEMICALS AS ANTICANCER AGENTS: A REVIEW**

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Cancer is a major public health burden in both developed and developing countries. There are four main types of gene involved in cell division. Most tumours have faulty copies of more than one of these genes i) Oncogenes ii) Tumour suppressor genes iii) Suicide iv) DNA-repair genes. Every year about 8,50,000 new cancer cases being diagnosed, India resulting about 5,80,000 cancer related death every year. India had the highest number of the oral and throat cancer cases in the world. Every third oral cancer patient in the world is from India. In males Oral, Lungs and Stomach cancers was the three most common causes of cancer incidence and death whereas In females Cervical, Breast and Oral cancers were the three main causes of cancer related illnesses and death. The three leading cancer killers are (i) Lung cancer responsible for 17.8 per cent of all cancer deaths. (ii) Stomach 10.4 per cent (iii) Liver 8.8 percent. Industrial nations with the highest overall cancer rates include: U.S.A, Italy, Australia, Germany, The Netherlands, Canada and France.

Developing countries with the lowest cancer were in Northern Africa. Anticancer activity is the effect of natural and synthetic or biological and chemical agents to reverse, suppress or prevent carcinogenic progression. Several synthetic agents are used to cure the disease but they have their toxicity and hence the research is going on to investigate the plant derived chemotherapeutic agents. Plant materials was been used for the treatment of malignant diseases for centuries. Recent phytochemical examination of plants which have a suitable history of use in folklore used in the treatment of cancer had induced and resulted in the isolation of principle compound with antitumor activity.

Therefore an attempt has been made to review anticancer medicinal plants of Indian origin belonging to 35 families along with detailed information regarding part used, extract used, type of the model used, types of tested cancer cell lines, etc. These plants continue to be used against various types of tumour such as sarcoma, lymphoma, carcinoma and leukemia.



**ORAL PRESENTATION - 48**

**EFFECT OF STAGE OF MATURITY AND CULTIVARS ON CHEMICAL CONSTITUENTS OF *HIBISCUS SABDARIFFA* GROWN IN SUDAN**

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Roselle is a perennial shrub grows in tropical and subtropical regions. In Sudan it is grown in rain fed areas in large scale and it is cultivated in small scale in irrigated areas. Almost any part of the plant can be utilized but calyces valid as the main item of commerce. Its calyces contain organic acids, minerals, pectins, carbohydrates and anthocyanins. Roselle has been recorded to have many medicinal uses as hypotensive, diuretic, antibacterial, antifungal, relaxant and antispasmodic activity. It is also used as food colorants [1]. The effect of three stages of maturity, namely premature stage, mature Stage and overmature stage , on the performance of four cultivars of *Hibiscus sabdariffa* -(namely: R., F., K. and A.)- was studied by evaluating some of its constituents as, organic acids (citric, ascorbic and tartaric), Anthocyanines (malvidin and pelargonidin), pH and essential amino acids under the semi -arid conditions of Sudan. It was found that, there was a significant effect of stage of maturity on pH, organic acids and essential amino acids content. With respect to amino acids, threonine, valine, methionine, leucine, isolucine, lycine, gave the highest amount at premature stage and arginine, phenylalanine and histidine were significantly higher at mature stage. On the other hand, it was found that, there was no significant different among cultivars in the pH, while the organic acids were significantly affected. The Abiad cultivar gave the lowest pigment content.

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**ORAL PRESENTATION - 49**

**ANTIOXIDANT PROPERTIES OF IRAQIAN AND TURKISH  
*GLYCYRRHIZA GLABRA* L. (LIQUORICE)**

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Phyto-constituents of plant are important source of antioxidant and able to terminate the free radical chain reactions. Antioxidants are substances that may protect cells from the damage caused by unstable molecules known as free radicals. Antioxidants interact with and stabilize free radicals and may prevent some of the damage free radicals might otherwise cause. Free radical damage may lead to cancer. The aim of this study was to find out in vitro antioxidant activity of the extracts of *Glycyrrhiza glabra* L. roots collected from Turkey and Iraq. For the extraction of the roots; methanol, ethanol and water were used as solvents by using three extraction methods, e.g., microwave, accelerated solvent extraction (ASE) and conventional extraction techniques. The antioxidant activities of extracts were evaluated by employing UV-vis spectrophotometer. 1,1-diphenyl-2-picrylhydrazyl (DPPH) and butylated hydroxytoluene (BHT) were used as a free radical and reference, respectively.

In conclusion, the highest DPPH scavenging activity value (98.57%) of Iraqi *Glycyrrhiza glabra* root extract was almost the same as that of Turkish one (98.25%), both of which was obtained by using conventional methanol extraction. The DPPH scavenging power of the whole extracts studied here was higher than that of BHT.

**ORAL PRESENTATION - 50**

**ANALYSIS OF THE AROMATIC AND MEDICINAL PLANTS SECTOR  
IN THE ARID AREA OF THE SOUTH-EAST OF TUNISIA**

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In Tunisia the Aromatic and Medicinal Plants (AMP) and their derivatives took their economic importance recently. They are actually become in the center of sectoral policies and the strategic orientation of the economy. The present work is analyzing the socio-economic importance of the AMP in the base of the results researches done in the project " biologic diversity, the cultural and economic values of the aromatic and medicinal plants in the south of Tunisia " realized in collaboration between Institute of Arid Regions of Tunisia, International Center for Agricultural Research in the Dry Areas (ICARDA) and the ministry of agriculture in USA.

Three dimensions were analyzed and discussed:

- The international dimension covers the analysis of the importance of the international market of AMP and the international position of Tunisia.
- The national dimension make an accent in the macro-economic and social importance of the principles AMP in Tunisia and the identification which hinder the development of this sector.
- The local dimension is concerned with a case study of the Tunisian southern chain of Matmata. The importance of AMP in the family economy, sectors of the main products of AMP and the main constraints of the sector were analyzed.

The paper is closed by a number of strategic directions in terms of the AMP sector positioning in Tunisia compared to the international market.

**ORAL PRESENTATION - 51**

**THE DEVELOPMENT OF IDEAS OF HEALING THROUGH THE AGES**

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Introduction to the different methods of healing that have been developed over time have increased the ability of medicinal professionals to meet the challenges that arise with expansion of their professional roles. The methods of healing of cave people were undeveloped. Holistic medicine has taken over a lot of techniques from Shamanism. The methods of Chinese medicine are focused on balancing the internal and external energies. Holistic and sophisticated system of healing represents Ayurveda. Egyptian medicinal texts show a close relationship between the supernatural and empirical healing. Illyrians applied hydrotherapy and physiotherapy. Experiences in the field of religious medicine and initial medicinal institution had Thracians. Healing in Ancient Greece was based on the law of similarity. Greek physicians favored diet and life adaptations in relation to the use of drugs. Alexander's Medicinal School saved ancient Greek medicine from a stagnation of a one century under the influence of medicinal thought of oriental Asian nations. With the Roman sanitary legislation were regulated public hygiene and sanitation facilities.

Galen created elaborate system through which he made efforts to balance the fluids in the sick person using drugs with opposite nature. He also used poly pharmaceutical preparations. Rational drug therapy in Middle Ages decreased and was replaced with Church knowledge. Arabic physicians have rejected the old idea that a bitter pill act best, instead of this they prepared their dosage forms tasty and attractive by silver or gold plating and use of syrups. Paracelsus pioneered in chemically prepared drugs out of raw plants and mineral substances; nonetheless, however he believed that the collection of those substances ought to be astrologically determined. He used special drug for a particular disease. In the Renaissance, a great jump is made in the preparation of drugs. For a period of about 300 years, significant discoveries were made in the chemistry of drugs. Today, current gene therapy has the potential to prevent, correct, modulate gene or acquired diseases.

**ORAL PRESENTATION - 52**

**TREATMENT OF HEPATITIS C. VIRUS AND ITS COMPLICATIONS USING THE WILD EGYPTIAN ARTICHOKE**

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Infection by hepatitis C virus (HCV) and its subsequent complications are a major cause of mortality worldwide. HCV is currently the major burden on the health care system in Egypt with infection prevalence almost ten times greater than any other country in the world and the highest prevalence of HCV genotype 41 and according to FAO, Egypt is the second top country, after Italy, for producing Artichoke in 2010 and 2011. The water extract of the leaves of the wild Egyptian artichoke (WEA) (*Cynara cardunculus* L. var. *sylvestris* (Lam.) Fiori) showed improvement of HCV infection symptoms. Therefore the aim of our study was to disclose its significant anti-HCV activity for the first time. The water extract of WEA plant showed outstanding activity against HCV infection and its complications such as ascites and jaundice. The phytochemistry of the WEA extract resulted in the production of many compounds and subfractions. Anti-HCV activity of these compounds was evaluated by inoculation of the highly permissive human hepatoma cell line Huh7/Scr cells with firefly luciferase reporter viruses based on the intra-genotypic genotype 2a chimera Jc<sup>1</sup> (Luc-Jc1)<sup>2</sup>. The biological investigation identified two compounds which showed a broad spectrum and potent activity against all genotypes of HCV.

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**ORAL PRESENTATION - 53**

**IN VITRO ANTIOXIDANT ACTIVITIES OF DIFFERENT EXTRACTS OF  
*CISTUS LADANIFERUS* (CISTACEAE) FROM MOROCCO**

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Morocco is blessed with the richest source of medicinal and aromatic plants<sup>1</sup> due to a privilege, geographic situation and variable agro-climate conditions. Those plants have evolved numerous medicinal and environmental properties. A number of medicinal plants is used for treatment of some pathogenic germ attack<sup>2</sup>. Antioxidant activity is one of the important biochemical activities in a living system; the objective of this study is to evaluate the antioxidant activity of some chemical extracts of *Cistus ladaniferus* from Morocco. The total antioxidant activity has been measured based on DPPH essay method in-vitro. The obtained results showed that methanol and water extracts possess the highest antioxidant activity (100% with 10µg/mL). EtOAc extract has also an important antioxidant activity concord with solution concentration of extract. However, DCM and Hexane extracts have a low antioxidant activity. This study supports the idea that *Cistus ladaniferus* from Morocco can be a good source of natural antioxidant and can be used by the food industry and replace chemical antioxidants. The important compounds biologically active (phenolic and tannin ...) content in the extract of *Cistus ladaniferus* was responsible for the large antioxidant activity.

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**ORAL PRESENTATION - 54**

**THE MEDICINAL PLANTS OF KYRGYZSTAN**

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Kyrgyzstan is a country with so many mountains and is located in the north-eastern Central Asia; which includes 7 regions, 22 cities, 44 districts and borders with Tajikistan, People's Republic of China, Uzbekistan, Kazakhstan. The area consist of 198.500 m<sup>2</sup> and the population is 5,3 million in it. The Tianshan mountain has an altitude of 7,439 metres with sharp peaks and covered glaciers is bordered Fergana, Chui and Talas valleys ranging from 800 to 2200 metres with average heights. The lowest place from the sea level of the country is Fergana Region and, on the other hand, the highest peak is Victory Peak of 7439 metres. (Kakşaal mountains). The climate conditions of Kyrgyzstan are determined by the highest settlement and its being far from the ocean and high sea level of the country. Such being the case, the country is faced with such factors as radiation, drought and sharp continental climatic conditions.

Kyrgyzstan has been an issue worth inquiring owing to her people's making use of her flora for several purposes as well as its combining various tribes and different cultures time out of mind. Among 35000-70000 plants used in folk and known to be practiced in medicine in the world, are of 4100 species of flora are found in Kyrgyzstan and of these approximately 1600 species economic value, among which more than 200 are used for medicinal purposes.

Most of the medicinal plants which are in Kyrgyzstan are growing as wild plants in Central Asia and 233 species of them are considered endemic (For example, *Vinca erecta*, *Ajuga turkestanica*) and the proportion of them is 3% of the total plant Kyrgyzstan. During the spring and summer months, *Gagea*, *Crocus*, *Astragalus*, *Ranunculus*, *Ziziphora*, *Thymus*, *Betonica* and *Salvia* species are very common and *Iris kolpakowskiana* species. The grasslands are rich in floristic contents. *Aconitum*, *Delphinium* and *Cerastium* species, *Codonopsis clematidea*, *Erigeron aurantiacus*, *Aster alpinus*, *Gentiana karelinii*, *Primula algida* in perception, *Androsace ovczinnikowii* species are encountered in the aforementioned places.

**ORAL PRESENTATION - 55**

**METABOLOMIC TOOL AND FRACTIONNATION BIOGUIDED EXTRACTION ASSAYS TO IDENTIFY ANTIOXIDANT COMPOUNDS FROM *FRAXINUS ANGUSTIFOLIA* LEAF AND STEM BARK EXTRACTS**

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*Fraxinus angustifolia* Vahl (Oleaceae), most commonly known as narrow leaves ash or desert ash, is a medium-sized deciduous tree. As many species of medicinal plants, *Fraxinus angustifolia* was reported for many uses: as an industrial crop for natural dye production and textile color, as cattle food and may traditional medicinal uses. In North Algeria, *Fraxinus angustifolia* is traditionally used to treat many inflammatory diseases like arthritis rheumatism and gout.

This study aimed to apply and compare two different ways to characterize antioxidant activity of leaves and stem bark of *Fraxinus angustifolia* and elucidate structures of bioactive compounds. A comprehensive extraction for metabolomic study of the several obtained fractions compared to old way one solvent extraction followed by bioguided chromatographic fractionation bioassay were applied on leaves and bark dried powder, furthermore the whole obtained extracts were investigated for antioxidant potential using FRAP test. Phytochemical composition of the active extracts and chromatographic fractions were also performed by H-NMR spectroscopy.

Metabolomic tool allowed us to correlate by multivariate data analysis the results obtained from biological activities tests with H-NMR data reduced to buckets, using Simca P+ software. Most correlated H-NMR signals to bioassay results obtained from OPLS plots permitted us to assign the NMR data to phenolic compounds, leading to structural elucidation of many of them, mainly flavonoid glycosides (rutin, quercetrin and kaempferol derivatives), phenylethanoids (verbascoside, calceolariosides) and secoiridoids (mainly oleuropein and ligstroside). Applied metabolomics tool allowed us to attribute rapidly the antioxidant power of *Fraxinus angustifolia* leaves and stem bark to the signals of these phenolic compounds, largely involved in this activity, in the corresponding H-NMR spectra of the most active fractions.



**ORAL PRESENTATION - 56**

**CONSERVATION OF *CITRUS AURANTIUM* PEEL BY A SOLAR DRYING PROCESS**

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The use of solar energy for drying various MAP has received considerable attention since food drying has a great effect on the quality of the dried products. Enclosed solar dryers have many advantages. Citrus plants are especially rich in flavonoid sources. They may have beneficial human health effects. The present work deals with the conservation of Citrus aurantium peel by a solar drying process.

The thin layer behaviour of Citrus aurantium peel was experimentally investigated in a convective solar dryer. The drying temperature was ranged from 50 to 60°C, the air relative humidity from 23 to 31% and the drying air flow rate from 0.0277 to 0.0833 m<sup>3</sup>/s. Drying curves obtained from the experimental data were then fitted to thirteen semi-theoretical and empirical thin layer drying models. The effect of drying air temperature on the model constants and coefficients were predicted by regression equations. All the models were compared according to three statistical parameter; i.e. correlation coefficient ( $r$ ), chi-square ( $\chi^2$ ) and mean bias error (MBE). According to the results, Midilli-Kucuk model proved to be satisfactory to describe the solar drying curves of Citrus aurantium peel with an ( $r$ ) of 0.9999, ( $\chi^2$ ) of 2.0681 10<sup>-4</sup> and (MBE) of 2.1181 10<sup>-4</sup>.

**ORAL PRESENTATION - 57**

**PHENOLIC COMPOUNDS FROM FENUGREEK (*TRIGONELLA FOENUM-GRAECUM* L.) SEED, OPTIMIZATION OF EXTRACTION PROCESS**

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Fenugreek (*Trigonella foenum-graecum* L.) is regarded as an important medicinal plant and used for various therapeutic purposes in traditional medicine. In the current study, different process modifications were adopted for the application of ultrasonic-assisted extraction (UAE) of phenolics from fenugreek seed. It was observed that 3 day germination at 35 °C resulted in phenolic contents reduction. A series of preliminary trials were carried out to predict suitable levels of UAE time, temperature, and ethanol and they were 30 min, 35 °C, and 30%, respectively. The designed experiment was based on Box-Behnken design followed by regression analysis and response surface methodology applications to predict optimum UAE conditions which were established as 38 °C temperature, 32 min time and 33 % ethanol for the maximum phenolics yield (8.41 mg GAE/g DW). It may be inferred based on this study that fenugreek seed is a valuable source of important bioactive compounds which carry radical scavenging activity of up to  $62.74 \pm 1.66\%$ . A properly designed extraction process is essential to obtain the best yields of phenolics and for their enhanced biological activities.

**ORAL PRESENTATION - 58**

**MEASUREMENTS AND MODELING OF COMPARATIVE ADSORPTION OF THYME, TREATED WITH TWO STORAGE TECHNOLOGIES: GAMMA IRRADIATION AND THERMAL-BIOCHEMICAL**

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*Thymus satureioides* is an endemic plant of Morocco used for its virtues in traditional medicine. Thus, it is necessary to study the effect of preservation processes on the storage conditions of the plant. We studied two axis: first of all, the behavior of thyme during storage by the experimental determination of adsorption thyme kept in constant conditions of temperature and moisture isotherms. Then, the identification of the mathematical model Enderby for the description of thyme adsorption compared with three other models (GAB, Peleg et LESPAM).

**ORAL PRESENTATION - 59**

**DEVELOPMENT, OPTIMIZATION AND INVITRO EVALUATION OF ONCE A DAY CHRONOTHERAPEUTIC DRUG DELIVERY SYSTEM OF GYMNEMA SYLVESTRE FOR TREATMENT OF DIABETES**

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Diabetes is a disorder of carbohydrate and fat metabolism. *Gymnema sylvestre* is a potent antidiabetic plant used in indigenous system of medicine. It targets several of the etiological factors connected with diabetes and obesity and thus can offer holistic treatment. However the dosage form in which it is administered is traditional and conventional resulting in reduced efficacy of the drug. The method by which a drug is delivered can have a significant effect on its efficacy, if the modern drug delivery technology is applied to *gymnema sylvestre*, it has a potential to synergize benefits of both.

Diabetes is one of the diseases where the constant drug levels are not preferred but needs a pulse of therapeutic concentration when the blood sugar levels are high. Chronotherapeutic drug delivery systems has a specificity in delivering therapeutic amount of drug in a burst at circadian timings correlated with specific pathological need to achieve maximum drug effect.

Taking into consideration the advantages of chronotherapeutic drug delivery, present study investigated the potential of same for *gymnema sylvestre* based on time controlled approach. The drug delivery system is designed to achieve three pulsatile drug deliveries from a single formulation at the time when the blood sugar level is high. The various components of the system were formulated, evaluated and optimized for the desired drug release. Also, as one of the main mechanisms of action of *gymnema* is inhibition of glucose absorption which is exerted in the small intestine and as oral use of *gymnema* may cause irritation of the gastric mucous membrane and reflux, the chronotherapeutic formulations were modified so as to make the drug available at the site of action and probably the site of absorption, as well as to prevent the side effects in the stomach.

The developed chronotherapeutic system was able to achieve the said objective of integrating modern method of drug delivery with herbal drug for once a day therapy of *gymnema sylvestre* with enhanced therapeutic efficiency and better patient compliance.

**ORAL PRESENTATION - 60**

**STUDIES ON PONGAMIA BASED AGRI-SILVI SYSTEM  
INTERCROPPED WITH *ANDROGRAPHIS PANICULATA***

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“Integrated nutrient management studies in *Andrographis paniculata* (Kalmegh) intercropped in Pongamia based Agri-silvi system” were conducted during Kharif 2013 at Students Farm, College of Agriculture, Rajendranagar, Hyderabad under Southern Telangana agro climatic zone of Telangana state. The experiment was laid out in randomized block design with eight treatments namely T1- Control, T2- 100% RDF (75:50:50 NPK), T3-Farm yard manure @ 5 t ha<sup>-1</sup> , T4- Vermicompost @ 2 t ha<sup>-1</sup> , T5- Neem cake @ 1 t ha<sup>-1</sup> , T6- 50% RDF+50% Farm yard manure, T7- 50% RDF+50% Vermicompost, T8- 50% RDF+50% Neem cake replicated thrice.

In conclusion, yield and yield attributes were significantly influenced by integrated nutrient management treatments. Fresh and dry herbage yields of 2968.9 and 2078.2 kg ha<sup>-1</sup> were recorded with 50% RDF+50% Neem cake compared to 1386.6 and 970.6 kg ha<sup>-1</sup> in control.

**ORAL PRESENTATION - 61**

**INHIBITORY EFFECT OF THE AQUEOUS EXTRACT OF *ARTIMISIA HERBA ALBA* ON GROWTH OF SOME WEEDS AND PHYTOPATHOGENIC FUNGUS ASSOCIATED WITH CEREALS**

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Artimisia herba alba aqueous leaf extract, prepared by 10 gm powder of dry leaf dissolved in 100 ml of double distilled water, were tested for their inhibitory effects on seed germination of two weeds (*Bromus tectorum* and *Melilotus indica*) and two phytopathogenic fungus (*Fusarium graminearum* and *Fusarium sporotrichioide*). Inhibitory effect of leaf extract of different concentrations of Artimisia herba alba and its possible allelopathic effect tested in a laboratory experiment. The experiment was conducted in sterilizes Petri dish with a 7 days for seed germination and growth of mycelium of fungus on an average of 25° C. The effects of different concentrations of aqueous extract were compared to distilled water (Control C).

Aqueous effect caused pronounced inhibitory effect on seed germination and root length of *Bromus tectorum* than *Melilotus indica* and growth of mycelium of *Fusarium graminearum* than *Fusarium sporotrichioide*. Seed germination and root length of tow weeds and growth of mycelium of fungus results indicated that the inhibitory effect was proportion to the concentration of the extract. Inhibitory effect was much pronounced radicle length rather than germination. Hence, it could be concluded that the mesquite leaf aqueous extract contain water-soluble allelochemicals. This could inhibit the seed germination and reduce radicle length of *Bromus tectorum*. It is suggested that Artimisia herba alba extract a possibility of using for the discovery and development of environment friendly biobicides to control weeds and phytopathogenic fungus.

**ORAL PRESENTATION - 62**

**COMPARATIVE MOISTURE SORPTION ISOTHERMS, MODELLING AND ISOSTERIC HEAT OF SORPTION OF WITNESS AND IRRADIATED MOROCCAN ROSEMARY LEAVES**

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In this work, we study and compare water sorption isotherms of irradiated and non-irradiated rosemary at three temperatures: 30, 40 and 50 °C, using the standard static gravimetric method. This method consists on the use of different salts solutions, over a range of relative humidity from 0.05 to 0.9. These isotherms have been fitted using four different sorption equations, Enderby model found to be the most suitable model for describing the sorption curves for both of samples.

**ORAL PRESENTATION - 63**

**THE FARMERS KNOWLEDGE ON HENNA CULTIVATION UNDER THE CLIMATIC CONDITIONS OF SOUTH EAST OF ALGERIA**

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The religion feasts of Muslim people and the wedding ceremonies have all a comment point which is the henna night. The cosmetic plant which contain a natural dye in the leaves, is applied by women as past on their hand, nails, feet and a natural dye for hair.

Our aim of study is to know the manner that the plant of henna is cultivated, what are the special techniques practiced by the farmers, for that reason we led a field investigation, the interview with henna cultivators took place on their fields, and that with the rural women in their houses.

The main results are that the farmers have a considerable knowledge in the conduct of this culture: since the success of the germination and seedling stage, plantation, prevention against weeds, the number of dishes a year. For the women they master the drying of leaves, collection of leaves as well as the seeds collection.



**ORAL PRESENTATION - 64**

**MORPHOLOGICAL AND ANATOMICAL STUDIES OF MOROCCAN MEDICINAL PLANTS: *CISTUS CRETICUS* L. AND *C. MONSPELIENSIS* L. (CISTACEAE)**

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The genus *Cistus* L. (Cistaceae L.), comprises several medicinal plants of perennial shrubs. Sixteen *Cistus* L. species are typical members of the Mediterranean and pioneer plants which disseminates themselves. Leaves of all *Cistus* taxa are covered with glands secreting resins and essential oils. The common name for the resin is "ladanum". This resin is composed mainly of flavonoids, pro-anthocyanidins, terpenoids and tannins.

This study aims to compare and set anatomical and morphological characteristics of the aerial parts of *Cistus creticus* and *C. monspeliensis*. Indeed, these characters can serve as important taxonomic markers especially for the differentiation between subspecies of *C. creticus* represented in Morocco by only subsp. *corsicus* and subsp. *eriocephalus*. Species of the genus *Cistus* have a piliferous layer or trichome structurally and functionally diverse that can be used in the distinction and determination of specific infra taxa (Paolini et al., 2009; Tattini et al., 2007). In other hand, the genus *Cistus* is complex because of polymorphism and active hybridization of the majority of species which introduces further uncertainty into the distinctions between different species.

Continuing our research on the genus *Cistus*, we report the results obtained in investigation of anatomical and morphological descriptions of the aerial parts of *C. creticus* L. and *C. monspeliensis* L.

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**ORAL PRESENTATION - 65**

**MECHANISM OF THE ANTIBACTERIAL ACTION OF (*LEPTOSPERMUM SCOPARIUM*) MANUKA OIL ON METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* (MRSA) AND *E. COLI* DETERMINED BY DISC DIFFUSION ASSAY, MICS AND MBCS VALUES, TIME-KILL AND ELECTRON MICROSCOPY**

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Disk diffusion assay results and MICs, MBCs determinants showed a marked inhibitory activity of *Leptospermum scoparium* essential oil against Gram positive bacteria, including MRSA, *M. phlei* and *B. Subtilis*, and showed a moderate inhibitory effect against Gram-negative bacteria (*S. marcescens* and *E. coli*). The mechanism of this antibacterial action was further investigated by Time-Kill and electron microscopy studies, *Escherichia coli* and Methicillin-resistant *Staphylococcus aureus* (MRSA) were used as Gram negative and Gram positive bacterial models, respectively. Time-Kill and electron microscopy observation confirmed the remarkable inhibitory activity of manuka essential oil against Gram positive bacteria and the temperate inhibitory effect against Gram-negative bacteria. Manuka oil – MRSA treated cells showed considerable morphological alterations including seriously damaged cells, marked cellular lysis and free cellular contents while Manuka oil – *E. coli* treated cells appeared shortened and distorted shapes and had some lose of their integrity. When manuka oil was added to exponentially growing Methicillin-resistant *Staphylococcus aureus* (MRSA) and *E. coli* a significant reduction in the MRSA cells viability was observed where a less effect in *E. coli* was noticed.

**ORAL PRESENTATION - 66**

**ISOLATION OF THREE BIOACTIVE PHENANTROINDOLIZIDINE ALKALOIDS FROM THE FRUIT LATEX OF *FICUS BOTRYOCARPA* MIQ.**

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Latex of *F. botryocarpa* fruit is applied on sores, wounds and other skin infections in Papua New Guinea ethnotherapeutic practices. Systematic bioassay guided separation and isolation of subsequent fractions of latex extracts resulted in three bioactive fractions active against *Staphylococcus aureus* and *Escherichia coli*.<sup>1</sup> This study reports structural elucidation of the three isolates. Structures were determined by physical (M<sub>p</sub>t and R<sub>f</sub> values) and spectroscopic (1D-1H NMR, 2D-HSQC NMR, 2D-HMBC NMR) and MS ESI-POS. The two methylene protons (2H-1) and 2H-3) resonate as triplets at  $\delta$  3.59 and  $\delta$  4.99 respectively. Electron dense  $\delta$  4.99 (2H-3) on (C-3) depicts the strong electron withdrawing component, quaternary nitrogen (=N= +). Protons resonating at  $\delta$  3.88 and 3.89 are singlets depicting two methoxy groups. Both  $\delta$  3.88 and  $\delta$  3.89 are para-aryls substituents. The methines  $\delta$  9.13 and 8.60 are singlets depicting two lone protons on the indolizidinium aryl component.

All isolates, (1), (2) and (3) were identified to be ficuseptine by comparing 1D-NMR assignments. 2D-NMR and MS of (2) found it to be ficuseptine chloride “2, 3-dihydro-6, 8-bis (4-methoxyphenyl)-, 1H-indolizinium chloride”. Their counter ions of the ficuseptines were not established and provide promising lead for further investigation.

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**ORAL PRESENTATION - 67**

***URTICA DIOICA* ALCOHOLIC EXTRACT INCREASES THE CELL-MEDIATED INNATE IMMUNE POTENTIAL IN CHICKENS**

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Active principles from stinging nettle (*Urtica dioica*), a wide-spread herbaceous perennial flowering plant, are well known for their anti-oxidative, anti-microbial, anti-ulcer and anesthetic capacity. This study aimed to investigate the in vivo and in vitro effects of an alcoholic stinging nettle extract in 38 days old chickens (n=30) on the non-specific immunity. The birds were divided in three equal groups and subjected to treatments on days 0 and 7, as follows: I (control) 0.5 ml saline/chicken, sc.; II (solvent control) 0.5 ml 70° alcohol /chicken, sc.; III (treated group) 0.5 ml alcoholic nettle extract /chicken. Blood was sampled on days 0, 7 and 14 and subjected to total leukocyte counts and carbon particle inclusion test to estimate the in vitro phagocytic activity after 30 and 60 min. Phagocytic activity index was calculated as the difference between the natural logarithms of the optical densities of the phagocytosis at 0-30•min and 30-45•min divided by time (30 and 15 min respectively).

Alcoholic nettle plant extract significantly ( $p < 0.05$ ) increased the total leukocyte numbers, from  $15,400 \pm 3,005/\text{mm}^3$  to  $17,125 \pm 2,813/\text{mm}^3$ , when compared to groups I ( $16,666 \pm 1,807/\text{mm}^3$  to  $16475 \pm 2,098/\text{mm}^3$ ) and II ( $19050 \pm 2,098/\text{mm}^3$  to  $17611 \pm 1,966/\text{mm}^3$ ). The highest, statistically significant increase ( $p < 0.01$ ) of the in vitro phagocytic activity of leukocytes was recorded in the nettle extract treated group from day 0 to day 14 for the first (0 to 30 min,  $0.347 \pm 0.07$  to  $1.464 \pm 0.06$ ) but not the second (30 to 40 min,  $0.196 \pm 0.05$  to  $0.223 \pm 0.06$ ) tested time interval. In conclusion, in vivo treatment of 38 days old chickens with alcoholic stinging nettle extract increased the numbers and enhanced the phagocytic capacity of their leukocytes.

**ORAL PRESENTATION - 68**

**IN VITRO ANTIOXIDANT ACTIVITY OF DIFFERENT EXTRACTS OF CORCHORUS DEPRESSUS LINN.**

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*Corchorus depressus* (Linn.) (Family: Tiliaceae) commonly known as 'bhaufali' is regarded as good sand binder in the desert. The plant is rich in flavonoids and has a variety of medicinal properties<sup>1</sup>. *C. depressus* was extracted with different solvents such as petroleum ether, chloroform, ethyl acetate and methanol. The antioxidant activity of *C. depressus* extracts was investigated using different in-vitro methods like 2,2-diphenyl-1-picryl-hydrazyl (DPPH) radical scavenging, 2,2'-azino-bis (3-ethylbenzthiazoline-6-sulfonic acid) (ABTS) diammonium salt radical scavenging, hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) scavenging, nitric oxide (NO) scavenging, ferric reducing power and  $\beta$ -carotene bleaching assay<sup>2</sup>.

The ethyl acetate extract of *C. depressus* (CDEAE) exhibited significantly ( $p < 0.05$ ) higher ABTS and NO radical scavenging activity, reducing power ability and inhibition of  $\beta$ -carotene bleaching. Total phenol and flavonoid contents were highest in the CDEAE ( $112.10 \pm 23.63 \pm 0.65$  mg GAE/g and  $119.27 \pm 4.54$  mg QE/g) respectively. Further, a significant Pearson's correlation was observed between total phenolic contents found in different extracts of *C. depressus* and antioxidant activity. Similarly, a significant correlation was observed between total flavonoid contents found in different extracts of *C. depressus* and antioxidant activity<sup>3</sup>. The results obtained indicate that *C. depressus* is a potential source of natural antioxidants.

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**ORAL PRESENTATION - 69**

***HYPERICUM PERFORATUM* AS A CURE AGAINST MEMORY LOSS AND ALZHEIMER'S (EXPERIMENTAL STUDY IN MICE)**

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Neurodegenerative diseases of the human brain comprise a variety of disorders that affect an in-creasing percentage of the population. Alzheimer's disease (AD) is a complex, multifactorial, heterogeneous mental illness, which is characterized by an age-dependent loss of memory and an impairment of multiple cognitive functions, but this 10 last years it concern the population most and most young.

It is the most common type of dementia in the ageing population due to a severe loss of cholinergic neurons in selected brain area. In traditional medicine, numerous plants have been used to treat cognitive disorders, including neurodegenerative diseases such as Alzheimer's disease. *Hypericum perforatum* has traditionally been used as an external anti-inflammatory and healing remedy for the treatment of swellings, wounds and burns,diseasesof the alimentary tract and psychological disorders. It is currently of great interest due to new and important therapeutic applications.

The chemical composition of methanolic extract of *Hypericumper perforatum* (HPM) was analysed by using high performance liquid chromatography – diode array dedector (HPLC-DAD). The in vitro antioxidant activity of HPM was evaluated by using several antioxidant tests. HSM exhibits inhibitory capacity against posphatidylcholine liposome peroxidation, induced with iron and ascorbic acid, scavenge DPPH andsuperoxide radicals and act as reductants. The cytotoxic activity of HSM was also determined by using MTT cell viability assay on HeLa and NRK-52E cell lines. The in vivo activity studies in Swiss mice were determined by using behavioral, memory tests and Histological study. According to tests results HPM that may be relevant to the treatment of cognitive disorders.

**ORAL PRESENTATION - 70**

**EVALUATION OF THE ANTIMICROBIAL POTENTIAL OF SELECTED MEDICINAL PLANT EXTRACTS AGAINST SOME PLANT AND HUMAN PATHOGENS**

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In vitro antimicrobial activity of methanolic extracts of six medicinal plants (black seed, camphor, cloocynt, clove, ginger and white cedar) were investigated against pathogenic bacteria and fungi at 3, 6 and 9% concentrations. Results obtained in this study showed that the six plant extracts exhibited varied extents of antimicrobial activity against the tested organisms even at low concentration. Among the tested plant extracts, ginger recorded the highest antifungal activity against *Alternaria radicina*, *Fusarium oxysporum*, *F. solani*, *Macrophomina phaseolina*, *Nigrospora oryzae*, *Phoma destructiva*, *Rhizoctonia solani* and *Sclerotium rolfsii* at 9% concentration. Whilst, the maximum antibacterial activity was achieved by black seed extract at 9% concentration against the Gram-negative bacteria (*Escherichia coli* and *Pseudomonas aeruginosa*) and Gram-positive bacteria (*Staphylococcus aureus* and *Streptococcus pneumonia*). Chemical compositions of ginger and black seed methanolic extracts were studied using GC-MS analysis and resulted in the identification of 19 and 17 compounds, respectively. Further studies are needed to investigate the antimicrobial potentiality of the active constituents singly or in mixtures with other antibiotics.

**ORAL PRESENTATION - 71**

**HARVEST STAGE EFFECTS ON SOME YIELD AND QUALITY CHARACTERISTICS OF LEMON BALM (*Melissa officinalis* L.)**

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The purpose of this study was to investigate the effects of different harvesting stages on some yield and quality characteristics of lemon balm during the 2013 and 2014 vegetation periods in Odemis, Izmir ecological conditions for the first time. The experiment was established as randomized blocks design with four replications and the plants were harvested at three growth periods such as before florescence, florescence and after florescence. Plant height, green herb yield, drug herb yield, drug leaf yield, drug stalk yield, essential oil content and constituents were determined.

Statistical analyses showed that the plant height, green herb yield, drug stalk yield and essential oil content were affected by harvest stages. Mean value of the plant height ranged between 71.63-92.88 cm, green herb yield was 16471.9-45787.1 kg ha<sup>-1</sup>, drug herb yield was 4721.4-929.30 kg ha<sup>-1</sup>, drug leaf yield was 624.2-1236.6 kg ha<sup>-1</sup> and drug stalk yield was 490.4-1019.3 kg ha<sup>-1</sup>. Essential oil content ranged between 0.23-0.45% and the highest content was provided from florescence stage of the plant. The main constituent of the essential oil was determined as E-Citral ranged between 25.90-37.74% and the highest content was obtained from the florescence stage. Z-Citral and Caryophyllene oxide were identified as other components of the lemon balm essential oil.



**ORAL PRESENTATION - 72**

**GOJI BERRY -THE ULTIMATE SUPER FOOD; A REAL CHI (LIFE FORCE): THE INSIDE STORY-TAURINE FACTOR**

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With the arrival of second millennium, in China during Tang dynasty (1000-1400 AD), Goji Berry with beautiful orange fruits was considered as “yin” for its utility in strengthen of eyes, liver and kidney, to a great wonder China is also the birth place of this plant. Subsequently Goji berry traveled a long journey and its potential as well as utility in number of other health problems compel to add several other of its benefits to a long list of its usefulness. With time and finding; its utility in strengthen the immune system, improve circulation, sperm production, enhanced sexual performance to modern disease like diabetes, cancer and many others have been well recognized. In this millennium it has now crossed the national boundary of China even it has climb the Great Himalayas, walked through the Asian continent, and it seems that now it has reached the all part our planet. This plant belongs to family of solanaceae, botanically known as *Lycium barbarum* also called wolfberry. The barriers are eaten raw, drunk as juice, wine or tea and also processed to tinctures, powders and tablets, The greater acceptably of the plant is due to its role in enhance longevity ,hair loss, supplementation to natural testosterone and to increase sperm count. To cope with latest taste and demand it is now part of cookies, crispy bars, chocolates, muesli, sausages and soaps and one can easily found in drug stores, “Reformhauser” and organic food shops. On chemical front, fruit the most valuable part contains, polysaccharides, carotenoids, flavonoids important for anti oxidation properties, besides it also contains minerals like Na, Ca, Mg, Fe ,Cu and Mn. The best part of this fruit is, it contain a number of free amino acids of which Taurine is abundant (.32g/100g wet wt). Taurine beneficial action has a board spectrum, and many of its protective action are now well established. Almost all biological action exhibited by Goji berry is also part of broad spectrum biological properties of taurine; from vision to cancer, anti-oxidation to host defense.

It is believed that ,biological properties of any substance is the cumulate index of its physio- chemicals properties in return the molecules presents as chemical initory and their arrangement, interaction, association, provides synergic effect. It is surprising to know that, Goji berry and taurine has overlapping beneficial properties. The high contents of taurine provide a basis to think; why? Such high concentration of taurine; hence is logical to conclude that it might possible, in; inside story of action mechanism of Goji berry beneficial activities; taurine may be a major contributing agent of its biological action profile. Phyto-chemicals are future bio-molecules for improving human health and preventing diseased states. The in depth study of techno-functional properties of various constituents of this plant is urgently needed and if it is done in proper from then this plant can be efficiently exploited for many fold for food ,cosmetic, longevity, ultimate pleasure and medicine application. I am sure with such happening this plant can be synonymous to “life energy” in coming decades.

**ORAL PRESENTATION - 73**

**A PROSPECTIVE STUDY OF MEDICINAL PLANTS USED IN THE WEST OF ALGERIA**

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Since ancient times plants have been indispensable sources of both preventive and curative traditional medicine preparations for human as well as animals.<sup>1</sup> In Algeria, plant remedies are still the most important and sometimes the only sources of therapeutics for nearly 50% of human and more than 70% in rural population ,Therapeutic uses of the same plant species for humans in west of Algeria have also been compared. The identification of plant species traditionally from the local flora could be also potentially useful for the isolation of natural extracts of phytotherapeutic interest to increase a results of resistance to the antibiotics.<sup>2</sup> An ethnobotanical study of medicinal plants was carried out in the west region of Algeria. It was made in order to establish a catalog of medicinal plants and gather all the information about the therapeutic uses practiced by the local population in the study area. Using survey files ethnobotanical field were introduced at this study. The results have identified 39 medicinal plants used in the west region of Algeria.

This work showed that the leaves and seeds are the most used parts and most of the remedies is prepared as is brewing. In terms of the treated diseases, digestive disorders rank first with a rate of 42.5%, followed by skin diseases (17.5%), rheumatism (10.0%) Face care (5.0%).Our results were the first a very valuable source of information in our study area and to the national medicinal flora in the west of algeria;. They could be a database for future research in a phytochemistry ; pharmacognosy studies.

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**ORAL PRESENTATION - 74**

**BIOLOGICAL ACTIVITIES OF PLANTS COLLECTED IN THE ALGERIAN SAHARA**

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Nine extracts (dichloromethane, methanol, water) of three plants: *Ammodaucus leucotrichus* C. et D. (Apiaceae), *Cymbopogon schoenanthus* (L.) Spreng. (Poaceae), *Matricaria pubescens* (Desf.) Schultz. (Asteraceae) collected in the Algerian Sahara were screened for antibacterial, antifungal, cytotoxic activity, as well as inhibitory activity towards two key enzymes PLA and elastase.

Extracts were tested against *Staphylococcus aureus* Gram (+), *Escherichia coli* Gram (-) and a yeast *Candida tropicalis*. Dichloromethane and methanol extracts appear the most active in all bioassays. dichloromethane extract of *A. leucotrichus* exhibits marked antibacterial and antifungal activity and the extracts (dichloromethane and methanol) of *M. pubescens* were the most effective in the inhibition of PLA2 activity. Aqueous extracts devoid of any antimicrobial or antifungal activities, display noticeable elastase inhibition.

**ORAL PRESENTATION - 75**

**ETHNO-BOTANICAL STUDY OF MEDICINAL PLANTS USED IN NORTH-WEST SAUDI ARABIA VILLAGES: QUANTITATIVE APPROACH**

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The flora of Saudi Arabia has a high level of biodiversity. It has affinities with the flora of east and north Africa, the Mediterranean and the Irano-Turanian countries. This may be due that Arabia peninsula acted as conduit for the species, incense and perfumes, thousands years ago, from the south coast and north-western side. Actually, numerous oasis scattered in the desert, camels and goats resources have anchored the Bedouins away from the cities. This population closely linked to their environment and their culture as well as the lack of health services have increased the traditional therapy using wild plants to treat diseases. This ethnobotanical study is done in order to preserve this traditional knowledge, to conserve biodiversity of the wild medicinal plants and to propose some of these plants for a possible use in pharmacology process. More than twenty village are surveyed using ethno-botanical questionnaire by the students in their respective villages, asking native inhabitants about the plants, their local name, the used plant parts, the dose, the preparation and the respective treatment. Specimens were collected and deposited in the herbarium of museum of natural history at Taibah university Campus of Al Ula.

The collected data were analyzed through use informant consensus factor (Fic), fidelity level (FL), and direct matrix ranking (DMR). Several wild medicinal species have been identified which have different activities such as diuretic, purgative, laxative, antiasthmatic, hepatoprotective, antidiabetic, antiepileptic, antiallergic, tooth, eye and ear care, and various other medicinal properties. These species belong to different genera and different families such as Lamiaceae, Asteraceae, Zygophyllaceae, Poaceae, Aloaceae, Boraginaceae, Solanaceae and Loranthaceae. The ethno-medicinal knowledge and plants with high Fic and FL values should be further analyzed chemically and biologically for future exploration of modern medicine. The Loranthaceae family contains among six species *Plicosepalus acaciae* that could be included in pharmaceutical research for the cardiovascular treatment and cancer care.

**ORAL PRESENTATION - 76**

**BIODIVERSITY AND ETHNOBOTANY IN ALGERIA: COMPARISON BETWEEN TLEMCEM'S MODEL FOREST AND BIOSPHERE RESERVE OF DJURDJURA**

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Algeria is characterized by high biodiversity. Ancestral generation has a close relationship with nature, using medicinal plants (PAMs) for health purposes and others and transmitted it orally for other generations. However, Currently, only the old rural population kept it this know-How but without rational use. In fact, the biodiversity is decreasing also a disappearance of our Mediterranean phytotherapy culture.

To assess biodiversity lost, was conducted a direct ethnobotanical survey (154 samples) to 68 rural people living in 14 villages localized near or inside of North Algeria's protected areas in East and West respectively: Biosphere Reserve of Djurdjura and Tlemcen's Model Forest (TMF) . The majority of questioners were illiterate women, aged between 61 and 70 years. 72 healing plants were identified and classified in 36 families. 65 plants are common and spontaneous. 160 therapies were prepared in 12 different ways for cure 50 diseases at least. Green leaf infusion is the most used, although in Tlemcen, the root part is most estimated. Additionally, those plants were found useful for food, animal feed, craft and veterinary.

The study confirms the richness and close relationship between rural population and forest, but also shows the high risk of losing plant biodiversity by damage plant's root system, use of rare and endangered plants and unawareness of regulatory policies by rural people. This model showed not being effective and needs urgent development and collaboration among national institutions regarding biodiversity protection and natural resources management. Drawing guidelines and methodologies for conservation and management of NWFPs - traditional medicine for rural economy and modern phyto-pharmacy - must allow integration of this know-how in national green economy under international standards.

**ORAL PRESENTATION - 77**

**THE NATURAL INHIBITORS OF ADVANCED GLYCATION END-PRODUCTS**

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The natural inhibitors of advanced glycation end-products, AGEs contribute to the development of atherosclerosis joint diseases and they are also responsible for aging and tissue damage . The compounds able to break AGEs, or inhibit their formation, may be considered as potential drugs, dietary supplements or other bioactive ingredients These considerations have prompted the scientific community to identify and develop new anti-AGEs compounds, acting either via trapping of reactive dicarbonyl species, preventing oxidation using transition metal chelators or free radical scavengers, or breaking AGEs cross-linking Among various synthetic compounds exhibiting anti-AGEs properties some of them were clinically evaluated towards cardiovascular diseases, such as diabetic nephropathy and retinopathy. Clusiaceae and Calophyllaceae families are rich in compounds like polyphenols which are able to inhibit their formation and are therefore of great interest. *Calophyllum flavoramulum* a native Malaysian plant, was selected after an anti-AGEs screening conducted on DCM and MeOH extracts from plants belonging to these aforementioned families.

In conclusion a bioguided method, we could identify potent anti-AGEs compounds such as amentoflavone and 3-methoxy-2-hydroxyxanthone as well as less potent ones The 3,4-dihydroxytetrahydrofuran-3-carboxylic acid is described for the first time from a natural source. As expected the caveat of a bioguided fractionation may be to exclude inactive but original compounds. This is the case for the new flavoramulone.

**ORAL PRESENTATION - 78**

**EFFECT OF EXPLANT SOURCE, NUTRIENT MEDIUM, PHYTOHORMONES AND ELICITATION TREATMENT ON IN-VITRO CALLUS CULTURE OF *BOERHAAVIA DIFFUSA* LINN. AND EXPRESSION OF SECONDARY METABOLITES**

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*Boerhaavia diffusa* L. (Nyctaginaceae), commonly known as 'Shothagni (cure for dropsy) in Sanskrit and 'Punarnava' in the Indian system of Medicines. Present research work deals with the development of in-vitro callus culture of such medicinally important plant and to find out the effect of explant source, nutrient medium, various phytohormones and elicitation treatment on it.

Leaf, stem and inflorescence of *B. diffusa* s were aseptically cultured on Murashige and Scoog (MS) medium, Gamborg (B5) medium, Whites medium and Woody plant medium supplemented with different concentrations of auxins and cytokinins like 2,4-D, IAA, NAA, BAP and Kinetin, individually as well as in combinations<sup>1</sup>. The cultures were maintained at 25±2°C temperature and 16hrs photoperiod. Induced calli were then subcultured and maintained on the same medium. Calli were also subjected to elicitation treatment. After sufficient subculturing when no further growth of callus has seen, it is subjected to extraction and phytochemical screening.

Out of various explants and hormone combinations, leaf explant on B5 medium supplemented with 3.2mg/l 2, 4-D + 3mg/l IAA + 0.5mg/l BAP was found to be the most effective for induction of yellowish friable calli, within 6 days. The preliminary phytochemical analysis of callus showed the presence of sterols, alkaloids and flavonoids<sup>2</sup>. In order to study the origin and nature of callus, histological study of callus was also carried out. In conclusion we claim that callus of *B. diffusa* can be a source for such medicinally important secondary metabolites.

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**ORAL PRESENTATION - 79**

**ANTIOXIDANT ACTIVITY OF POLYPHENOLIC EXTRACTS OF  
*CRATEAGUS OXYACANTHA***

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Natural substances extracted from the hawthorn (*Crateagus oxyacantha*) have multiple interests, most of them are used in the industry, supply, in cosmetology and dermopharmacy. These compounds which are stemming from the secondary metabolites of plant are saved to a large extent and illustrated in therapy.

This study allowed us, to compare the levels of polyphénols, flavonoids, flavonols, anthocyanins and condensed tannins as well as antioxidant activity (radical-scavenging activity of DPPH. and ABTS.+, reducing power) of three organ (flowers, leaves and fruits) using methanol 50%. The results show that the contents of antioxidants vary according to the type of organ and geographical origin. The results of the quantifying of polyphenols show no significant difference between the flowers, leaves and fruits of hawthorn (*Crateagus oxyacantha*). The Iakouren fruits are rich in polyphenols, while those of Ait selam are the poorest. The flowers are rich in flavonoids than the fruits. The reducing power of extracts of hawthorn shows no significant difference between the leaves, flowers and fruits of hawthorn, the same is noted for the radical scavenging activity of DPPH and ABTS+. The leaves of Thawrith-Ighil and flowers of El-Kseur have higher reducing powers than Oued-Ghir leaves and Toudja flowers. High content of phenolic compounds and as well as a significant antioxidant activity have been detected in the three organ. Therefore, these organs can be considered as important sources of antioxidants.



**ORAL PRESENTATION - 80**

**EXPERIMENTAL DESIGN AS A TOOL TO SELECT THE OPTIMAL OPERATING CONDITIONS FOR ESSENTIAL OIL EXTRACTION FROM LAUREL LEAVES**

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Evergreen dioic plant bay laurel is naturally grown through Mediterranean, Aegean and Black Sea in Turkey. Essential oil, get from fresh and dried leaves is widely used for food, medical and beverage industry. Dried leaves are also used in food industry for aroma and spices.

An experimental design was used to investigate the influence of different operating parameters/conditions on the essential oil extraction from laurel leaves. The extraction process was performed according to a 3-factor, 3-level face-centered central composite design, and the independent variables selected were as follows: x1=Boiler occupancy rate (boilers were filled to 50 %, 75 % and 100 %), x2= The duration of the distillation, (distillations was continued 60, 75 and 90 minutes) and x3= Particle size (leaves were cut in size 10, 20 and 30 mm via guillotine). The responses as dependent variables were: y1= Essential oil yield (mL) and yield (%).

The optimization of extraction process was conducted by response surface methodology and Taguchi approach. A good correspondence between the predictive and observed values was obtained. The application of the optimization technique lead to two optimal combinations of operating parameters which ensure in the same time robust, stable and insensitive to the noise factors responses.

**Acknowledgement**

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**ORAL PRESENTATION - 81**

**USE OF ESSENTIAL OILS TO MANAGE POST-HARVEST DECAY IN CITRUS**

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Essential oils extracted from seeds of *Trachyspermum captivum*, *Foeniculum vulgare*, *Cuminum cyminum*, buds of *Eugenia caryophyllata*, bark of *Cinnamomum zylanicum* and leaves of *Azadirachta indica*, *Ocimum basilicum*, *Ocimum sanctum* and *Eucalyptus globulus* were checked both in *in-vivo* and *in-vitro* conditions for their potential to control growth of *Penicillium italicum*, the causal agent of blue mold disease in citrus fruit. Comparative evaluation of ten essential oils revealed *T. captivum*, *F. vulgare* and *E. caryophyllata* as the three most effective antifungal oils. All essential oils were then subjected to chemical profiling by using Gas Chromatography-Mass Spectroscopy and Gas Chromatography-Flame Ionization Detector.

The chromatograms analyzed confirmed the presence of thymol, anethole, eugenol, citral, linalool, limonene, 1,8-cineole, eucalyptol,  $\gamma$ -terpinene and  $\beta$ -pinene as major constituents of selected essential oils. Among these compounds thymol was found to be the most effective chemical component that highly significantly inhibited the fungal growth. This was followed by anethole and eugenol. Maximum quantity of thymol was recorded in *T. captivum*, whereas, anethole and eugenol was found highest in *F. vulgare* and *E. Caryophyllata*, respectively. The study was extended to evaluate the effect of top three essential oils on physiological properties of Mandarin fruit during cold storage.

**ORAL PRESENTATION - 82**

**CHEMICAL COMPOSITION OF MEDICINAL PLANT *ATRACYLIS SERRATULOIDES***

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The Asteraceae family is one of the most important botanical families of vascular plants containing 24000 species and 1600 genera. *Atractylis* genus of the family Asteraceae, is widely known for its uses in folk medicine in Mediterranean basin. Indeed, *Atractylis* plants have been utilized as medicinal herbs against circulatory disorders, snake-bite poisoning, intestinal parasites, and for their diuretic effects. However, the species *Atractylis serratulooides* is used in North Africa against gallstone disease, circulatory disorders and to treat hepatitis. *A. serratulooides* Sieber ex Cass. is a perennial plant, 20-30 cm long, with carmine color flowers and yellow thorns. Phytochemical investigation of the roots of *A. serratulooides* led to the isolation of 9 compounds including 8 triterpenoids and 1 phenolic compound. Their structures were established on the basis of physical and spectroscopic analysis, including 1D and 2D NMR (1H, 13C, COSY, HSQC, and HMBC), mass spectrometry ESI, and by comparison with those published in the literature. Triterpenoids are typical compounds of *Atractylis* genus. The dichloromethane and n-butanol extracts of the species *A. serratulooides* were tested against three bacterial strains *Pseudomonas aeruginosa*, *Escherichia coli* and *Staphylococcus aureus*, by the diffusion method on agar medium. The obtained zones of inhibition indicated weak antibacterial activity.

**ORAL PRESENTATION - 83**

**CHEMICAL COMPOSITION AND IN VITRO BIOACTIVITY OF THE ESSENTIAL OILS OF TWO *MENTHA* SPECIES (*M. PULEGIUM* L., *M. ROTUNDIFOLIA* AUCT.) FROM BEJAIA LOCATION (ALGERIA): A COMPARATIVE STUDY**

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The essential oils were prepared from *Mentha pulegium* L. (MPE) and *Mentha rotundifolia* auct (L.) (MRE) by hydrodistillation and their chemical compositions were investigated by GC-MS. The oils were examined for their antioxidant activities using five in vitro assays. We evaluated also the contact toxicity, fumigant toxicity and repellency of the essential oils against adults of *Rhyzopertha dominica* (F.), the principal pest of wheat. The major components in MPE included pulegone (70.4 %), neo-menthol (13.4 %), neomenthol acetate (3.5%) and menthone (2.7%). On the other hand, MRE provided trans-piperitone epoxide (30.2%), piperitone oxide (8.7%), thymol (4.5%), germacrene D (3.5%) and terpinen-4-ol (2.7%) as major ingredients. It turned out that MRE had a stronger antioxidant activity than MPE in all tests. In the contact assay, DL50 values of MRE and MPE were 3.3 and 6.9 µL/ML, respectively. Fumigant toxicity assay of MPE and MRE showed mortality percentages of 44.3 and 39.2% respectively at the dose of 2µL/mL. In the fumigation bioassay the death rates were 46.03 and 47.54% after 96 h of exposure at the dose of 2µL/mL for MPE and MRE, respectively. As conclusion, MPE and MRE from Bejaia (Algeria) have a potential as an alternative to chemical additives for the food industry.

**ORAL PRESENTATION - 84**

**ALGAE AS INNOVATIVE NUTRACEUTIC**

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Recognized as the biomaterials of the future algae are the organisms whose richness in content and effects in health care is being understood more day by day. They are the organisms that are actively used to prevent or cure many diseases in last decade since they contain high level of protein, unsaturated fats, various vitamins, pigments and bioactive materials. Nowadays, algae are being used for curing many diseases like peptic ulcer, diabetics, chronic hepatitis, liver cirrhosis and radiation poisoning besides of the usage as a general health care product. The determination of the contents of algae, whose production in Turkey is possible, are essential to make them available for consumption in medicine and food sectors. This study has been carried out on algae like *Spirulina platensis* (Cyanophyta), *Haematococcus pluvialis* (Chlorophyta), *Chlorella vulgaris* (Chlorophyta), *Padina pavonica* (Phaeophyceae), *Sargassum vulgare* (Phaeophyceae) and *Jania rubens* (Rhodophyta) in order to determine their biochemical composition, i.e., proteins, fat-fatty acids, minerals and wet-dry matter, their phenolic components and molecular weight distribution, such as free amino acids, dipeptides and polypeptides, of their protein contents. Moreover, following contents determination, the potential of the use of algae in health and food sectors was also investigated.

**ORAL PRESENTATION - 85**

**ANTIBACTERIAL AND ANTIFUNGAL SCREENING OF FOUR  
ALGERIAN MEDICINAL PLANTS**

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The present describe the ethnopharmacology study and the screening of the antimicrobial activity of hydroalcoholic and chloroform extracts of the four plants, *Ceratonia siliqua*, *Salvadora persica*, *Aloe vera* and *Anastatica hierochuntica*, harvested in different area of Algeria and at different periods. The Ethnopharmacological study was performed with a questionnaire which was placed at the disposal of users of various professions. The antimicrobial activity was determined using diffusion disk and solid agar dilution methods against 12 bacteria, according to the recommendations of the Clinical and Laboratory Standards Institute. The ethnopharmacology study provided us useful information about how and the parts used for the preparation of extracts. The extracts obtained by maceration reveal variable yields depending on the polarity of the solvent used. The higher yields are those extracts obtained by the hydroalcoholic solvents. The *Anastatica hierochuntica* and *Ceratonia siliqua* extracts were by far the most interesting one and exerted significant antibacterial activity (MIC of 0.07 to 0.13 mg/ mL). In conclusion the results suggest that *Ceratonia siliqua* could serve as an alternative source of antibacterial agents for human protection against infectious diseases.

**ORAL PRESENTATION - 86**

**ANTIMICROBIAL EFFECT OF EXTRACTION OF *ZHUMERIA MAJDAE* AND 8-HYDROXY QUINOLINE SULPHATE ON VASE LIFE OF CUT CARNATION 'WHITE LIBERTY'**

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Carnation is one of the most popular flowers in the world. Regarding the economic importance of the carnation, in this study, the effects of extraction of an aromatic plant *Zhumeria majdae* (0, 10, 20 and 30 %) and 8-hydroxy quinoline sulphate (0, 200, 400 and 600 mg L<sup>-1</sup>) on the vase life of cut carnation cv. 'White Liberty' were investigated. The study was conducted as a factorial experiment based on RCBD with 16 treatments, 3 replications and 48 plots, each plot containing 5 cut flowers. The cut flowers transferred to preservative solutions contained of mentioned chemicals with 3% sucrose. The characteristics such as vase life, dry matter, fresh weight loss, vase solution uptake, the number of bacteria colonies in the vase solution and stem of cut flowers, and pigment carotenoid were evaluated. Maximum of flower vase life was related to treatment with 30% extraction + 200 mg L<sup>-1</sup> 8-HQS that increasing of vase life carnations 7.87 days to control. The results showed that 30% *Zhumeria* extract was more effective on the improvement longevity compared to 8-HQS. According to observations, *Zhumeria* extraction with its antioxidant and antimicrobial effects, inhibited the growth of microorganisms in vase solution and with increasing water uptake, considerably extended the vase life of cut carnations.

**ORAL PRESENTATION - 87**

**SCREENING OF THE ANTIOXIDATIVE DNA DAMAGE ACTIVITY OF SOME MEDICINAL PLANTS FROM JORDAN**

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Herbal medicinal products represent a major focus for drug development and industry and it holds a significant share in drug-market all over the globe. In here, a number of medicinal plant extracts from Jordan with high antioxidative capacity will be tested for their protective effect against DNA damage, which correlates future likelihood of cancer development or birth defects. In this study, a number of selected Jordanians ethanolic plant extracts were screened, so far, for their antioxidative DNA damage in vitro using 8-hydroxydeoxyguanisine assay, which is a standard biomarker for DNA damage. The following plant extracts (more than one plant part) were tested *Cupressus sempervirens* L., *Psidium guajava* (L.) Gaerth., *Silybum marianum* L., *Malva sylvestris* L., *Varthemia iphionoides* Boiss., *Eminium spiculatum* L. Blume, *Pistachia palaestina* Boiss., *Artemisia herba-alba* Asso, *Ficus carica* Linn L., *Morus alba* Linn, *Cucumis sativus* L., *Eucalyptus camaldulensis* Dehnh., *Salvia triloba* L., *Zizyphus spina-christi* L. Desf., and *Laurus nobilis* L. of them, *S. marianum* L., *P. palaestina* Boiss., *E. camaldulensis* Dehnh., *S. triloba* L., and *Z. spina-christi* L. Desf. extracts showed significant antioxidative DNA damage properties. Our ongoing work involves fractionation scheme for these active plant extracts. Best plants extract fractions will later be tested for their antimutagenic and cancer protective properties.



**ORAL PRESENTATION - 88**

**HPLC-UV ANALYSIS OF PHENOLIC COMPOUNDS IN THREE MOSSES SAMPLES EITHER COLLECTED FROM NATURE OR PRODUCED VIA IN VITRO CULTURE**

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Twelve different phenolic compounds (gallic acid, caffeic acid, p-coumaric acid, taxifolin, rosmarinic acid, kaempferol, genistein, quercetin, biochanin A, daidzein, formononetin, shikimic acid) were determined quantitatively by means of HPLC-UV in three species collected from nature in May (2012), the *Bryum capillare* and *Thamnobryum alopecurum* herbarium samples collected at different times and *Sphagnum palustre* samples which were grown with in vitro tissue culture. The highest phenolic compounds were obtained from MS1, MS4, MS5 and MS6 media for the in vitro spore culture of *B. capillare*, in vitro gametophyte culture of *B. capillare* these are MS3, MS4, MS5, MS7, MS8. Among mediums of in vitro gametophyte culture of *S. palustre*, which have the highest phenolic compounds are MS6, MS4 and MS2. Among mediums of in vitro spore culture of *T. alopecurum*, while the ones which have the highest phenolic compounds are MS2, MS3, MS4, MS5 and MS8, in vitro gametophyte culture of *T. alopecurum* this is MS1. Among the species in 12 different phenolic compounds, *B. capillare* had the highest amount. In *B. capillare* spores culture, the highest amount of shikimic acid was in MS4 medium (261,65 mg/g); in gametophyte culture, the highest amount of the same acid was in MS6 medium (220,4 mg/g), while in herbarium samples the highest amount of gallic acid collected from the 9-month-old extracts was 1,2 mg/g. The highest amounts of shikimic acid in *S. palustre* gametophyte culture, *T. alopecurum* spores culture and in gametophyte culture were determined in MS4 medium (251,88 mg/g), in MS8 medium (120,92 mg/g) and in MS8 medium (120,92 mg/g) respectively. However, in herbarium samples the highest amount of shikimic acid collected from the 4-month-old extracts was seen as 3,52 mg/g. By means of the obtained results, these three species were found to be rich in phenolic compounds.

**ORAL PRESENTATION - 89**

**INVESTIGATION OF THE ANTIBACTERIAL EFFECT OF THE EXTRACT OF ANTEP PISTACHIO (*Pistachia vera* L.) NUT PERICARP AGAINST CLINICAL ISOLATES OF METHICILLIN-RESISTANT *Staphylococcus aureus* (MRSA)**

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*Pistacia* species from the Anacardiaceae family are widely distributed in Gaziantep, Turkey. In previous studies, antimicrobial, cytotoxic, pharmacological, toxicological, antioxidant characteristics of some *Pistachia* species has been reported, but a study on the antibacterial activity of pericarp of *P. vera* L. has not been determined yet. Methicillin-resistant *Staphylococcus aureus* (MRSA) is commonly seen in hospitals, clinics since the mid-1990s. *Staphylococci* are readily spread from person to person and easily contaminate the environment. Topical agents such as mupirocin or fusidic acid can be used as a treatment for MRSA, but the organisms often become resistant. This study was conducted to determine the antibacterial effect of ethanolic extract of Antep Pistachio (*P. vera* L.) nut pericarp against clinical isolates of MRSA recovered previously from Sanliurfa, Harran University, Medicine Faculty Hospital patients using the disc agar diffusion method.

In conclusion, the extract of Antep Pistachio (*P. vera* L.) nut pericarp showed significant antibacterial effect against MRSA clinical isolates. Standard drugs with antibiotic action like cefoxitin, was also used against this bacteria as the control agent. The maximum zone of inhibition of 26 mm of ethanolic extract of *P.vera* was observed against MRSA. This is the first study on the antibacterial effect of Antep Pistachio (*P. vera* L.) nut pericarp against clinical isolates of MRSA.

**ORAL PRESENTATION - 90**

**CHEMICAL COMPOSITION AND ANTIMICROBIAL ACTIVITY OF THE ESSENTIAL OIL OF *THYMUS LANCEOLATUS* DESF. AN ENDEMIC THYME FROM ALGERIA**

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The aim of this study it's to investigate the chemical composition for the first time, and antimicrobial activities of essential oil (EO) of *Thymus lanceolatus* Desf. an endemic thyme from Tiaret province of Algeria. The chemical composition of hydrodistilled essential oil from flowering aerial parts has been analyzed by GC and GC/MS techniques, the antimicrobial activity was realised by agar disc diffusion method and MIC was determined in solid medium by direct contact. Essential oil of *T. lanceolataus* has been yielded of 2.336 (w/w) based on dry weight, the analyses cited above, led to the identification and quantification of 29 components, which accounted for 97.34% of the total oil. Oxygenated monoterpenes was the main fraction (88.31%) dominated by thymol (80.2%) as major component of this oil. Followed by carvacrol (6.25%), the other major constituents were p-cymene (2.67%), thymohydroquinone (1.96%) and  $\alpha$ -caryophyllene (1.63%). In the other hand this oil was found effective against all tested strains especially fungus, except *Pseudomonas aeruginosa* were low activity observed, in addition Gram (+) bacteria found to be more sensitive to the EOs than Gram (-) bacteria; this activity was ranging from  $12 \pm 2.65$ mm to  $60.00 \pm 0.00$ mm  $\emptyset$ , with the lowest MIC value of under 0.06mg/ml to 12.53mg/ml. This results provided the evidence that the studied plant might indeed be potential sources of natural antimicrobial agents.

**ORAL PRESENTATION - 91**

**PRELIMINARY PHYTOCHEMICAL SCREENING, PROXIMATE AND ELEMENTAL CONTENT DETERMINATION OF STEM BARK OF *CITRUS AURANTIFOLIA* LINN (LIME)**

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The stem bark of *Citrus aurantifolia* (linn) was investigated for its phytochemical constituents, proximate and elemental contents. The grounded air dried material was extracted with ethanol using soxhlet extractor and the percentage yield was estimated to be 13.93w/w. The preliminary phytochemical analysis of the extract reveals the presence of carbohydrate, saponins, terpenoids, cardiac glycoside flavonoids and steroids. The proximate analysis shows the percentage of dry matter (96.2%), carbohydrate (63.88%), crude fibre (31.0%), moisture content (3.8%), crude protein (2.62%) and fat (0.5%). The elemental contents was determined using Atomic Absorption Spectrophotometer (AAS) which indicate that Phosphorus (10.70mg/l), Potassium (1.00mg/l), Iron (4.37mg/l), Zinc (2.66mg/l), and Manganese (10.40mg/l), while Sodium, Lead, Cadmium and Chromium were not detected. The presence of the secondary metabolites may be an indication of the Pharmacological/medicinal properties of the plant, while the nutritional Importance of the plant is shown by its composition of the minerals described.

**ORAL PRESENTATION - 92**

**ANTIMICROBIAL ACTIVITY OF FRUITS, LEAVES, SEEDS AND STEMS EXTRACTS OF *ZIZIPHUS SPINA-CHRISTI***

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Petroleum ether, chloroform, methanol and aqueous extracts of the fruits, leaves, seeds and stems of *Ziziphus spina -Christi* belonging to the family Rhamnaceae were screened for their antimicrobial activity against six standard bacteria: two Gram positive (*Bacillus subtilis*, *Staphylococcus aureus*), four Gram negative (*Escherichia coli*, *Klebsiella pneumoniae*, *Proteus vulgaris* and *Pseudomonas aeruginosa*) and two fungi (*Aspergillus niger* and *Candida albicans*) using the cup plate agar diffusion method. The methanol extracts of all parts showed the highest activity against the bacteria tested followed by chloroform then petroleum ether. The aqueous extracts of all parts were inactive against all bacterial organisms. All four parts of the plant extracts showed no antifungal activity against the two fungi tested. The minimum inhibitory concentrations of the most active methanol extracts of fruits, leaves and stems were determined against standard bacteria using the agar plate dilution method. The antibacterial activity of five reference drugs and the antifungal activity of two reference drugs were determined against six bacteria and two fungi and their activities were compared with the activity of the plant extracts.

**ORAL PRESENTATION - 93**

**ANTICANCER POTENTIAL OF VARIOUS EXTRACTS AND FRACTIONS OF *SOLANUM NIGRUM***

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*Solanum nigrum* L. (Solanaceae) is locally called as Enab el Deib, Elmugad el aswad. Generally, in Sudan has been known to be used as folkloric medicine for cancer treatment. In the present work, we have aimed to investigate in vitro anticancer activity of eighty percent methanol and chloroform extracts of leaves and stems of *Solanum nigrum* using PC-3 human prostate cancer cell lines and Hela cervical cancer cells by MTT assay. All extracts in concentration 100 µg/ml showed anticancer activity in PC-3 and Hela and the highest percentage of growth inhibition obtained from stems methanol extracts on Hela 91.11% followed by leaves and stems methanol extracts (74.28 and 80.49 respectively) on PC-3. Leaves and stems of methanol extracts showed high growth inhibition percentages of cancer cell. These extracts were fractionated by using three solvent; Acetyl acetate, n- Butanol and Aqueous. Fractions were tested for their anticancer activity on PC3 prostate cancer cell line and Hela cervical cancer cell line using different fraction concentrations i.e. 50, 25 and 5µg/ml by MTT assay. The results obtained revealed that the most active fraction was the leaves n-Butanol fraction that inhibited both type of cancer cells with growth inhibition percentage of  $99.81 \pm 0.49$  on PC3 and  $98.59 \pm 0.21$  on Hela cell line with Inhibition Concentration for 50 percent of cells growth  $IC_{50} 5.92 \pm 0.46 \mu\text{g/ml}$  and  $1.6 \pm 0.17 \mu\text{g/ml}$  respectively. This was followed by stems n-Butanol and leaves Acetyl acetate fraction, whereas, leaves aqueous, stems aqueous and stems Acetyl acetate fraction were inactive on these tested cancer cells with  $IC_{50} > 50 \mu\text{g/ml}$ .

In conclusion, the results obtained indicate that *Solanum nigrum* leaves and stems methanol extracts have anticancer activity on prostate cancer, cervical cancer. This result supports the traditional use of *Solanum nigrum* for the treatment of cancer in different regions of the Sudan. More investigation is running to know the mechanism of growth suppression of tumor cell lines and whether it induces apoptosis or not and an intensive work is running to isolate and identify the potential inhibitory compounds.

**ORAL PRESENTATION - 94**

**BIOLOGICAL ACTIVITIES OF *JUNIPERUS PHONICEA* TAR,  
GROWING WILD IN BECHAR REGION, SOUTH WEST OF ALGERIA**

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Biological activities of medicinal plants have been recognized for a long time. In the present study, antioxidant and antimicrobial properties of *Juniperus phonicea* Tar, were investigated for their antimicrobial activities against six strains of Fungi and six strains of bacteria. Its sensitiveness (Minimal Inhibition Concentration) to mentioned micro-organisms in the following: *Klebsiella pneumoniae* (0.032 mg/ml), *Staphylococcus aureus* (0.05 mg/ml), *Pseudomonas aeruginosa*, *Enterococcus faecalis*, *Escherichia coli*, *Listeria monocytogenes* (0.1mg/ml). For fungi, and according to these results, the tar has great antifungal activity against all the investigated strains. The growth inhibition rate ranged from 0.006 to 0.1mg/ml with the highest inhibition values observed against *Fusarium oxysporum* f.sp *albedinis* (1)(0.006 mg/ml). The antioxidant capacity of the tar was evaluated using hydrogen peroxide scavenging, 1,1-diphenyl-2-picrylhydrazyl (DPPH), showed potent antioxidant ability ( EC<sub>50</sub>=1.45±0.16 mg ml<sup>-1</sup>) compared to the ascorbic acid used as positive control ( EC<sub>50</sub>=2.19±0.12 mg ml<sup>-1</sup>) .

**ORAL PRESENTATION - 95**

**PHYTOCHEMICAL PROFILING OF WILD *ARUM PALAESTINUM* (ARACEAE) LEAVES**

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*Arum palaestinum* is a species of flowering herbaceous perennial plant belonging to the Araceae family and native to the Mediterranean. Arum is an edible plant and widely used in cooking, it is also used in the traditional medicine for cancer treatment. Nevertheless, this plant was found to be one of the most potent anti-cancerous (particularly colon cancer) plant in Palestine. This besides, it's effective action against internal bacterial infections and poisoning. These properties have been partly assigned to the phenolics and triterpenes composition. Although, an important role of the naturally occurring antioxidants for human health, and the added-value of this plant in the traditional and folklore medicine, only few works have reported the phytochemical composition of *A. palaestinum*. Sample was extracted with aqueous methanol, centrifuged, followed by supernatant collection, evaporated, and finally recovered with aqueous methanol. The analysis of the phytochemicals from *A. palaestinum* extract was carried out on an Agilent 1200 series LC equipped with an Agilent Zorbax C18 column. Acidic water and acetonitrile were used as mobile phases. The HPLC system was coupled to Q-TOF-MS, equipped with an (ESI) source operated in the negative ion mode over the range from  $m/z$  50-1100. In this context, we aimed to characterize the phytochemical composition of the hydro-methanol extract of Arum palaestinum leaves by means of HPLC-ESI-MS/MS. In the present work, more than 100 phytochemical compounds have been identified in *A. palaestinum*, highlighting the importance of this plant as a functional food and a vital source of bioactive phytochemicals.



**ORAL PRESENTATION - 96**

**CITRUS LEMON ESSENTIAL OIL AND AQUEOUS PHASE OF INDUSTRIAL-LEMON-JUICE'S RAW WASTE AS PRESERVATIVES AGAINST *SALMONELLA ENTERITIDIS* INOCULATED IN CHICKEN MEAT**

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Essential oil (EO) and aqueous phase (AP) of *Citrus lemon* were obtained by hydro-distillation of the raw waste of an industrial lemon juice. The EO yield's is very high in the order of 6.75%. The chemical composition of the EO was rich with monoterpenes: limonene (50.77 %). Despite, the AP were rich with total phenols (36.96±1.2 µg/g). Strong bactericidal effects were shown, the minimal cidal concentrations (MCCs) values ranged from 0.25 to 10 µg/ml for the EO and 187.5 to 1500 µg/ml for the AP. Furthermore, the inhibitory effect of the EO and AP were evaluated by immersion for 15 min and by microatmosphere treatment against a foodborne pathogens belonging to *Salmonella enteritidis*, experimentally inoculated (10<sup>3</sup> CFU/g) in chicken meat, at different concentrations of the EO and AP and stored at 4-7°C for 16 days. AP showed a bacteriostatic effect against *S. enteritidis* with 0.25- 0.5 and 1 (mg of AP/g of meat). However, the bacterial load is still not in accordance with human consumption (> 10<sup>2</sup> CFU/25 g of meat). Moreover, EO showed a bactericidal effect with the highest concentration (1% v/g). However, the EO vapour activity was most effective even at the lowest concentration (0.5‰ (v EO/v boxes). The sensory evaluation, reveals that the treatment of the meat by immersion at the highest concentrations of EO and AP, give a bitter taste and were rejected. But, the treatment of the meat by the EO vapour's was the best accepted. Results obtained herein, may suggest that the EO of raw waste of juice industry and its water extract possess antimicrobial activity, and therefore, they can be used in biotechnological fields as natural preservative ingredients in food and/or pharmaceutical industry.

**ORAL PRESENTATION - 97**

**CHEMICAL COMPOSITION AND ANTIFUNGAL ACTIVITY OF EUCALYPTUS SPP. ESSENTIAL OILS AGAINST *BISCOGNIAUXIA MEDITERRANEA* (DE NOT.) KUNTZE, AGENT OF CORK OAK CHARCOAL CANCKER IN TUNISIA**

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*Biscogniauxia mediterranea* (De Not.) Kuntze associated with the decline of *Quercus suber* has been reported in many forests in many regions of the Mediterranean basin. This pathogen causes charcoal canker on the trunk. *B. mediterranea* was noted in Tunisian cork oak forests since 1967 causing damage mainly after a long drought period<sup>1</sup>. At present, there are no effective means of controlling this pathogen and the need to define suitable measures in order to control its infections in forest has become a priority. In this regard, essential oils may be a good candidate, as they are in general considered minimum-risk pesticides. There is a lack of research on the use of essential oils in forest and in nursery. Therefore, the objective of this work is to evaluate in vitro the antifungal activity of the essential oil extracted from *Eucalyptus sidéroxylon*, *E. camaldulensis*, *E. leucoxylon*, *E. rudis*, *E. lehmanii* against *B. mediterranea* using the disk diffusion methods on PDA plates. The essential oils were tested at different concentrations. Twelve compounds, representing 96,94 % of the total essential oil, were identified by chromatography analysis from *E. sidéroxylon*. The principal constituent is 1.8 cinéole (87.39 %). Seventeen compounds, representing 75,59 % of the total essential oil, were identified from *E. camaldulensis*. The principal constituents are p-cymène (30.07 %), le Spathulenol (14.58 %) and 1.8 cinéole (11.59 %). The essential oil of *E. leucoxylon* consists of 20 compounds representing 84,86 % of the total compounds. The principal constituent is 1.8 cinéole (44.95 %). The essential oil of *E. rudis* consists of 17 compounds representing 88.38 % of the total essential oil. The principals constituents are p-cymène (31.27 %), 1.8 cinéole (11.8) and Spathulenol (9.37 %). Ten compounds representing 93.8 % of the total essential oil, were identified by chromatography analysis from *E. lehmanii*. The principal constituents are 1.8 cinéole (67.15 %) and  $\alpha$ -pinène (10.58 %). The pure essential oil of *E. camaldulensis*, *E. rudis* and *E. Leucoxylon* showed a strong inhibitory effect on the mycelial growth of *B. mediterranea* by 33 to 40 %. The activities of the essential oil were associated to the major compound of oils. Our results may provide a basis for the development of new control strategies of *B. mediterranea* on *Q. suber*.

<sup>1</sup> Delatour.1969. Quelques observations de phytopathologie forestière faites en Tunisie. 11p.

**ORAL PRESENTATION - 98**

**EFFECT OF SOLVENT EXTRACTION ON THE BIOACTIVE SUBSTANCES AND THE ANTIOXIDANT CAPACITY OF DRY SALTED OLIVES**

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There is no single universal method to develop a procedure suitable for extraction of all plant phenolics because of the complexity of these compounds and the possibility of their interaction with other components present in the plant matrices<sup>1</sup>. This work was conducted to evaluate the effect of solvent nature (acetone, ethanol and methanol) and solvent concentration (50–90%) on the recovery of bioactive substance contents (polyphenols, flavonoids and proanthocyanidins) and antioxidant activity (ferric-reducing power and free radical scavenging activity) of olive extract. Spectrophotometric methods were used for analysis. The results showed that the nature and the concentration of solvent affects significantly ( $p < 0.05$ ) the analyzed compound contents and antioxidant activity of olive. We find that the most appropriate solvent for extraction of total polyphenols (2752 mg/100g) and proanthocyanidines (29 mg/100g) is 50% acetone. Concerning the flavonoid amount, the highest contents were obtained in both 50% ethanol and 70% ethanol extracts (1070 mg/100g). Furthermore, the 50% acetone extract exhibit the highest reducing power, while, the highest antiradical activity was achieved with 50% ethanol (776 mg/100g). On the other hand, High correlation was noted between phenolic contents and both ferric-reducing and free radical scavenging.

**Reference**

<sup>1</sup>Naczki, M. and F. Shahidi. 2006. Phenolics in cereals, fruits and vegetables Occurrence, extraction and analysis. *Journal of Pharmaceutical and Biomedical Analysis*, 41, 1523–1542.

**ORAL PRESENTATION - 99**

**IN VITRO AND IN VIVO ANTIFUNGAL ACTIVITY OF LEAVES EXTRACTS OF TWO TUNISIAN PLANTS AGAINST *PENICILLIUM* SP. AND *ASPERGILLUS* SP. THE CAUSE OF CITRUS ROT**

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Nowadays, tunisian citrus producers attach particular care to the "Naval" variety, which represents an important part of their local sales and export. Therefore, finding a storage solution to address the rot problems during the storage phase is needed. The aqueous extracts of two plants species olive and pumpkin, harvested in regions of southern Tunisia, were screened for their in vitro and in vivo antifungal activity against *Penicillium* sp. and *Aspergillus* sp. that cause citrus rot. The phytochemical analyses proved the richness of olive extract in phenolic compounds (500 mg/ml). Despite, the pumpkin extract was poor in total phenols (26 mg/ml). Strong inhibitory effects were shown. In fact, the pumpkin extract had the least minimal inhibitory concentration (MIC) value (0,81 mg/ml) against *Penicillium* sp. Also, the pumpkin extract also showed best results against both *Penicillium* sp. and *Aspergillus* sp in vivo with a radial growth reduction of 4.9 cm compared to controls placed in the same commercial storage conditions (15° C).

In order to understand the efficacy of these extracts, we determined the mode of action by the assay of proteins and enzymes involved in activation of the plant natural defenses of and improvement of product storage condition. Our results showed that these extracts enhanced the total protein content and increased the activity of phenylalanine ammonia lyase in treated citrus. However, these extracts decreased the activity of catalase in treated citrus. Since the proteins described previously are involved in activation of the natural defenses of plants, we conclude that extracts from leaves of olive and pumpkin have a high potential to control rot of citrus and may be used as an effective biological preservative without any toxic effects.

**ORAL PRESENTATION - 100**

**WATER PURIFICATION AND ANTIBACTERIAL ACTIVITY OF  
*CYMBOPOGON PROXIMUS* AGAINST COLIFORM BACTERIA**

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*Cymbopogon proximus* is traditionally used in Sudan to purify and give favorable flavor to drinking water<sup>1</sup>. This study aimed to examine the antimicrobial effect of *Cymbopogon proximus* in water against Coliform bacteria (*Escherichia coli*, *Enterobacter coloaee*, *Klebsiella pneumoniae*, *Citrobacter freundii*). Two sources of water sample were used, Blue Nile and White Nile waters. The whole plant and grinded form were added to water samples. The plant was extracted with 70% methanol and examined against the test microorganisms in different concentrations (100, 50 and 25 %) using disk diffusion technique<sup>2</sup>. The results indicated that the plant had effectiveness against Coliform bacteria.

In conclusion, *C. proximus* has a vast effect in both water purification and killing of coliform bacteria, therefore, using of *C. proximus* in water purification is recommended.

**References**

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**ORAL PRESENTATION - 101**

**COMPARATIVE STUDY OF OIL-BEARING SPECIES AND INTRASPECIFIC TAXONS *ROSA* (ROSACEAE) AND *EREMOTHECIUM* (EREMOTHECIACEAE)**

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Nowadays the plantation cultivation of an oil-bearing rose is not able to cover the increasing demand of food, cosmetic, chemical, pharmaceutical industries because of its limitations and laboriousness. Therefore, the interest to alternative sources of aromatic products with a rose scent, particularly to strains of homothallic ascomycetes *Eremothecium ashbyi* Guilliermond and *E. gossypii* Kurtzman, is rising. The aim of the carried out research was to analyze structural characteristics of the oil-accumulation organization of *Rosa* L. and *Eremothecium* Borzi in comparative aspects. The *Rosa* L. species (*R. alba* L., *R. centifolia* L., *R. gallica* L., *R. damascena* Mill, *R. rugosa* Thunb., *R. canina* L., *R. cinnamomea* L., *R. odessiana* Hort., *R. lutea* Mill.) and the *E. ashbyi* Guilliermond (VKM F-124, VKM F-3009, VKM F-4565D, VKM F-4566D, VKPM F-36, VKPM F-340) and *E. gossypii* Kurtzman (VKM F-2627, VKM F-3276) strains were studied. The features of secretory structures of the *Rosa* and *Eremothecium* species, presented as endogenous cavities and glandular epidermal cells and nonspecialized secreting hyphae, respectively, were found out. The firstly carried out by us investigation, of anatomical and cytomorphological aspects of biosynthesis, accumulation, and secretion of essential oils with a rose scent is crucial for the development of new ways to produce them and the characteristic of biological roles of *Rosa* and *Eremothecium* secondary metabolites.

**ORAL PRESENTATION - 102**

**INVESTIGATION OF ANTIBACTERIAL EFFECT OF *Pistacia vera* L. NUT PERICARP EXTRACT AGAINST CLINICAL ISOLATES OF METHICILLIN-RESISTANT *Staphylococcus aureus* (MRSA) and VANCOMYCIN RESISTANT *Enterococcus* (VRE)**

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In previous studies pharmacological, antioxidant characteristics of some *Pistacia* species has been reported, but a study on the antibacterial activity of pericarp of *P. vera* L. has not been studied yet. Methicillin resistant *S. aureus* is a significant cause of both health care associated and community-associated infections since mid-1990s. MRSA strains have acquired a gene that makes them resistant to all beta-lactam antibiotics. Hospital-associated strains of this microorganism are serious nosocomial pathogens that have become resistant to most common antibiotics, and treatment are challenging. The emergence of vancomycin resistance in enterococci presents a serious concern for physicians. Treatment options are often limited to experimental compounds with unproven efficacy. Mortality rates in patients with VRE bacteremia may reach 60% to 70%. This is the first study on the antibacterial effect of ethanolic extract of *P. vera* L. nut pericarp against clinical isolates of MRSA and VRE using the disc agar diffusion method. The extract of *P. vera* was examined for its potential antibacterial activity which was previously prepared from nut pericarp, slight activity was observed at extract concentration 25 µg/ml, whereas higher concentration showed significant antibacterial activity against MRSA clinical isolates. While no antibacterial effect was observed against Vancomycin resistant *Enterococcus* clinical isolates. The results indicated that the extract of *P. vera* L. nut pericarp have the capacity to inhibit the growth of MRSA. Standard drugs with antibiotic action like cefoxitin, was also used against MRSA as the control agent and vancomycin was used as the control agent against VRE. The maximum zone of inhibition observed was 24 mm against MRSA. MRSA was very sensitive while VRE was resistant to *P. vera* Ethanolic extract.

**ORAL PRESENTATION - 103**

**STUDY OF ACUTE TOXICITY AND HEALING ACTIVITY OF THE ESSENTIAL OILS OF *ROSMARINUS OFFICINALIS* AND *POPULUS ALBA* IN WISTAR RATS**

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The plants were still used for therapeutic reasons. They represent an important source of many chemical structures of compounds. For this purpose, the extraction of essential oils from two plants *Rosmarinus officinalis* and *Populus alba* was effected by hydrodistillation. The study of the toxicological properties was carried out on Wistar albino variety of rats that received doses of 0.5 to 5 mg / Kg of the extract of the essential oil by intra-peritoneal injection. As part of the pre-clinical studies testing the healing activity of essential oil of Rosemary and White poplar, wounds is carried out on one side of each rat under the ethical rules on laboratory animals and then treated with ointments made at different doses of essential oils of *R. officinalis* and *P. alba*. Measuring parameters related to the neoformation is essential for evaluating the healing process as the percentage of contraction and the healed area. The results indicate the absence of severe clinical signs and dead rats during the 14 days of observation. Thus, the essential oil of *Populus alba* and even *Rosmarinus officinalis* administered intraperitoneally has no acute toxicity in rats. In other hand, the inductive effect of healing is significantly greater in animals treated with the ointment Madécassole with a lesser degree for the rats receiving the ointment of the essential oils of *R. officinalis* and *P. alba*. These essential oils have a marked healing effect during the proliferative phase of wound healing process induced by wounds in rats.



**ORAL PRESENTATION - 104**

**HEPATOPROTECTIVE ACTIVITY AND PHYTOCHEMICAL STUDY OF  
*ALBIZIA LEBBECK* FLOWERS**

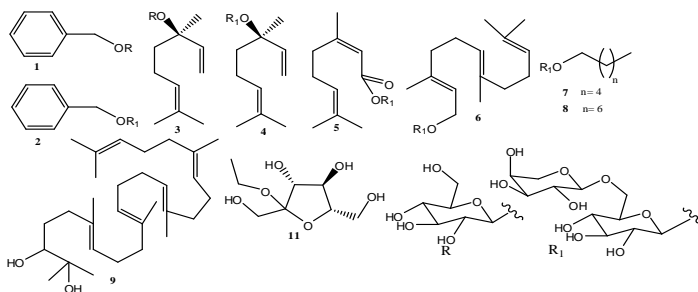
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The genus *Albizia* (Fabaceae), comprises approximately 150 species, mostly trees and shrubs native to tropical and subtropical regions of Asia and Africa. *A. lebeck* is used in Ayurvedic medicine to treat several inflammatory pathologies such as asthma, arthritis and burns. In traditional Chinese medicine the flowers are commonly used to treat anxiety, depression and insomnia. The genus *Albizia* has been known to contain many classes of bioactive secondary metabolites including saponins, alkaloids, flavonoids.. etc.. The dried powder flowers of the titled plant were exhaustively extracted by maceration with 70% ethanol. The total alcoholic extract showed a highly significant ( $P < 0.001$ ) protective effect on CCl<sub>4</sub> induced liver toxicity. Best improvement in biochemical parameters comparable with silymarin was observed in AST and bilirubin levels. Moderate improvement was observed in the levels of ALT, ALP and GGT. Significant ( $P < 0.01$ ) improvement in TP and MDA was observed. However, effect on NP-SH was insignificant. Aiming at discovery of hepatoprotective leads from natural product, the total alcohol extract was successively partitioned with n-hexane, dichloromethane, ethyl acetate and n-butanol. Intensive chromatographic fractionation and purification of dichloromethane and n-butanol extracts led to the isolation of 11 compounds identified as benzyl 1-O- $\beta$ -D- glucopyranoside (1), benzyl 6-O- $\beta$ -L-arabinopyranosyl  $\beta$ -D-glucopyranoside (2), Linalyl  $\beta$ -D-glycopyranoside (3), Linalyl 6-O- $\beta$ -L-arabinopyranosyl  $\beta$ -D-glucopyranoside (4), 2E)-3,7-dimethylocta-2,6-dienoate-6-O- $\beta$ -L arabinopyranosyl- $\beta$ -D-glucopyranoside (5), 1-O-[6-O- $\beta$ -L- arabinopyranosyl  $\beta$ -D-glucopyranoside] -(2E,6E)-farnesol (6), Creoside (7), Rodiooctanoside (8), 2,3-dihydroxy-2,3-dihydrosqualene (9), luteolin (10) and ethyl fructose (11). The structure of these isolated compounds were elucidated by spectroscopic methods.. Compounds 6 and 9 are reported here for the first time from natural source.



**ORAL PRESENTATION - 105**

**IN-VITRO ANTIBACTERIAL AND ANTIOXIDANT ACTIVITY OF THYMUS NUMDICUS POIR. AND SALVIA OFFICINALIS L. ESSENTIAL OILS ALONE AND IN COMBINATION**

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**Background/Introduction:** Resolve the problem of drug resistance by pathogens, which is increasing, is a great challenge to treat infectious diseases. The combination of antibacterial agents in order to get a synergistic effect seems to be a good way. Synergism between antioxidant molecules has also a great interest especially for the food industry. The aim of this study was to assess the antibacterial and antioxidant activity of the essential oils (EO) obtained from aerial parts of *Thymus numidicus* Poir., which is a poorly studied plant, and *Salvia officinalis* L. (Labiatae), on another hand to define the interaction of these EOs with some antibiotics for the antibacterial study and with DL- $\alpha$ -tocopherol for the antioxidant one. **Methods:** The antibacterial activity was performed against five gram negative bacteria and one gram positive bacterium but only three of them were used for the antibacterial combinations. The checkerboard method (MHB microdilution method), followed by repicages on nutrient agar to determine the MBCs, was used to assess this activity, while the free radical 2,2-diphenyl-1-picrylhydrazyl (DPPH) scavenging test was performed to assess the antioxidant one.

**Results:** The EO of thyme showed a significant antibacterial activity against all the strains tested (MBCs ranged from 0,117 to 0,469 mg/ml), higher than sage's EO (MBCs ranged from 3,749 to 14,995 mg/ml) and no synergistic effect had been shown for all the combinations performed. The EO of sage showed a weak antioxidant activity (IC<sub>50</sub> = 1999,28  $\pm$ 168,89  $\mu$ g/ml). In contrast, thyme EO showed a good one (IC<sub>50</sub> = 156,53 $\pm$ 20,23  $\mu$ g/ml) but lower than DL- $\alpha$ -tocopherol (4,1 $\pm$ 0,25  $\mu$ g/ml). Synergy effect was observed in scavenging the DPPH between DL- $\alpha$ -tocopherol and thyme EO but antagonism was shown with thymol (one of its main compounds).

**ORAL PRESENTATION - 106**

**PROTECTED EFFECT OF CACTUS (*OPUNTIA FICUS INDICA*) EXTRACTS AGAINST LITHIUM-INDUCED OXIDATIVE STRESS AND HEPATIC TISSUE DAMAGE IN RATS**

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The aim of this study was to investigate preventive effect of regular ingestion of cactus (*Opuntia ficus indica*) against lithium carbonate ( $\text{Li}_2\text{CO}_3$ ) induced-hepatic tissue damage. Treatments with lithium carbonate (95mg/kg, ip) (Li group) or with cactus juice (Cla group) were performed alone or in combination (Cla + Li group) in rats. At the end of treatment, blood and liver were used for biochemical parameters analyses as well as histological, lipid peroxidation, and antioxidant enzyme analyses.

Lithium carbonate treatment increased lactate dehydrogenase (LDH), aspartate aminotransferase (AST), alanine aminotransferase (ALT) activities as well as cholesterol and triglycerides levels in serum. Moreover, lithium carbonate significantly increases lipid peroxidation, superoxide-dismutase (SOD) and catalase activities but increases glutathione peroxidase (GPx) activity in liver. At histopathological level, lithium induces significant changes in liver structure with enhanced inflammatory signs and necrosis hepatic impairment. However, pre-treatment of rats with cactus juice prior to lithium exposition abrogates all altered parameters, reduces lipid peroxidation level similar to control and preserve normal liver histological structure.

In conclusion, cactus juice supplementation prevents efficiently lithium-induced hepatic tissue damage mediated by oxidative imbalance and transaminases overactivity.

**ORAL PRESENTATION - 107**

**IN VITRO AND IN VIVO INVESTIGATION ON THE POTENTIAL ANTI-INFLAMMATORY ACTIVITY OF *SALVIA TRILOBA* THROUGH INHIBITION OF PRO-INFLAMMATORY CYTOKINES: TNF- $\alpha$ , IL-6, AND IL-1 $\beta$**

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Pro-inflammatory cytokines such as tumor necrosis factor- $\alpha$  (TNF- $\alpha$ ), interleukin-6 (IL-6) and interleukin-1 $\beta$  (IL-1 $\beta$ ) are involved in inflammation, immunity and cellular organization, and have emerged as the major pro-inflammatory cytokines in rheumatoid arthritis (RA) pathogenesis and many other inflammatory diseases. The current pharmacological treatment continues to be inadequate in preventing the progression of this disease to the stage of irreversible joint erosion and deformity. Therefore, development of new anti-inflammatory and anti-rheumatic drugs continues to be essential. There is growing interest in the pharmacological potential of natural products.

*Salvia* are being used extensively in folk medicine in Jordan and many other Mediterranean countries and this study aimed to investigate the ability of *S. triloba* to inhibit pro-inflammatory cytokines production in peritoneal macrophages in vitro cellular model and in balb/c mice as an animal model. Both models are stimulated with LPS and treated with *Salvia* extract and compared with groups that are stimulated but not treated and a normal control group for each model. Cytokines concentrations were measured by murine Elisa kits.

The results obtained showed a potent inhibitory effect of *S. triloba* on the production level of pro-inflammatory cytokines in both models. Data obtained from this study is encouraging for considering *S. triloba* extract to be as potential anti-inflammatory candidate to be developed for the treatment of inflammatory diseases mediated by overproduction of pro-inflammatory cytokines such as rheumatoid arthritis.

**ORAL PRESENTATION - 108**

**ANTIOXYDANT ACTIVITY OF SOME ALGERIAN HONEY AND PROPOLIS**

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The objective of this study was to evaluate the antioxidant activity of some honey and propolis samples, harvested from the region of Bejaia. First, we have performed a quantitative analysis of the total polyphenols and flavonoids content. To maximize the extraction of polyphenols, four solvents (water, ethanol 50 %, ethanol 85 % and methanol 50 %) were tested. After that, the antioxidant capacity of the samples was estimated by determining the reducing power.

The polyphenol contents of propolis are significantly different from those of honey. The water permits a better extraction of polyphenols from honey, whereas ethanol (85 %) was the best solvent of polyphenol extraction from the propolis samples. Regarding the contents of flavonoids, they were higher in the propolis samples. The study of the antioxidant activity by the method of reducing power showed that the analyzed samples exhibit interesting antioxidant activity. A good correlation was found between the phenolic content and the reducing power of the samples.

**ORAL PRESENTATION - 109**

**LEAF EXTRACTS FROM *TEUCRIUM RAMOSISSIMUM* PROTECT AGAINST DNA DAMAGE IN HUMAN LYMPHOBLAST CELL K562 AND ENHANCE ANTIOXIDANT, ANTIGENOTOXIC AND ANTIPROLIFERATIVE ACTIVITY**

Mohamed Ben Sghaier<sup>1</sup>, Manel Ben Ismail<sup>2</sup>, Lamia Hamrouni<sup>1</sup>, Kamel Ghedira<sup>2</sup>, Leila Chekir-Ghedira<sup>2,3</sup>

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The in vitro antioxidant, antigenotoxic and antiproliferative activities of *Teucrium ramosissimum* extracts were investigated. The antioxidant activities of the tested extracts were evaluated through three chemical assays: The Cupric reducing antioxidant capacity, the reducing power and the ferric reducing antioxidant power. TR3C fraction from methanol extract showed the best antioxidant activity evaluated by the CUPRAC, RP and FRAP assays with TEAC values of 4.04, 1.77 and 1.48  $\mu\text{M}$  respectively compared to control. Yet, TR3E fraction exhibited the lowest antioxidant effect with a TEAC values of 1.97, 0.408 and 0.35  $\mu\text{M}$  respectively.

All the tested extracts were also found to be effective in protecting plasmid DNA against the strand breakage induced by hydroxyl radicals. Furthermore, the effects of *T. ramosissimum* extracts on cell proliferation were also examined. The cytotoxic study revealed that methanol extract significantly inhibited the proliferation of K562 cells ( $\text{IC}_{50} = 150 \mu\text{g/mL}$ ). The antigenotoxic properties of these extracts were investigated by assessing the induction and inhibition of the genotoxicity induced by the direct-acting mutagen, hydrogen peroxide ( $\text{H}_2\text{O}_2$ ), using an eukaryotic system; the "Comet assay." The results showed that all the extracts inhibited the genotoxicity induced by  $\text{H}_2\text{O}_2$ , and particularly TR3E fraction from methanol extract (96.99%) and methanol extract (96.64%).

**ORAL PRESENTATION - 110**

**THE PROTECTIVE EFFECT OF *TRIBULUS TERRESTRIS* FRUITS AGAINST TESTICULAR TOXICITY IN RATS**

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**Aims:** This study was carried out to assess the protective and antioxidant activities of the methanolic extract of *Tribulus terrestris* fruits (METT) against sodium valproate (SVP)-induced testicular toxicity in rats. **Material and methods:** Fifty mature male rats were randomly divided into 5 equal groups (n=10). Group 1 was used normal (negative) control, and the other four groups were intoxicated with SVP (500 mg/kg-1, orally) during the last week of experiment. Group 2 was kept intoxicated (positive) control and groups 3, 4 and 5 were orally pretreated with METT in daily doses 2.5, 5.0 and 10.0 mg/kg-1 for 60 days, respectively. Weights of sexual organs, serum testosterone, FSH and LH levels, semen picture, testicular antioxidant capacity and histopathology of testes were the parameters used in this study.

**Results:** Oral pretreatment with METT significantly increased weights of testes and seminal vesicles; serum testosterone, FSH and LH levels and sperm motility, count and viability in SVP-intoxicated rats. METT enhanced the activity of testicular antioxidant enzymes and partially alleviated degenerative changes induced by SVP in testes. **Conclusion:** The pretreatment with METT has protective and antioxidant effects in SVP-intoxicated rats. Mechanisms of this protective effect against testicular toxicity may be due to the increased release of testosterone, FSH and LH and the enhanced tissue antioxidant capacity. These results affirm the traditional use of *Tribulus terrestris* fruits as an aphrodisiac for treating male sexual impotency and erectile dysfunction in patients. The study recommends that *Tribulus terrestris* fruits may be beneficial for male patients suffering from infertility.

**ORAL PRESENTATION - 111**

**CHEMICAL COMPOSITION OF THREE EDIBLE WILD PLANTS FORM VAN PROVINCE**

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Van province, with distinguished microclimate, has rich plant diversity in Turkey. From past to present a number of wild plants have been used as food purposes and known as wild edible plants. *Marrubium parviflorum* Fisch & C.A.Mey. subsp. *parviflorum*, *Mentha pulegium* L. and *Salvia pocolata* Nábelek are of abundantly consumed wild plant by local people in Van province. Wild edible plants are good source for minerals and they have useful effects on human health. In this point of view, wild plants mentioned above were analyzed their nutritive value and mineral compositions. After biologically identification, collected plants were cleaned from foreign materials and separated into used parts. Afterwards, plants were dried under shade and prepared for chemical analysis. Dry matter, total ash, N %, crude protein, crude fiber and pH were determined in the used plants parts. Additionally, mineral composition that useful - hazardous for human health (Ca, Cd, Co, Cr, Cu, Fe, K, Mg, Mn, Na, P, Pb, S and Zn) of the samples were analyzed. Results in this research showed that *Mentha pulegium* L. contained high value of mineral elements such as total N (2.56 %), calcium (15.98 g/kg), sulphur (1.42 g/kg), manganese (39.82 mg/kg) and zinc (19.05 mg/kg)), and high ash value in comparison with other plants. Also, *Marrubium parviflorum* had maximum mineral elements such as sodium (0.73 g/kg), phosphorus (1.45 g/kg) and crude protein (16 %), crude fiber (43.50 %) value in comparison with other plants in this study. In addition *Salvia pocolata* contained high value magnesium (4.36 g/kg), potassium (12.37 g/kg) and iron (569.03 mk/kg).



**ORAL PRESENTATION - 112**

**TUNISIAN CITRUS AURANTIUM L. PEELS SECONDARY  
METABOLITE CHEMICAL COMPOSITION INVESTIGATION**

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Natural products have proven to be an invaluable source of new drugs although very few have been exploited. Sour orange *Citrus aurantium* L. is known in Tunisia for Neroli production by its flowers hydro-distillation. The non fertilized flowers became the named fruit sour oranges. All vegetable parts of this tree have been reported to be important for Tunisian folk medicine and world wild. Apart from the essential oil composition, little is still known about the chemical composition of secondary metabolites especially in the peels. This work is focused on evaluating the metabolic profile of the raw methanolic extract of the peels. A great number of secondary metabolites were isolated and identified through extensive LC-MS and NMR techniques, in particular belonging to the biogenetic class of coumarins.

**ORAL PRESENTATION - 113**

**WHITENING SKIN EFFECTS OF ARGANIA SPINOSA BY-PRODUCT**

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The color of the skin, hair and eyes of mammals (and other species) is derived from the production and distribution of pigmented biopolymers known as melanins. This pigment protects the skin and eyes from the harmful effects of UV irradiation. However, the overproduction and accumulation of melanin in the skin could lead to pigmentary disorders, such as freckle, melasma, post-inflammatory melanoderma and even melanoma.

*Argania spinosa* (L.) Skeels (Sapotaceae) is an endemic tree of Morocco. It presents great ecological and socio-economic roles in this area. The fruit of *A. spinosa* has an oleaginous kernel from which well-known oil is used in folk medicine and cosmetics. In this work, we evaluated the effect of argan oil and argan press-cake, the main by-product of argan oil extraction, on melanogenesis and its action mechanism in B16 murine melanoma cells. Cells treated with argan oil or argan press-cake showed a significant melanin biosynthesis inhibitory effect on B16 cells in a time-dependent manner without cytotoxicity.

The results of Western blot and Real time PCR analysis suggest that argan oil and argan press-cake inhibits melanogenesis through the down-regulation of microphthalmia-associated transcription factor (Mitf) and its downstream genes, tyrosinase, dopa-chrome tautomerase and tyrosinase related protein1. The results of this study provide the scientific basis for the traditionally established benefits of *Argania spinosa* and present its therapeutic potential against hyperpigmentation disorders.

**ORAL PRESENTATION - 114**

**ANTIOXIDANT AND ANTI-INFLAMMATORY ACTIVITIES OF  
*ARGANIA SPINOSA* LEAVES**

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*Argania spinosa* of the family sapotaceae is an endemic species of Morocco. This tree plays an important socio-economic and ecologic interest for centuries in Morocco. The kernels of the fruit are used to produce well-known edible oil. Argan oil, having been used as a nutritious food and as cosmetics for centuries by Moroccan people, has been a subject of much scientific interest in the last few decades, confirming its multifarious biological, therapeutic and functional food applications. Traditionally argan leaves are used to treat gastritis, diarrhea, fever, infected wounds and scabies animals. The aim of this work is to evaluate the anti-inflammatory effects and antioxidant activities of *Argania spinosa* leaves. The antioxidant of argan leaves extracts was evaluated using different tests,  $\beta$ -carotene bleaching method, reducing power, DPPH scavenging and ABTS cation radical-scavenging assays. In addition the anti-inflammatory effects of argan leaves extract on xylene-induced oedema formation in mice ear were evaluated in vivo. The obtained results showed that argan leaves exhibit an interesting antioxidant and anti-inflammatory activities.

This study indicates that *Argania spinosa* leaves can be considered as a potential anti-inflammatory agent and as a source of natural antioxidants comparable to some synthetic antioxidants commonly used in the food industry.

**ORAL PRESENTATION - 115**

**IN VITRO ANTIMICROBIAL EVALUATION OF SOME  
UMBELLIFERONE DERIVATIVES**

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We report a feasible study concerning synthesis under conventional methods, structure elucidation and in vitro evaluation of antimicrobial activities of some umbelliferone derivatives. The structures of the synthesized compounds were assigned by elemental and spectral analysis: IR, <sup>1</sup>H-NMR, <sup>13</sup>C-NMR, 2D COSY, 2D HETCOR (HMQC and HMBC). All of these derivatives were screened in vitro for antimicrobial activity against various bacteria species and *Candida* spp. The investigated compounds exhibited very good and moderate activities against all of the tested microbial strains.

**ORAL PRESENTATION - 116**

**TOXICOLOGICAL STUDY OF *UMBILICUS RUPESTRIS* L.LEAVES:  
HEMATOLOGICAL, BIOCHEMICAL, AND HISTOPATHOLOGICAL  
STUDIES**

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*Umbilicus rupestris* (UR) is an herbal medicine traditionally applied medicine against the ignitions of the skin. The present study was aimed to study the acute and subacute toxicity studies with orally administered methanolic leaves extract of *U. rupestris* (URMeOH). In acute toxicity tests, four groups of rats were orally treated with doses of 500, 1000, 1500 and 2000 mg/kg, and general behavior, adverse effects, and mortality were recorded for up to 14 days. In subacute toxicity study, rats received URAMeOH by gavage at the doses of 100, 200 mg/kg/day for 28 days, and biochemical, hematological, and histopathological changes in tissues /liver, kidney;were determined. URMeOH did not produce any hazardous symptoms or death and in the acute toxicity test. Subacute treatment with URMeOH did not show any change in body weight, and hematological and biochemical profiles. In addition, no change was observed both in macroscopic and microscopic aspects of vital organs in rats. Our result showed that *U. rupestris* extract could be safe for human use.

**ORAL PRESENTATION - 117**

**SCREENING OF ANTI-INFLAMMATORY ACTIVITY OF *PISTACIA LENTISCUS* LEAF AND ROOT BARKS EXTRACTS AND ITS FRACTIONS USING NMR AND UMETRICS METHODS**

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*Pistacia lentiscus* is an evergreen shrub of the family Anarcadiaceae, widely used in mediterranean area for the treatment of diarrhea, throat infections, renal stones, jaundice, asthma and peptic ulcer. In this study, we evaluated the anti-inflammatory activities of *Pistacia lentiscus* leaf, root barks extracts and its fractions by assessing their effects on the inhibition of the Tumor Necrosis Factor- $\alpha$  (TNF- $\alpha$ ) production of LPS-activated macrophages, in vitro. Moreover, in vivo study was also conducted on Zebra fish bioassays investigate the phagocyte activities in the neuromast.

More than 60% of TNF- $\alpha$  productions from activated macrophages were inhibited by the most tested extracts and aqueous ones were the most active (>90%) of both parts of the plant, without an appreciable cytotoxic effect at a concentration of 10 $\mu$ g/ml. Also, the same aqueous extracts exhibited a significant anti-inflammatory activity on Zebra fish model. Aqueous fractions were subjected to chromatographic fractionation and tested in vivo using Zebra fish as model organism. NMR data coupled with multivariate data analysis methods like PCA and PLS were used to identify bioactivity related metabolites in extracts and fractions. PCA and PLS were used and lead us to identify myricetin and quercetin derivatives, galloyl and quinic acid galloyl derivatives and catechin as compounds which correlate positively with the high activity in samples. The present investigation is the first report on the anti-inflammatory effects of crude extracts of *Pistacia lentiscus* and its fractions both in vitro and in vivo. NMR integrated with multivariate data analysis methods were successfully applied to identify the major activity metabolites.

**ORAL PRESENTATION - 118**

**FLAVONOID DIVERSITY IN THE SAHARAN *LAUNAEA* CASS. GENUS (ASTERACEAE)**

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*Launaea* Cass. is a small genus of the family Asteraceae (tribe Lactuceae, subtribe Sonchinae), comprises 54 species which 09 are presented in the flora of Algeria. Plants in the genus *Launaea* have been used in traditional ethopharmacopeae as bitter stomachic, for treating diarrhea, gastrointestinal tracts, as anti-inflammatory, for skin diseases, treatment of infected wounds, hepatic pains, children fever, as soporific, lactagogue, diuretic and used as insecticidal.

From a biochemical point of view, only ten species of the genus *Launaea* Cass. have been subjected to previous phytochemical investigation. Different secondary metabolites including terpenoids, triterpenoid saponin, sesquiterpene lactones, steroids, polyphenolic compounds have been reported. We present the nature of flavonoids constituents together with their biological activities to provide a comprehensive compilation of the polyphenol compounds from the genus *Launaea* Cass., especially those growing in Algerian Sahara and used as medicinal plants, namely: *Launaea arborescens*, *L. nudicaulis* and *L. residifolia*.

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**ORAL PRESENTATION - 119**

**ANTIOXIDANT ACTIVITY AND TOTAL POLYPHENOLS COMPOUNDS OF MARINA ALGAE *Ulva rigida***

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Three different methods, soxhlet extractor (40°C), maceration at 4°C and ultrasonic assisted extraction, have been applied for the extraction of polyphenols from the green alga *Ulva rigida*. The influence of different solvents (Methanol, hexan, ethyl acetate) on their extraction was examined. Crude extracts were evaluated for total phenolic contents (TPC) using Folin–Ciocalteu method<sup>1</sup>. Furthermore the antioxidant activity of these extracts was investigated by DPPH scavenging assay to measure the radical scavenging activities (RSA) of each extracts<sup>2</sup>. The aim of the present work was to also determine the best extraction method that gives a better yield of polyphenols with highest antioxidant activity.

Results showed a significant association between the antioxidant potency and the TPC. The excellent DPPH radical scavenging was observed in ethyl acetate extract of ultrasonic assisted extraction (IC<sub>50</sub> 1.61 mg/ml), with the highest phenolic contents (28.06 mg equivalents/100 g dry alga powder).

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**ORAL PRESENTATION - 120**

**STUDY OF ANTIOXIDANT EFFECT FROM ALGERIAN MEDICINAL PLANTS**

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In this study involving the search of new natural therapeutic value of three plant species, namely *Ruta montana* and *Anabasis articulata*, selected on the basis of their widespread use in local traditional medicine have subject to phytochemical screening to highlight the different phytoconstituants present in these plants.

The essence of the plant *R. montana* extracted by hydrodistillation using Clevenger apparatus is obtained in quantitative yield and comparable to previous work. The qualitative chemical analysis of the aqueous extract of *A. articulata* showed that preliminary alkaloid tests were positive for both tertiary and quaternary alkaloids according to Mayer's and Dragendorff's reagents. Moreover, the screening for saponin component showed positive results with  $\text{FeCl}_2$  and  $\text{HgCl}_2$ . The quantitative chemical analysis exhibited the presence of alkaloids and saponin with percentage 1.25 and 1.3, respectively. After development of butanol extract in plates of silica gel and observed under UV light, four saponin glycosides were detected; saponin bands turned red and were visualized.

Evaluation of antioxidant activity of aqueous extracts of three plants was addressed in two ways:

- The test of DPPH.
- The flow cytometry.

Our results demonstrate the antioxidant activity *in vitro* by inhibiting the oxidation power of DPPH. In light of these results we can highlight the protective power of new natural antioxidants of these plants against the onset and progression of certain diseases related to oxidative stress.

**ORAL PRESENTATION - 121**

**NUTRITIONAL ANALYSIS AND ETHANOL PRODUCTION FROM PINEAPPLE WASTE BY *ZYMONONAS MOBILIS* NCIM-2428**

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The aim of this study is to investigate the feasibility of using the juice from discharged pineapple waste as low cost substrate for nutritional value and ethanol production by *Z. mobilis*, NCIM-2428. *Z. mobilis*, NCIM-2428 species was procured from NCL, Pune, India and maintained on a growth medium as a source of culture for ethanol making from pineapple fruits juice (500 ml). A high ethanol yield of 30.2% (v/v) (157 ml) was obtained when compared with commercial wine yeast (control) which gave 10.4 % (v/v), indicative of higher ethanol tolerance by this isolate. Pineapple fruit ethanol, which harbors quite a number of these strains, could serve as an alternative source for commercial wine making from pineapple fruits pulp. Nutritive analysis of pineapple fruits pulp were determined by using different biochemical methods and the results revealed the good nutritive value (384.02 Cal/ 100 gm) showing maximum amount carbohydrate (85%); enough protein (10%) and low fat content (0.2 %) on dry matter basis which can be utilized for production value added products.

In conclusion, the discharged pineapple waste might be utilised as low cost substrate for nutrient and ethanol production by *Z. mobilis*, NCIM-2428 and further utilised for development large scale production of ethanol.

**ORAL PRESENTATION - 122**

**ANTIOXIDANT EFFECT OF THE METHANOL, DICHLOROMETHANE AND ETHYL ACETATE EXTRACTS, OF MOROCCAN *Cistus laurifolius* L. LEAVES.**

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All species of Cistaceae including *Cistus laurifolius* are frequently used in traditional medicine for their anti-inflammatory, antioxidant<sup>1</sup>, anti-microbial, anti-tumor, anti-viral, antifungal, antiulcer, antioxidant, antispasmodic and hypotensive activities<sup>2</sup>.

In the current study, the methanol, dichloromethane and ethyl acetate extracts obtained from the leaves of *Cistus laurifolius* L. were evaluated for their antioxidative effect using 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging activity. The extracts dissolved in pure methanol were mixed with DPPH solution. Different concentrations were used for these extracts. The remaining DPPH amount was measured at 520 nm. Caffeic acid was employed as the reference. All the fractions showed an antioxidant activity. The ethyl acetate extract displayed the best activity against DPPH, It shows an MIC near to one of caffeic acid.

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**ORAL PRESENTATION - 123**

**SECONDARY METABOLITES, ANTIOXIDANT AND ANTIMICROBIAL ACTIVITIES OF TWO *CISTUS* SPECIES, CULTIVATED FROM TUNISIA**

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In the Mediterranean folk medicine, the *Cistus* species are frequently used as general remedies in folk medicine for the treatment of various skin diseases, as anti-inflammatory agents. This study aims to evaluate and determine the chemical composition, the antioxidant and antimicrobial activities of three different method extraction using ethanol, hexane and distilled water, from leaves, roots and stems of two *Cistus* species, *Cistus monspeliensis* and *Cistus salvifolius*. Leaves were rich on phenolics, flavonoids and condensed tanins compared to stems and roots for both species *C. monspeliensis* and *C. salvifolius*. Thus, the levels of total phenols obtained with ethanol are higher compared to those obtained with distilled water and hexane extracts. In addition, the ethanolic extract of *C. salvifolius* species showed a strong antioxidant activity against the DPPH and the ABTS radicals scavenging compared to *C. monspeliensis* one.

The ethanol extracts of the leaves of both *Cistus* species exert a bactericidal effect on 7 studied strains. Thus, the *Cistus salvifolius* ethanolic extracts are more efficient than those of *Cistus monspeliensis*. In conclusion, it appears that the maceration with ethanol is the best extraction of total polyphenols, flavonoids, and condensed tannins. As for DPPH and ABTS assays, the ethanolic extract showed better antioxidative capacity than the aqueous extract for both *cistus* species. In addition, the ethanolic extract showed strong antibacterial and antifungal activities. In this manner, the ethanolic extract of both *cistus* species may be suggested as a potential source of natural antioxidants.

**ORAL PRESENTATION - 124**

**ASSESSING THE IMPACT OF STORAGE TEMPERATURE ON THE STABILITY AND BIOCIDAL ACTIVITY OF ESSENTIAL OILS FORMULATED. CASE *TRIBOLIUM CASTANEUM* (HERBST). (INSECTA, TENEBRIONIDAE)**

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Cereals like other stored food currently experiencing serious health problems during storage. The offending agents are primary pests such as *Sitophilus oryzae* and secondary pests among other (*Tribolium.sp*). This study focused on the evaluation of the biocidal effect of the essential oils of thyme and made the citrus, against adults of red flour beetle (*Tribolium castaneum*) under different temperature regimes. The results of this study showed that different molecules have made a late effect (12h-14h-16h-18h) on the populations of *Tribolium castaneum* at the storage temperature of 20°C. The same results show an early striking effect of thymol and carvacrol on individuals *Tribolium castaneum* compared to limonene. The toxicity of thymol and carvacrol are much more active than limonene at 12h and exercises a very remarkable as limonene expresses its toxicity that from 14h deadly effect. Temperatures under 20 ° C and 25 ° C, thymol showed a greater degree of efficiency followed by carvacrol and limonene which has a low. However at 28 ° C, carvacrol expresses a very significant biocidal effect compared to the other two formulations thymol and limonene.

**ORAL PRESENTATION - 125**

**PRECLINICAL SCREENING OF 'İKSUT' FROM FOLK MEDICINE TO ANIMAL TESTING**

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Belonging to Cuscutaceae plant family, different *Cuscuta* species have been used in folk medicine for some ailments all over the world. Of these species, *Cuscuta arvensis* Beyr., growing naturally in different regions of Turkey has a special importance for curing liver disorders as a traditional medicine. As a parasitic plant *Cuscuta* (dodder), locally known as İksüt, Eşkit, Küsküt, grows on varying host plants such as lentil, vegetables, grass, grape and licorice. İksüt, mostly, has been collected and used as folk medicine in Mardin district located in Southeastern part of Turkey. *Cuscuta arvensis* Beyr., mostly applied to prevent or heal liver disturbances, and physiological hepatitis, which occur in newborns and mostly their mothers<sup>1</sup>. Therefore, the effect of *Cuscuta arvensis* extracts were explored for their biological and pharmacological activities. Addition to *in-vitro* antimicrobial and antioxidant activities<sup>2</sup>, hepatoprotective activity of the polar, methanolic and aqueous extracts of *Cuscuta arvensis* were determined by *in-vivo* experiments using rats.

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**ORAL PRESENTATION - 126**

**WOUND HEALING ACTIVITY OF A FORMULATION OF *PISTACIA LENTISCUS* SEED OIL IN GUINEA PIGS**

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*Pistacia lentiscus* is a medicinal plant widely distributed in the Mediterranean region. Its seed oil is used in traditional Tunisian medicine for gastric problems, inflammatory disorders and for healing skin wounds. The aim of this study is to evaluate the clinical and histopathological aspects of a cutaneous application of *P. lentiscus* oil-based ointment on healing surgical wounds. In order to evaluate the potential of this formulation (*P. lentiscus* oil-based ointment) to heal wounds, experimental wounds were done on guinea pigs and efficiency was comparatively assessed against a reference ointment, Cicaderma®. Wound contraction was performed on days 5, 10 and 15. Tissue sections were also evaluated histopathologically after collecting skin specimens from the wound of each animal on days 7, 14 and 21.

Results showed that for all days (5, 10 and 15), the highest wound contraction values were attained for the *P. lentiscus* oil-based ointment treated group with wound contraction values of 19.38%, 55.8% and 77.11%, respectively, as compared to the reference drug Cicaderma® where contractions were 7.97%, 49.53% and 71.44%, respectively. Vehicle and negative control groups however showed no statistically significant wound healing activity on the excision wound model. These results were also confirmed by histopathological evaluation. In Conclusion, these experimental studies revealed that the *P. lentiscus* oil-based ointment displays remarkable wound healing activity, in accordance with its use in traditional medicine.

**ORAL PRESENTATION - 127**

**ANTIFERTILITY EFFECTS IN MALE WISTAR RATS WITH  
TREATMENT OF ETHANOLIC EXTRACT OF PLANTS**

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Plants have been used in traditional and modern medicines for different pharmacological activities to cure diseases. The present investigation has been taken to observe and evaluate effects of seven traditional medicinal plants viz *Cassia occidentalis*, *Cassia tora*, *Citrullus colocynthis*, *Echinops echinatus*, *Euphorbia nerriifolia*, *Martynia annua* and *Maytenus emergineta* on the reproduction functions of male rats in search a safe, orally effective and reversible fertility regulating agent. Hydro ethanolic extracts of these plants were prepared and administered orally in male Wistar rats at the doses of 50 and 100 mg / kg.b.wt./rat/day for a period of 60 days and some of the treated rats were kept 30 days for recovery of fertility to assessed reversibility effects. Hematological indices, serum clinical investigations were also performed to assess toxic effects caused if any in rats by treatment. Proteins, cholesterol, glycogen, ascorbic acid, sialic acid and fructose level were analyzed in rats. Serum FSH, LH and Testosterone levels were measure. For histopathological observations tissues were fixed in Bouin's fluid, dehydrated, sectioned and stained with Hematoxylin and eosin. Plants extracts treatment of significantly reduced the weights of testes and accessory sex organs. Sperm density and motility were declined high significantly. Levels of Testosterone and FSH hormone were significantly decreased in rats .The protein, sialic acid, fructose, ascorbic acid and glycogen contents of reproductive accessory sex organs were decreased significantly. Germinal epithelium of testes degenerated and number of spermatocytes, spermatids and spermatozoa in lumen of seminiferous tubules reduced. The decreased testes and accessory sex organs weights suggest androgen deprivation effects of the treatment. Decreased sperm motility, density and testosterone level in rats also indicatives of androgen suppression effects of extracts treatment cause inhibition of spermatogenesis resulted reduction of fertility of male rats.



**ORAL PRESENTATION - 128**

**OLIVE LEAF: AN IMPORTANT SOURCE OF PHYTO-PHARMACEUTICAL INDUSTRY AND ITS CHEMICAL COMPOSITION**

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Flavonoids and phenolic acids are of the most important bioactive compounds in plants owing to the physiological and ecological significance but the contents are dependent on a number of different factors, such as plant species, harvesting times, environmental conditions, soil and plant mineral content, extraction techniques etc. Nutritional status of plants is of great importance for sustainable crop productivity and desired traits of plants. In this context, the present study was designed to investigate and correlate the plant nutritional status with total phenolic (TPC) and flavonoid contents (TFC). Briefly, total phenolic and flavonoid contents were determined using spectrophotometric method and plant mineral contents (N, P, K, Ca, Mg, Fe, Cu, Zn, and Mn) were measured with ICP-OES. TPC was positively correlated with contents of Ca, Mg, Fe, Zn and Mn but TFC was negatively correlated with all elements measured in the present study.

**ORAL PRESENTATION - 129**

**TOTAL PHENOLIC CONTENT, ANTIOXIDANT and ANTIMICROBIAL ACTIVITIES of KAHVALTILIK ZAHTER**

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Kahvaltılık Zahter is a kind mixture of spice and nuts for breakfast. This traditional food have been produced in homes and recently in industrial scale especially in southeastern part of Turkey and some Arabic countries. Its composition is very rich and changes by production place. Because of spices in the Kahvaltılık Zahter, rich total phenolic content, high antimicrobial activity and antioxidant capacity could be expected. Thus, the aim of the present work was to determine total phenolic content using spectrophotometric method, the effect of antimicrobial activity by agar disc diffusion method and antioxidant capacity by DPPH radicals inhibition in different extracts (methanol and ethanol) of six samples obtained from homemade and industrial production. *Staphylococcus aureus* and *Klebsiella* sp. were used as bacterial strains.

In conclusion, the total phenolic contents of methanol and ethanol extracts were revealed to range from 56.54 to 3660.77 mg/L and 1254.45 to 5489.03 mg/L, expressed as gallic acid equivalents, respectively. Antioxidant capacity of different extracts were found between 78.2 % (methanol) - 91.4 % (ethanol). In compared to total phenolic contents and antioxidant activities of extracts, the highest values for both parameters were acquired in ethanol extracts. Antimicrobial activity of different concentrations (10, 30, 50, 70 and 100 µL) of the extracts against two bacteria was also investigated. Antimicrobial activity of the extracts was compared with the standard antimicrobial agent, gentamicin (10 µg/disc). In 100 µL concentrations of ethanol and methanol extracts, maximum inhibition zones were recorded against *Klebsiella* sp. and *Staphylococcus aureus*. Extracts obtained from homemade produced Kahvaltılık Zahter samples gave almost the highest total phenolic content, antimicrobial and antioxidant activity than industrial products. Because of its high antimicrobial and antioxidant capacity, Kahvaltılık Zahter - traditional energy source in breakfast- could also be thought as protective and curative for some illnesses.

**ORAL PRESENTATION - 130**

**PRINCIPAL COMPONENT (PCA) AND HIERARCHICAL CLUSTERING ANALYSIS OF ESSENTIAL OIL COMPONENTS OF SALVIA OFFICINALIS SUBJECTED TO VARIOUS SALT STRESS**

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Salinity is of the major environmental constraints influencing plant growth, yield and quality by adversely affecting soil fertility. However, plant behavior can change with respect to the secondary metabolite synthesis, production, secretion, and storage during onset and development of salt stress. For this purpose, the effects of various salt compounds with different concentrations on the essential oil components of *Salvia officinalis* leaves were investigated. The component discrimination was evaluated from the PCA scores plot between different salt treated groups using only identified metabolites. Four groups concerned with essential oil components were composed according to the PCA analysis and illustrates that there were significant differences between salt treated groups on the level of essential oil components. Also, cluster-specific essential oil components were determined according to the hierarchical clustering averages. Heat map for essential oil was also constructed with the Java based MeV in order to generate informative and interrelated displays of expression and annotation data obtained from multiple salt treatment experiments.

**ORAL PRESENTATION - 131**

**CURRENT PERSPECTIVE OF MEDICINAL PLANTS AS ANTICANCER AGENTS**

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Throughout human evolution, many plants and their phytochemical compounds have been used as natural products in the medicine, pharmacy and drug industry and also cancer research. In recent years, cancer is known to be the second most common disease among humans for this reason it is a major health problem and leading cause of death worldwide. There are so many methods for treating cancer, but these methods cannot be effective in treating different kind of cancer. Therefore medicinal plants, which have pharmacological activity and extraordinary therapeutic possibilities, have afforded more potent, more selective and less toxic compounds and because of these, they are better therapeutic indices as anti-cancer, anti-tumor and anti-proliferation agents. Nowadays, there are some important natural anti-tumor compounds and molecules such as podophyllotoxin, camptothecin, paclitaxel, vinblastine, promycin, mitomicin C, dactinomycin, doxorubicin, daunorubicin, blemycin, mitramicin, masoprocol and resveratrol. Podophyllotoxin is obtained from *Podophyllum* (Berberidaceae), effective in the treatment of Wilms' tumours and different types of genital tumors. *Camptoteca acuminata* has main active components (camptothecin, topotecan and irinotecan) that have anti-tumor activity on small-cell lung cancer, metastatic ovarian cancer and colorectal cancer. Vinblastine and vincristine are isolated from *Vinca rosea* which is used against non-Hodgkin lymphoma, pediatric solid tumors, cervical-uterine cancer, bladder cancer and lung cancer. Paclitaxel and docetaxel are used for the treatment of metastatic ovarian, lung and breast cancer which are isolated from *Taxus baccata* and *Taxus brevifolia*. In summary, it can be concluded that medicinal plants have played important roles as natural anti-cancer agents and also they will continue to be a key source of anti-cancer agents and anti-tumor drugs in the future.

# **POSTER PRESENTATIONS**

**TOPIC – I**

**AGRICULTURE & BOTANY**

**PP-1**

**DUST CAREER IMPACTS ON *Pinus halepensis* GROWTH**

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*Pinus halepensis* Mill., is a most common tree in the Mediterranean basin. In Tunisia, specifically Kroumirie, it is an excellence species. However, for several years, we assist a continual deterioration of this ecosystem type. Several factors are the origin for this degradation: insects and fungi attack, fire, aging populations, low regeneration and hardening climate. This degradation is further accentuated by installing careers around the pine forest. Our objective in this study was to identify the career dust influence on growth and productivity of Aleppo pine; through dendrochronological approach (tree rings study) and dendrometric approach (measurement of diameter, height and survival rate). Study is accomplished on two populations: a reference site 'Charchara' located away from mining and Wed el maaden site near a gravel extraction career. Results showed significant differences of parameters studied between stations both in dendrometric and dendrochronological parameters over time.

**PP-2**

**COMPARISON OF THE INHIBITORY CAPACITY OF TWO GROUPS OF PURE PLANT EXTRACT ON THE CRYSTALLIZATION OF TWO TYPES OF URINARY STONES *IN -VITRO* STUDY**

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Urolithiasis is defined as the result of an abnormal precipitation within the urinary tract. This precipitation is most often from the normal constituents of the urine. This is a fairly common condition in the population. She is happy and recurrent etiology is often unknown if hypothetical. In Algeria, as in many countries, a large number of patients use herbal medicines in the treatment of their diseases including urolithiasis. Thus the aim of this study is the most widely used to evaluate the effectiveness of aqueous extracts of medicinal plants, in the treatment of calcium urolithiasis oxalo-and magnesium-amoniaco in vitro. The study also examines the effect of these extracts on the states of crystallization (nucleation, crystal growth, crystal aggregation), followed by photography on polarized light microscope.

In this regard, we are devoted to studying the crystallization steps from oxalo-calcium and phospho-calcic prepared as artificial urine and supersaturated aqueous solutions, maintained at 37 ° C to remain close to biological conditions. Extracts of the first group of herbs: *Ammodaucus leucotrichus*, *Ajuga iva*, *Globularia alypum*, *Atriplex halimus* are studied on the crystallization calcium oxalate, we cite the *Ammodaucus leucotrichus* which acts on the stages of nucleation, growth and the aggregation with a total inhibition. The second group of extracts plants tested on calcium phosphate crystallization: *Acacia raddiana*, *Citrullus colocynthis*, *Rhus tripartita*, *Pistacia lentiscu*, *Warionia saharae*, are able to significantly reduce phosphate crystallization in vitro. It is easily proved by FTIR and optical microscope.

In conclusion the results of our work allows us to confirm the use of these plants as an aqueous decoction, in the field of urolithiasis. These activities may help to strengthen the body in depressed situations.



**PP-3**

**INFLUENCE OF GAMMA RAY IRRADIATION ON ESSENTIAL OIL YIELDS, ANTIOXYDANT AND ANTIFUNGAL ACTIVITIES OF ALGERIAN *ARTEMISIA HERBA ALBA ASSO***

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Medicinal herbs possess an important health and economical values and their products were the main sources of drugs. Phytotherapy is based on use of plant natural products with healing properties for the treatment of human, animal or vegetable diseases. With these aims, and for more information regarding local medicinal plants and to replace chemical preservatives in natural products, we are interested in essential oils from endemic plant belong Asteraceae family: *Artemisia herba alba* Asso which was undergoes a hydrodistillation after its irradiation by Gamma rays at frequencies of 10KGray, 20KGray, 30KGray giving respectively for 100g of aerial plant material; essential oil yields of 1.087%, 1.087%, 1.085%, compared with that of the untreated sample providing a yield of 1.27%.

Evaluation of the antioxidant activity *in vitro* of essential oil for *Artemisia herba alba* has been assessed by two different methods: inhibition of DPPH radical and measurement of reducing power. The first method has not revealed a very big difference regardless of the dose of irradiation, likewise, the test of reducing power awarded us a maximum reducing capacity was registered by the specimen irradiated at 20K Gy, it has more better antioxidant power than no irradiated sample. To combat *Fusarium culmorum*, causing the wilts and rots, we are focused on the antifungal screening of this aromatic plant. With a yield superior to 1%, the essential oil has shown a remarkable efficiency on the stump, mainly for sample irradiate at 30 KGray with a minimum inhibitory concentration MIC of 2%. These results, although preliminary, demonstrate a good antifungal activity, and the positive effect of dose of irradiation, to limit and even to stop the development of the pathogenic.

**PP-4**

**EXTRACTION AND VALUATION OF THE HEMICELLULOSES OF THE CELL WALL OF *RETAMA MONOSPERMA* (L.) BOISS**

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The kind *Retama* belonging to the family of Fabaceae is endemic of the Mediterranean Basin. It characterizes the coastal ecosystems and the desert. In Algeria, three species of the *Retama* are indicated: *Retama monosperma* Boiss. *Retama raetam* Webb and *Retama sphaerocarpa* L.<sup>1</sup>. *Retama monosperma*, object of our study, develops particularly on the littoral dunes of Algeria and presents several interests. To know better this vegetable with the aim of a better valuation adds us a biochemical study of the hémicelluloses.

Hémicelluloses has an economic interest mattering in the food and pharmaceutical domain notammmentle xylose which enters the preparation of alcohols such as the Butanol, the manufacturing of candies without sugars. The extraction of hémicellulos by the protocols gives a yield 14, 33 % of hémicellulose. The qualitative analysis by CCM in shown that hémicelluloses is established by some glucose and by xylose (glucoxylane).

The pres ence of xyloses in the construction of hémicelluloses incites us to look for protocols of purification of this sugar which gives the xylitol, it is the polyol which possesses interesting properties what makes its high value for the pharmaceutical and food industries. It is about one compose which has a similar sweetening power in saccharose, not - cariogene who is already exploit in food industry as ingredient in the chewing gum and the toothpaste. Furthermore he can be use by the obesés persons or the diabetics<sup>2</sup>.

**References**

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**PP-5**

**ECOLOGICAL AND BIOCHEMICAL STUDY OF ALFA (*STIPA TENACISSIMA* L.) FROM WESTERN ALGERIAN'S HABITATS**

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Our job is to carry out a comparative study on the ecology and analysis of cell wall compounds of four ecotypes of esparto grass (*stipa tenacissima* L.): mountain (Mount Tessala); forest (forest Messer); steppe (Ras El Ma) and coastline (Beni-Saf). The ecological study included: soil analysis, analysis of the floristic composition and realization of floristic surveys of the four studied stations. This allowed us to establish a list of species that coexist with our planet and the affinity between ecotypes.

The biochemical study also revealed that the hemicellulose fraction varies from one sampling station to another ( $P < 0.01$ ). The highest rate is recorded in the leaves of the forest esparto grass (Messer forest). For the lignin, there are no variabilities between stations studied. However, leaves of the station of Tessala Mount recorded a slightly higher rate. The different results are compared by variance analysis (ANOVA I) to a single factor (the station) at a significance level  $\alpha$  of 5%.

**PP-6**

**EFFECTS OF DRYING TEMPERATURE ON THE TOTAL PHENOLICS, FLAVONOIDS CONTENT AND ANTIOXIDANT ACTIVITY OF DRIED SAGE LEAVES**

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The aim of this study was to optimize the percentage yield and percentage of bioactive compounds (polyphenols (PPH) and flavonoids (FLV)) of sage leaves using maceration as the extraction method. Response surface methodology was employed, using a Bex–Behnken statistical design to evaluate the effects of three independent variables: drying temperature of sage leaves (30–60°C), ethanol/water concentration (40-80%) and solid/solvent ratio (10-20). Antioxidant activity was measured by 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging assay. Optimal extraction conditions, as predicted by response surface methodology were different and depend of the objective targeted. The maximum extraction yield regarding PPH and FLV was achieved with the leaves dried at 45°C. As regards the anti-radical activity, comparison of the IC<sub>50</sub> of the various extracts tested indicates that the best anti-radical activity, with values of IC<sub>50</sub> of 0.468 mg/ml was obtained from the sage leaves dried at 30 °C.

**PP-7**

**ORGANOGENESIS AND CYTOLOGICAL STUDY OF BUDS OF  
*PISTACIA ATLANTICA DESF. SSP. ATLANTICA***

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The Atlas pistachio (*Pistacia atlantica Desf*) family Anacardiaceae is known as the common name of "Betoum". It is a powerful tree up to 20 m high in many individual marcescent trunk and leaves. It grows in arid and semi-arid presaharian in Algeria. It is said heliophilous. The Betoum is a vigorous tree, very rustic. One of the main characteristics of the pistachio is its high resistance to drought thanks to its highly developed root system. It must be considered for the protection and restoration of soil in marginal areas.

In this context we are interested to study the cytology of this species including axillary buds and terminal meristems and the different steps of forming buds. The bud has at its base a meristematic zone consisting of undifferentiated cells not creating photosynthesis (not functional plastids) but multiply very rapidly at the time of removal. Meristem can continue to grow indefinitely as long as he is alive and annually produces the leaves of the tree.

The results of the longitudinal and transverse sections and the study of the different steps (organogenesis) of forming a bud show the structures of the meristematic zones of undifferentiated cells and the direct formation of primordia structures from the epidermis and in epidermal cells.

**PP-8**

**BREEDING PROGRAMS REDUCING VARIATION IN EUCALYPT  
ESSENTIAL OIL QUALITY**

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The pharmaceutical value of Eucalyptus oil is based on the proportion of the monoterpene 1,8-cineole (eucalyptol). The key source of pharmaceutical grade oil in Australia is *Eucalyptus polybractea* (blue mallee), the oil of which can be comprised of up to 96% cineole<sup>1</sup>. Oil quality varies among blue mallee genotypes; however, as a consequence of variation in the structure of a multi-product cineole synthase, synthesising the ‘cineole cassette’<sup>2</sup>. A breeding program was established to reduce oil quality variability in offspring, but an accurate and early method of judging its success is required. This is not simple as oil quality can vary greatly due to processes such as volatilization and chemical modifications of constituents within leaves. Therefore, the leaf choice when sampling is very important. We aimed to develop a technique to consistently evaluate the cineole cassette in *E. polybractea* seedlings. Clones of four *E. polybractea* genotypes of different ages (7 months to 7 years old) and different environmental conditions (glasshouse and field) were analysed and results showed the utility of our screening technique. Subsequently, this method was used to evaluate the offspring of a clonal seedling orchard and highlighted the potential gains that can be achieved with this breeding strategy.

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**PP-9**

**THE FEATURES OF INTRODUCTION AND PHENOLOGY OF SPECIES  
GENUS OF *GLEDITSIA* L. AND ITS VALUE**

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Variety of Azerbaijan dendroflora attracts many visitors come to Institute of Dendrology. All researchers introduced plants from Far East come to the conclusion that most of them have broad ecological amplitude. However, in the flora of Azerbaijan according to our observations, there are a number of difficult plants to grow. Botanists have faced serious challenges in greening the newly created towns and villages, creating windbreaks and forest massive from resistant plant species soil and climate conditions of Azerbaijan. From introduced species have required adaptation to heat climate, considered cold resistance, the ability to saline soils resistance and wind-resistance. Necessary, promote species to grow rapidly, have high technical qualities of woods, were durable and resistant to various and diseases and pests.

**PP-10**

**MACRO AND MICRO-PHYTODERMICS SEASONAL CHARACTERS OF WILD RUTA SPECIES (*RUTACEAE*) IN NORTHWESTERN ALGERIA**

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The stomatal diversity (type, shape, size and orientation) in the foliar epidermis is of great value in plants systematic and taxonomic studies. The micro- phytodermics characteristics variations in leaves of *Ruta* species are very little known. So how this phenomenon may be related to the physiological response of species depending on their environment is also unknown. A comparative micro-morphological study of leaves of three *Ruta* species (*Ruta montana* (Clus.) L., *Ruta chalepensis* sub.sp. *latifolia* (Salisb.) Lindb. and *Ruta chalepensis* sub.sp. *angustifolia* (Pers.) P. Cout.) in addition to them macro-morphological characteristics was done under different bioclimate from north-western Algeria.

The results of our investigation have revealed that the leaflets samples are amphystomatic with a presence of eight stomata types. Among these 8 stomatal types, the Tetracytic and Anomocytic types are very common than other. They have also an abundance of stomata on the abaxial face depending seasons. Statistical analysis revealed a significant difference with *p-value*  $\alpha = 0,05$  between the species. The size of stomata and the density of secretory cavities are more important in spring and summer; except for *R. montana* which has no relationship with season effect. The structure, shape and size of stomata and secretory cells varied among the different species and even within the seasons.



**PP-11**

**A CONTRIBUTION TO THE STUDY OF POTATO TUBERS INFECTION  
(*SOLANUM TUBEROSUM L*) VARIETY (SPUNTA) BY *PHYTOPHTHORA*  
*INFESTANS* AND THE ANTAGONIST ACTIVITY OF *TRICHODERMA*  
*VIRIDE***

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The results of the in vitro test revealed that the confrontation between *Trichoderma viride* and the *Phytophthora infestans* showed the inhibitory capacity of *Trichoderma viride*, be it directly (68%) or remotely (58 %) on a growth medium. Interesting results have also been obtained in vivo. In fact, the injection of the tubercles with a *T.viride* spore solution has reduced the development of *Phytophthora infestans* with an average penetration of 3.28 mm for the *T.viride* and of 1.65 mm for the *Phytophthora infestans*. The results of the mycelia discs method were similar to the injection method with a penetration average of 2.62 mm for *T.viride* and 1.81 mm for *P.infestans*.

*Trichoderma viride* has the ability to colonize the place before the arrival of the pathogenic plant. It exerts different action modes such as competition, antibiosis and mycoparasitism.

**PP-12**

**EFFECT OF DIFFERENT MEDIA AND FERTILIZERS ON YIELD AND YIELD COMPONENTS OF *ALOE VERA***

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An investigation was carried out to study the effect of some media and fertilizers on yield and yield components of Aloe vera in Saveh. Media consist of: 1- Pure sand, 2- 50% pure sand + 50% decayed sheep manure, 3- 50% cocopeat + 50% pure sand, 4- 50 % loamy soil + 25% pure sand + 25% decayed sheep manure. Fertilizers consists of: 1- 0 % (no fertilizer), 2- Complete fertilizer (13-40-13) 20g. square meter, 3-  $\text{No}_3\text{Nh}_4$  (Amonium nitrate) 15g. square meter. Completely randomized blocks design with 12 treatments and 4 replications for any treatment was implemented. One 4 months old Aloe plant was planted in one pot with 5 pots in any replication in February and were placed in plastic greenhouse and later in outdoor in late May. In any media 3 kind of fertilizers were used separately. After 6 months Aloe plants were isolated and these parameters measured: Gel rate, refuse (reminder of plant after gel isolation), fresh leaf weight, dry leaf weight.

The effect of media on following parameters is significant in 1% levels and as follows: 1- The effect of media on gel rate was significant in 1 % level and pure sand + manure medium had most gel production (47.17g). 2- The effect of media on fresh leaf weight was significant in 1% and pure sand + manure had most production (100.61 g). The effect of fertilizers on following parameters is significant in 5% level and as follows: Complete fertilizer had most gel production (32.89g) and most fresh leaf weight production (69.94g). There was no significant difference in 1% level in interaction between media and fertilizer on gel and fresh leaf weight production. In this experiment highest amount of gel is obtained by sand+ manure medium and complete fertilizer (NPK) and highest amount of dry matter has obtained by sand+ manure medium and Amonium nitrate fertilizer.

**PP-13**

**INTRODUCTION OF HERB *SAMBUCUS EBULUS* L. AND USE IN MEDICINE**

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Genus of *Sambucus* L. concerns to family *Sambucaceae* Batsch ex Borkh. From 20 species and genus of *Sambucus* L. in Caucasus 4 species and in Azerbaijan 2 species have wild grown: *S.ebulus* L. and *S. nigra* L. It was studied features germination of seeds and dynamics of development seedlings *Sambucus ebulus* L. in condition of Absheron. Shoots are appeared in the second decade of April and consists 85 %. Growth begins in starting of May and depends on metrological conditions of year, finished in end of September-October ( $150\pm 7$  days). In end of the period of vegetation the height of plants reaches 90-160 cm, diameter of neck roots to 10 mm, diameter of crone to 80 cm, buds have appeared in the beginning of June, have blossomed in end of June. In July were noted full flowering, seeds ripened in end of September. It is revealed that *Sambucus ebulus* L. is successfully acclimatized and has given qualified seeds and is a perspective herb for introduction.

**PP-14**

**IMPACT OF LEAD ON THE DEVELOPMENT OF *CORIANDRUM SATIVUM* L.**

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Heavy metals are present in the air we breathe, the water we drink and even the food we eat. We must not forget other sources of pollution everywhere in household products, cleaning or hygiene, not to mention various pollutants from electromagnetic fields and radiators that have invaded our lives. Lead is a heavy metal pollutant considered environmental causes many toxic effects, especially when exposed to high dose of disturbances in the whole human body and more on plants and disrupts its growth on the parties shoots and roots. An ecological solutions for soil remediation is the use of living organisms, especially plants, one speaks of phytoremediation. The aim of our study is to evaluate the effect of lead on *Coriandrum sativum* L of biochemically and histologically.

Our work has two parts: an application of a stress by lead on the cilantro in the short term (21 days) and long-term (40 days). Our results obtained shows that there are disturbances in the parameters measured, an increase in proline content, lipid peroxidation and hydrogen hydroxide whenever there is an increase in the concentration of lead, and a decrease in chlorophyll pigment content. We also noticed that there were disturbances in protein synthesis. The histological sections show that there is no change in the tissues of roots and stems. The soil used was the subject of a soil survey, the results show that there is no change in its properties.

**PP-15**

**EFFECTS OF HORMONAL COMPOUNDS ON MERISTEM  
REGENERATION OF PEPPERMINT ROOT**

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*Mentha* is a genus of aromatic perennial herbs belonging to the family Lamiaceae. It is distributed mostly in the temperate and sub-temperate regions of the world. Several *Mentha* species are considered industrial crops as they are a source of essential oils enriched in certain monoterpenes, widely used in food, flavour, cosmetic and pharmaceutical industries. *Mentha* has a large number of species that differ widely in their characteristics and polyploidy level. It is known to comprise about forty recognizable species. To investigate the effect of the factors a randomized complete block design was conducted in a factorial  $12 \times 2 \times 2$ . A factor includes two sampling sites (apex and root), B factor includes 12 sampling sites like BAP, NAA, TDZ with different densities. Analysis of variance showed that there are many differents regeneration between different levels of the hormone compounds. This difference suggests that there is variation between hormonal compounds. But between the two sampling locations were not much different in terms of mean regeneration meristem. Comparison of results between hormonal compounds showed the maximum mean value of combined hormonal regeneration is NAA=2 and BAP=2 mg per liter and minimum TDZ=0.5 and NAA=0.5.

**PP-16**

**EFFECT OF THE EXTRACTS OF SOME SAHARAN PLANTS ON THE CELLULASES OF *FUSARIUM OXYSPORUM* F. SP. *ALBEDINIS***

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*Fusarium oxysporum* f. sp. *albedinis* (Foa) is a soil borne fungus causing the most serious disease of date palm (*Phoenix dactylifera* L.) called "Bayoudh". In this study, two plants from the Algerian Sahara (South-West of Algeria): *Acacia raddiana* and *Launaea arborescens*, were used to evaluate their extracts for inhibition activity on the cellulases of Foa, the cell wall degradation enzyme of the host plant (*Phoenix dactylifera* L). Two parts of each plant were used to evaluate their extracts (extraction with heat reflux flow by four solvents of increasing polarity). The diversity of natural substances was observed in these extracts. The results of the enzymatic activity, by the technique of the contact bioautography, showed that some extracts of the selected plants present a significant effect on the cellulases of Foa. Extracts obtained by cyclohexane and ethyl acetate had the most effective results. Some extracts presented a diameter of inhibition zone higher than 2 mm; it is the case of the extracts by cyclohexane of *Launaea arborescens* (aerial part), as well as an extract by ethyl acetate of *Acacia raddiana* (bark).

**PP-17**

**POSITIONAL DISTRIBUTION OF FATTY ACIDS IN THE TRIGLYCERIDES OF THE SEED OIL OF *CITRULLUS COLOCYNTHIS***

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Medicinal plants have been identified and used throughout human history. Plants have the ability to synthesize a wide variety of chemical compounds that are used to perform important biological functions, and to defend against attack from predators such as insects, fungi and herbivorous mammals. To contribute to the development of local medicinal plants for their therapeutic properties, we are interested in the study of *Citrullus Colocynthis* plant known in traditional medicine. *Citrullus colocynthis* is one of the species of the *Cucurbitaceae* family which grows in Mediterranean countries. In this study, it was investigated as a new source of vegetable oil.

The oil content of the *Citrullus colocynthis* seeds of Algeria was 17.85 %, the predominant fatty acids were palmitic acid (10,22 %), stearic acid (8,98 %), oleic acid (9,36 %) and linoleic acid (68,49 %). The distribution of fatty acids of triglycerides from *Citrullus Colocynthis* seed oil has been determined using Gunstone technique. The oil was found to contain TAG that were disaturated (8,85%), monosaturated (47,57%), and triunsaturated (45%). The results show that the majority fatty acid entering the combination of most of the triglycerides is linoleic (L). The trilinoleic LLL (30.391%) is the most TAG found followed by the two monosaturated TAG: PLL (15.85%) and the SLL (13.92%).

**PP-18**

**POLLEN AND POLLINOSIS: AERO- PALYNOLOGICAL STUDY  
REALIZED IN THE NORTHEAST OF ALGERIA**

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According to OMS, the allergics affections are forth in their kind (chronic disease), and between this allergic affection , pollen and pollinosis ranks first ; it touch a large part of people , with a significant progression of prevalence , for example, statistics shows a prevalence in the child of 15 % ; in algeria ( 25 to 30) % of population suffer of rhinitis which is allergic disease in (35 to 40 % of circumstance , which is in the two thirs seasonal which mean pollen, and the alarming thing is that( 35 to 40) % of untreated rhinitis evolved to asthma, we deduce that pollen allergy represent a real problem to public health , it necessitating a serious support by the concerned authorities

The present work have on pollen allergy studies in the northeast of Algeria, characteristics and manifestations of the allergic subject , and the prejudice ways like the determination of the pollen calendar by the result of the phenological studies .

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**PP-19**

**STOMATAL TYPES STUDY OF *PISTACIA LENTISCUS*  
(ANACARDIACEAE)**

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*Pistacia lentiscus* or mastic tree is an aromatic species of the genus *Pistacia* (*Anacardiaceae* family). It is an evergreen shrub (rarely small tree reaching 4-6 m). Although it is easily distinguished by its strong smell of resin, mastic tree is a principal component of the thermophylle Mediterranean maquis at low altitudes (0-500m). He reappears as a distinct breed, variety *emarginata* Ang. in Eastern Africa. According to the monograph of the genus established by Zohary (1952), the mastic belongs to the section *Lentiscus* Zoh. which includes evergreen species.

The identification of stomatal types of *P. lentiscus*, purpose of our study, focused on fresh leaflets collected in the north western region of Algeria (Tessala Mounts). Epidermal imprints were observed by light microscopy and scanning electron microscope (SEM). The results revealed a diversity of stomatal types. Epidermal imprints are revealed as hypostomatic. The peltate glandular trichomes were as well observed under SEM.

**PP-20**

**EFFECT OF EXTRACTION SOLVENT/TECHNIQUE ON THE ALKALOIDS CONTENT OF *MATRICARIA PUBESCENS***

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*Matricaria pubescens* (Desf.) is frequently used in the traditional medicine against rheumatisms, aches, bones, joints and muscular pains, cough, allergies, ocular affections, dysmenorrhoea, scorpion sting and dehydration. There is no data reported about the extraction of alkaloids form *Matricaria pubescens*.

The effects of four extracting solvents (ethanol, methanol, acid methanol (pH=4), and alkaline chloroform (pH=9)) and two extraction techniques (shaking and reflux) on the alkaloids content of *Matricaria pubescens* were investigated. The results of the present investigation showed clearly that the highest alkaloids contents in extracts was achieved by the ethanol solvent using reflux extraction technique and the methanolic acidified solvent using shaking for the extraction, with rates of 4,03 and 4,02% respectively. Whereas most poor yield 2.69% was obtained with alkaline chloroformic solvent and using shaking for the extraction. The alkaloids yield found by using ethanol like solvent and the reflux technique for the extraction was higher than that obtained by using the same solvent and the shaking technique.

**PP-21**

**EVALUATION OF GROWTH RESPONSE AND YIELD *ECHINACEA PURPUREA* (PURPLE CONEFLOWER) TO APPLICATION OF ZINC SULFATE AND ASCORBIC ACID UNDER DROUGHT STRESS**

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In order to evaluate of growth response in *Echinacea purpurea* to application of zinc sulfate and ascorbic acid under drought stress, an experiment was carried out by Split plot method on the base of RCBD with three replications in the agricultural research station of Islamic Azad University, Tabriz Branch in 2011-12. Experimental factors included water stress as the main factor on three levels (irrigation after 70mm evaporation from class A basin, irrigation after 120mm evaporation from class A basin and irrigation after 170mm evaporation from class A basin), Secondary factor included: application of micro element in two levels (control and application of zinc sulfate) and ascorbic acid in four levels (not application, application of 50 p.p.m of ascorbic acid, application of 100 p.p.m of ascorbic acid and application of 150 p.p.m of ascorbic acid). The results showed that drought stress on Purple coneflower decreased in plant height and biological yield but that caused to increase of stomata resistance, oxidase and peroxidase activity. Microelement application of Zinc had significant effect on plant height, stomata resistance, essence percentage and biological yield of purple coneflower. The most effect on biological yield was equal to 290.3 kg/ha obtained in foliar application of zinc sulfate in condition of irrigation after 70mm from class A basin. The most of essence percent with 0.854% obtained in foliar application of zinc sulfate in condition of 120mm water stress.

In conclusion, Application of ascorbic acid as an antioxidant decreased harmful effects of drought stress in some studies trait of Purple coneflower and increased essence percentage and biological yield of Purple coneflower.

**PP-22**

**EFFECT OF NITROGEN ON PHARMACOLOGICAL ACTIVITY OF  
*ATHRIXIA PHYLIKOIDES* (BUSH TEA) GROWN UNDER GREENHOUSE  
CONDITIONS**

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Bush tea is indigenous shrub of South Africa that has been used traditionally as medicinal and herbal tea. A greenhouse trial was conducted to investigate the effect of nitrogen on pharmacological properties of bush tea. Antimicrobial activity, cytotoxicity assay and antioxidant activity of bush tea treated with different nitrogen dosage were analyzed. Results of this study demonstrated that antimicrobial activity (MIC and MMC) demonstrated that the ethanol extract of bush tea possesses antimicrobial activity. The MIC of bush tea ranged from 3.1 to 12.5 mg/mL while the MMC ranged from 6.3 to >25mg/ mL. The antioxidant activity was tested on minimum extract concentration of 3.90µg/ml and maximum extract concentration of 500µg/ml. The results showed unfertilized bush tea had average antioxidant inhibition activity ranging from -92.80% to 78.56%. Bush tea leaves fertilized with different nitrogen doses exhibited an average antioxidant activity ranging from -171.36% to 78.89%. Bush tea was found toxic when 0Kg/ha (IC=88.14) and 225kg/h (IC=85.19) were applied. Less toxicity samples were evident at 300Kg/ha(IC=109.7) and 375Kg/ha (IC=102.9) with non-toxicity levels were at 75Kg/ha (IC=213.7) and 150Kg/ha(IC=235.3), respectively.

**PP-23**

**USE OF TREATED WASTEWATER FOR IRRIGATION OF  
*ROSMARINUS OFFICINALIS* L.**

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Treated wastewater is accepted as an alternative irrigation water resource that can be used throughout the year in order to protect clean water sources. For this reason, it is used as irrigation water particularly in arid regions suffering from water shortage. The objective of this study, which was conducted in Karaisalı (Adana-Turkey) in the Mediterranean climate between April 2008 and December 2009, was to determine the use of treated wastewater for irrigation of *Rosmarinus officinalis* (rosemary) that is used for ornamental and medicinal-aromatic purposes. The trial was designed in the form of random blocks with 3 replications. Clean water and wastewater that is treated in a pilot scale constructed wetland were used as the irrigation water.

The data on plant growth (plant height, plant diameter, number of shoots, shoot length and shoot diameter) were collected in monthly periods. The data obtained were statistically analyzed using the independent t-test. With this study, it was found that the plant growth was faster in the first year than in the second year for both irrigation type. And, in the second year, *R. officinalis* plants that were irrigated with treated wastewater growth slower than irrigated with clean water. This showed that plant growth was continued and no negative effect was identified. As a result, treated wastewater is accepted as an alternative irrigation water source for the green areas designed with rosemary. However, it's required to increase the number of studies for both its use in landscape architecture with ornamental characteristics and its cultivation in agricultural areas for its medicinal-aromatic properties.

**PP-24**

**EFFECTS OF CUMIN AND FENNEL ESSENTIAL OIL ON METABOLIZABLE ENERGY, DEGRADATION PARAMETERS AND DRY MATTER DISAPPEARANCE OF BARLEY GRAIN AND SUGAR BEET**

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In this study *in-vitro* gas production technique was used to investigate metabolizable energy and rumen degradation parameters of barley grain and sugar beet treated with 1 and 2 percentage fennel and cumin essential oil. A completely randomized design including 10 treatment (control, 1 and 2 percentage fennel and 1 and 2 percentage cumin essential oil and 2 feedstuffs) and ten replicate were used. Gas production of treated and untreated barley and sugar beet were done using Menke<sup>1</sup> (1988) method and degradation parameters and ME were estimated by equation described by Menke<sup>1</sup>. Fennel and cumin had no effect on barley ME but the effect of cumin and fennel essential oil on sugar beet ME was significant where sugar beet ME without any treatment was 7.802<sup>a</sup> MJ/Kg DM and when treated with 1 and 2 percentage cumin and fennel essential oil, sugar beet ME was observed 8.477<sup>b</sup>, 8.765<sup>b</sup> and 8.379<sup>b</sup>, 8.761<sup>b</sup> MJ/Kg DM respectively. These essential oil had no significant effect on degradation parameters and rumen disappearance in barley grain and sugar beet. Because of providing energy and protein to ruminants is much expensive part in ruminants' diet, using of these essential oil to improving energy availability in ruminants diet suggested.

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**PP-25**

**EFFECTS OF DIFFERENT LEVELS OF GARLIC ESSENTIAL OIL ON GAS PRODUCTION, DEGRADATION PARAMETERS, ESTIMATED METABOLIZABLE ENERGY AND FOOD DISAPPEARANCE**

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An *in-vitro* gas production technique was used to investigate the associative effects of garlic on degradation parameters and metabolizable energy (ME) of sugar beet. A completely randomized design including 3 treatment (control, 1 and 2 percentage garlic essential oil) and ten replicate were used. Gas production of treated and untreated sugar beet were done using Menke<sup>1</sup> (1988) method and degradation parameters and ME were estimated by equation described by Menke<sup>1</sup>. Results showed that gas production was different significantly between treatments in incubation times till 24 hours (42.70<sup>b</sup>, 45.56<sup>a</sup> and 45.14<sup>a</sup> in time 24 respectively) and using garlic was resulted to an increasing in gas and also ME (7.802<sup>b</sup>, 8.251<sup>a</sup> and 8.186<sup>a</sup> MJ/Kg DM respectively). Dry matter disappearance in rumen was significantly higher in treatment 3 (%2 garlic) (0.784<sup>b</sup> for control group, 0.799<sup>b</sup> and 0.888<sup>a</sup> percentage for treatment groups respectively). Garlic essential oil had no effect on degradation parameters (soluble and insoluble section of feed). The result of this research suggested that supplementing livestock diet with 2 percentage of garlic essential oil, can improve their production because of effect of garlic in increasing ME and rumen degradation of feedstuffs.

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**PP-26**

**QUALITY ANALYZES OF OLIVE VARIETIES USED FOR GENETIC CROSSES**

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The research concerned the study of olive oil target to maximize its performance while improving its quality through genetic improvement. In order to predict the qualitative performance at the progeny of genetic crosses of six productive and resistant olive varieties, the analysis of the quality and the composition of the oils of three foreign varieties introduced to Morocco : Arbequina, Picholine Languedoc and Manzanilla, and three local varieties: Menara Haouzia and M26 was performed. The performance of these varieties have been studied through the determination of several quality parameters namely acidity, specific extinction index, color, viscosity, chlorophyll content and the content of total phenols. The results show that there is a significant difference (ANOVA test) between the quality parameters of olive oil of the varieties studied especially for chlorophyll content and extinction index, the highest content of total phenols was among the variety M26.



**PP-27**

**THE ANATOMICAL, HISTOCHEMICAL CHARACTERIZATION AND STRUCTURAL FIBERS OF REED (*ARUNDO DONAX L.*). MEMORY FOR THE OBTAINING OF THE MAGISTER DEGREE IN PLANT BIOTECHNOLOGY**

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The *Arundo donax L.* is a plant which grows in the regions of the Mediterranean sea, it is very important from the economic and ecologic view. In the aim to know deeply this kind of plant and for a better enhanced value, many aspects were studied in this context. Biometric fibers and morphological examination shows what are heterogeneous forms thick-walled presenting with pits, average 0.45 mm for adult leaves their length and 0.40 mm stems rank among plants with short fibers. Tandy's their widths ranging from 0.005-0.02 mm.

The qualitative analysis of different fractions (cellulose, Hemicellulose, and pectin) neutral oses is carried out according to the Protocol of Gabrielli *et al.*, 2000 yielded the following results: Very low yield for hemicellulose; The C.C.M analysis showed that consist of hemicelluloses: Xylose, Arabinose. Cellulose is formed of Glucose mainly along with traces of Xylose. The Qualitative analysis shows that pectin's are consisting of Rhamnose, Galactose, Arabinose.

Setting up of fibrous tissue reveals two types of fiber:

- Fibers in epidermal.
- Périfasciculaires fibres surround driver beam.

The Histochemical study and cytochemical conducted specifically for the study of lignins showed coniféryles radicals seem to be prevailing level stems and radicals syringyls upgrade adult leaves. And other share, the study of cytological aspects allows the description of the cytoplasmic contents (starch, lipids) very required by different industrial sector.

**PP-28**

**STUDY THE EFFECT OF SOME FERTILIZERS TREATMENTS ON THE VEGETATIVE GROWTH CHARACTERISTICS FOR THE LOCAL ALMOND SEEDLINGS**

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Study was conducted under the conditions of the nursery of the Faculty of Agriculture and Veterinary Medicine, University of Dhamar during the period 21.11.2012 to 5 / 6/ 2013. The study has carried out in two phases: first was cold stratification for almond seeds which collected from Old Sana'a. Seeds was divided into two groups: the first was treated mechanical Scratch and the second had not been treated. At this stage results showed that cold stratification led to break seed dormancy for seed which planted in the winter and started in germination after about 85 days from the date of cultivation, while mechanical Scratch accelerated the germination process about 13 days compared to untreated seeds. The second phase included the treatment of seedlings in four different fertilizer transactions and different concentrations is a NPK treatment with concentration (0, 1, 1.5, 2 mL / L ) , foliar spraying with Megafool fert. (0, 0.5, 1, 1.5 ml / l), seaweed extract (0, 2, 2.5, 3 mL / l) and *Glycyrrhizaglabra* extract and yeast with (0, 50, 50 +5, 100 +10 ml / l).

Data were collected and analyzed statistically using the design (RCBD) with GenStat Discovery-4 program and the results showed that : superiority the extract of seaweed on the most of characters which achieved the highest rate of weekly increasing in length Seedling amounted to 4.55 centimeter per week and the highest rate of increasing in the number of leaves amounted to 6.62 leaf per seedlings in the week as well as the highest rate of increasing in the number of branches of the seedlings reached to 2.72 branch per seedling in the week while NPK fertilizer gave the highest rate of increasing in stem diameter of 0.4 millimeters per week .

**PP-29**

**THE EFFECT OF MICRONUTRIENT (YASHIL) AND  
MACRONUTRIENT (UREA) FERTILIZERS ON YIELD OF  
*CALENDULEA OFFICINALIS***

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*Calendula officinalis* is one of the most important medicinal plants. To investigate the effects of Yashil (Micronutrient) and Urea (Macronutrient) chemical fertilizers on yield of *Calendula officinalis*, a experiment was conducted on the basis of randomized complete blocks design in four replicates at Iranian Islamic Azad University of Tabriz. The fertilizer treatments in three levels (Yashil, Urea, Yashil fertilizer + Urea fertilizers) and control (no fertilizers). The results showed that the effect of Yashil and chemical fertilizers was significant ( $P < 0.01$  and  $P < 0.05$ ) on all of parameters (plant height, stem diameter, essential oil, total fresh weight and total dry weight). The maximum plant height, stem diameter, essential oil, total fresh weight and total dry weight were obtained by Yashil fertilizer + Urea fertilizer treatment. The least parameters were observed by control treatment.

In this experiment, commercial formulation of Yashil and chemical fertilizers had significantly positive effect on growth parameters of *Calendula officinalis*. In interaction effects Yashil and chemical fertilizers improved vegetative and reproductive traits. In general, these compounds can be supply essential nutrients like nitrogen, phosphorous and potassium and affect on morphological growth of the plant.

**PP-30**

**PEROXYDASES STRESS IN HALOPHYTES**

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For the purpose of comparison, the protein content and peroxidase activity (vegetable antioxidant) in the roots and leaves of *Atriplex halimus*, endemic of Méditerranéan regions and *Atriplex canescens* endemic of American regions in relation of salt stress (100, 300 and 600 Mm NaCl) are determined. BEARDEN (1978) Method is used for dosage of protein. Gaïacol and H<sub>2</sub>O<sub>2</sub> are used for dosage of peroxydase activity. The results show that the amount of protein in leaves is double than in roots in *halimus* and almost triple in *canescens*. Leaves of *halimus* are higher in protein than those of *canescens* with more 30%. As for peroxidase activity, leaves show almost double the root's activity in *halimus*. While, in leaves *canescens*, this activity is canceled. *Canescens* roots have an activity three times higher than that of the roots *halimus*. In response to salt stress, results show increased protein in the leaves of *halimus* and only at low concentration (100 mM) in leaves of *canescens*. Peroxidase activity increases in both leaves and roots of *halimus* at low concentration. However, the latter increase is observed in *canecens* roots at the same concentration suggesting that peroxidases seem not to be the enzyme system used by leaves *canescens* to deal with the stress conditions.

**PP-31**

**MICROSCOPIC CONTROL OF TURMERIC *CURCUMA LONGAE* L.  
RHIZOMES USING MULTIVARIATE ANALYSIS**

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*Curcuma longa* is widely used as spice and traditional medicine. This study was aimed to establish the microscopic identification of different commercial samples and finding parameters for discriminating the identification of turmeric powder. We have analyzed 15 samples from different origins; each experience was performed in triplicate. Statistical techniques were used to analyze the partition of structure observation. Principal component analysis test was applied to the distribution of observations for each sample. In total, 13 elements have been identified from 45 microscopic observation of turmeric powder. The most diagnostic features are starch granules, converging trichome, vessels, cork, fibres and parenchymateous cells containing starch granules. The results showed that microscopic observation of *C. longa* powder could be grouped according to the presence of non glandular trichome, and two forms of calcium oxalate crystals.

In conclusion, the microscopic analysis coupled with statistical analysis, could provide a platform of herb identification, particularly in authentication for diagnostic commercial sample.

**PP-32**

**EFFECT OF RED LIGHT ON BIOMASS PRODUCTIVITY OF GREEN MICROALGAE *CHLORELLA SP.* STRAIN ISOLATED FROM DJURDJURA NATIONAL PARK (NORTH ALGERIA)**

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The biodiversity of microalgae is a real potential for research and industry<sup>1</sup>. Microalgae have the potential to produce lipids with a high productivity such as two to three times what we may do with plants. We know also that the lipid quality can add value (EPA and DHA) to cosmetics and food complements<sup>2</sup>. However, further researches are to be done in order to optimize parameters governing growth and to develop large scale cultivation systems. Light energy is the most important environmental factor that has a positive influence on increasing biomass productivity. But, applying light for long hours yield to Oxidative stress.

The main objective of the current contribution was to study the effect of light quality on biomass production of microalgae *Chlorella* sp. cultivated in photobioreactor. The study shows that biomass production is significantly enhanced when the culture was growth under short photoperiod and received a red light illumination at the beginning of the dark period. The carried out experience illustrate the relationship between the phytochrome and the control of growth in *Chlorella* sp.

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**PP-33**

**ANATOMICAL STRUCTURE OF *TANACETUM NITENS* (BOISS.&NOE) GRIERSON FROM TURKEY**

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Genus *Tanacetum* belongs to Asteraceae (Compositae) family. This genus, represented in Turkish flora by 44 species with endemic 23 species and altogether 59 taxa, is rich in essential oils, bitter substances and sesquiterpene lactones. In this study, the anatomical properties of the species *Tanacetum nitens* (Boiss.&Noe) Grierson was studied in detail. In anatomical investigations, samples were taken from the plants' stem and leaves. For Microscopic observations sections from the specified part of the plant was prepared with a microtome after embedding in parafinne and photogrophede with a microphotography. In leaf anatomy; mesophyll, palisade parenchyma and upper and lower epidermis and in stem anatomy; cuticle epidermis, collenchyma, parenchyma cells and vascular bundles were observed. As a conclusion, anatomical structure of this taxa investigated first time in detail.

**PP-34**

**FATTY ACID COMPOSITION OF OLIVE OIL SAMPLES PURCHASED FROM MARKET**

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Olive oil, which is one of the oldest known vegetable oils, is extracted from the fruit of the olive tree, *Olea europaea* L. (Oleaceae). Virgin olive oil from olive fruits obtained directly by using physical methods, include high level oleic acid and different antioxidants. Olive oil is considered as a functional food by the authorities of international medical science because of medicinal effects as; reducing the risk of heart disease, protective effect against some types of cancer. In this study olive oils purchased from markets with “tariş, komili and aymar “ trademarks and analysed by GC-MS after methylation method. As the results of GC/MS analyses main fatty acids were determined as oleic acid, palmitic acid, linolelaoidic acids. As a conclusion quality of olive oils could be change depending on the brand.



**PP-35**

**ASCORBIC ACID CONTENT OF *HIBISCUS SABDARIFFA* FRESH CALYCES ACCORDING TO DIFFERENT SOWING AND HARVESTING TIME**

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Roselle (*Hibiscus sabdariffa* L.) is a member of the family *Malvaceae* to which okra, cotton and kenaf belong. *Hibiscus sabdariffa* Linne is a traditional Chinese rose tea and has been effectively used in folk medicines for treatment of hypertension, inflammatory conditions. Roselle seeds purchased in Thailand. In this study, ascorbic acid content of *Hibiscus sabdariffa* fresh calyx in different sowing (1 March, 1 April, 1 May 2013) and harvesting times (12 November and 4 December 2013) was investigated. Fresh calyces analyzed at wavelength of 520 nm with UV/visible spectrophotometer. The result revealed that the ascorbic acid content according to sowing times and harvesting times of fresh calyx of *Hibiscus sabdariffa* were 4.50, 22.13, 13.77 mg/100g and 11.78, 15.15 mg/100g respectively. The analysis revealed that *Hibiscus sabdariffa* contained higher amount of ascorbic acid at second sowing and harvesting time. As a conclusion analysis results showed that *Hibiscus sabdariffa* has high nutritive values in terms of the vitamins.

**PP-36**

**RESPONSE OF ATRIPLEX HALIMUS LEAVES TO SALT STRESS ON AN AMENDED BENTONITE SUBSTRATE**

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The increase of the osmotic pressure, the reduced soil fertility, and the imbalance of mineral nutrition and the reduction of the water absorption have an effect on the plants yield. The high osmotic pressure can provoke, therefore slower plant growth and reducing crop yields. Salinity is a major environmental stress in the world; affecting development. The proposed work is used to test the physiological and morphological characteristics of the leaves of a species of *Atriplex* (*Atriplex halimus* L.) driving under NaCl-based salt stress at doses of 100, 200, 400, 800 mEq/L during two weeks on substrate amended bentonite dosages of 5%, 7% and 10%. The results show that the doses of 5 and 7% bentonite are the most convenient, combined with low salt concentrations (100 meq / l).

**PP-37**

**ANTIOXIDANT CAPACITY, TOTAL PHENOLICS AND VITAMIN C CONTENTS CHANGES DURING HARDY KIWI FRUIT RIPENING**

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Changes in antioxidant activity of hardy kiwi fruit of three cultivars (Saehan(SH), Daesung(DS), Chilbo(CB)), which were selected from different sites and registered as a new cultivar in 2013, were studied at different 5 ripening stages. *Actinidia arguta*, called hardy kiwifruit, has an edible smooth skin and contains high amounts of sugar and vitamin C (ascorbic acid). Antioxidant activities were determined and their relationships to total phenolic contents, and vitamin C contents were analyzed. Antioxidant activity of the extracts was evaluated using 1, 1-diphenyl-2-picrylhydrazyl (DPPH) radical scavenging method. Total phenolic contents of the extracts were determined by the Folin-Ciocalteu method. Vitamin C content was also measured by a colorimetric method. The highest free-radical scavenging activities of three cultivars (SH, DS, and CB) were 45.43%, 38.67% and 55.53% at 100  $\mu\text{g}/\text{mL}$ , respectively and the highest total phenolic contents of three cultivars were 540.23, 379.62, and 853.05  $\mu\text{g}/\text{mg}$ , respectively. In general, the antioxidant activity and the related parameters, including total phenolic content and vitamin C content decreased during fruit ripening. Total phenolic contents of the hardy kiwi fruits (SH, DS, and CB) were correlated with free-radical scavenging activity ( $R^2 = 0.7854, 0.8395, \text{ and } 0.9741$ ). Based on the results in this study, we could suggest that during fruit ripening the antioxidant capacity and total phenolic content were decreased. Although the vitamin C contents were decreased during fruit ripening, the decrease rate was not significant. These results improve the knowledge of the effect of ripening on the antioxidant activity and related compounds contents that could help to establish the optimum fruit harvest data for various usages (for medicine or food).

**PP-38**

**ALTERATIONS IN PHARMACOLOGICAL COMPOSITIONS AND TUBER GROWTH OF *GASTRODIA ELATA***

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*Gastrodia elata* is a myco-heterotrophic orchid that has been used in traditional medicine to treat number of human illnesses. It establishes symbiotic associations with compatible mycorrhizal fungi, such as *Mycena* species and *Armillaria mellea*, depending on its developmental stages. *G. elata* tubers contain two major pharmacological substances; gastrodin (GA) and ergothioneine (ERG). Here we investigated whether the use of different tree species could enhance the growth of *G. elata* tubers, or of the content of GA or ERG. *A. mellea* infected all 30 tree species but its infection levels varied among species. However, only 14 species stimulated the growth of *G. elata* immature tubers; *Ulmus davidiana* produced the biggest tubers (7.8 g FW) while *Abies holophylla* generated the least significant changes on the growth of tubers reaching their weights to 0.9 g. In contrast to the tuber growth, the infection levels of *A. mellea* in those trees were similar, indicating that the colonized levels of *A. mellea* on different tree hosts were not correlated with the yield of *G. elata* tubers. Interestingly, the weights of immature tubers developed on 14 tree species were negatively correlated with the levels of ERG, but not with those of GA. In conclusion, our study suggested that the use of *U. davidiana* instead of *Quercus* species, which has been used for traditional cultivation of *G. elata*, might enhance the yields of *G. elata* tubers, but reduce the ERG levels while maintaining the GA levels.

**PP-39**

**ONTOGENETIC AND DIURNAL VARYABILITY OF *SALVIA SCLAREAE* FLOWERS**

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In this study, ontogenetic and diurnal variations of *Salvia sclareae* flowers have been identified. In this research, determination fatty acid composition of *Salvia sclareae*'s flowers taking into cultures grown in Cumra ecological conditions. Find of oleic acid (C18:1), linoleic acid (C18:2) and linolenic acid (C18:3) fatty acids of *Salvia sclareae*'s flowers in July harvesting time. These fatty acids are known the major fatty acids.

Observation of *Salvia sclareae*'s flowers  $\omega$ -3,  $\omega$ -6 and total unsaturated fatty acid. The total saturated fatty acid are known useless for human healthy less than unsaturated fatty acid in flowers of *Salvia sclareae*.

**PP-40**

**THE EFFECT OF  $\Gamma$  -IRRADIATION ON GERMINATION OF TURKISH OREGANO (*ORIGANUM ONITES*) AND HYSOP (*HYSSOPUS OFFICINALIS*) SEEDS**

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This study was performed in the year 2010 to determine the effects of  $\gamma$  -irradiation on germination velocity, germination rate and emergence ratios of Turkish oregano (*Origanum onites*) and hyssop (*Hyssopus officinalis*) seeds. The seeds used in the research were supplied from plants grown in Cumra Vocational High School. Except for the control group, 2.5 kGy, 4 kGy, 5.5 kGy and 7 kGy doses of  $\gamma$  -irradiation were applied to Oregano and Hyssop seeds.

As a result of the experiments, germination and emergence ratios decreased inversely by increasing the dose of  $\gamma$  -irradiation. Increasing the  $\gamma$  -irradiation dose stabilized the number of days of the first germination and the number of days that germination stopped. For 7 kGy exposure dose, there was no germination observed in either of the seeds. Additionally, starting germination for both of the seeds was delayed by increasing the dose of  $\gamma$  -irradiation. Emergence rate for both of the seeds was delayed by increasing the dose of  $\gamma$  -irradiation.

**PP-41**

**DROUGHT PROVOKED THE ACCUMULATION OF ANTHOCYANINS  
IN COMMON BEAN (*Phaseolus vulgaris L.*) LEAVES**

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The application of a hydric stress in seedlings of bean provoked many disturbances of biochemical and physiological processes. Our results show modification of the metabolism of anthocyanins a variation of flavonic metabolism particularly that of the anthocyanins. The H<sub>2</sub>O<sub>2</sub> can act as a molecule signal capable to inducing the expression of the genes involved in the synthesis of anthocyanins.

Anthocyanins are highly accumulated in leaves of seedlings in hydric deficit (64,26% compared to control ), this increase is a function of the physiological stage of plants and of the intensity of the stress. Anthocyanins present some biological activities that are attributed to their ability to trap free radicals besides antioxidant activity<sup>1</sup>, it has also been suggested that anthocyanins may be directly involved in osmotic adjustment. A higher content of anthocyanins would establish a defence system toward drought.

**References**

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**PP-42**

**EFFECT OF BIOLOGICAL AND CHEMICAL PHOSPHORUS ON PERCENTAGE OF COLONIZATION, NITROGEN, PROTEIN AND PHOSPHORUS AMOUNT OF POT MARIGOLD (*CALENDULA OFFICINALIS* L.) UNDER WATER DEFICIT CONDITION**

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*Calendula officinalis*, commonly known as Marigold, has been traditionally used for its anti-inflammatory effects. Extracts of *C. officinalis* have also been found to have anti-oxidant, anti-fungal, anti-oedema, anti-diabetic and wound healing properties. The major constituents of *C. officinalis* include steroids, terpenoids, triterpenoids, flavonoids, phenolic acids and carotenes. Faradiol, rutin, caffeic acid and chlorogenic acid have been isolated from *C. officinalis* and have shown biological activity in the body. Among the abiotic stresses, drought is the most common where plants are constantly exposed to, making up about 26% of all stresses. Drought stress reduces both nutrient uptake by the roots and transport from roots to the shoots, due to restricted transpiration rates and impaired active transport and membrane permeability. Drought stress affects genes expressions and protein synthesis. To evaluate the physiological response of pot marigold to water deficit stress in varying Phosphorus, a factorial experiment was conducted based on randomized complete block design with three replications at Urmia university in 2014.

Treatments were irrigation at two levels (50% and 80% FC) and fertilization system (control, super phosphate triple, phosphat solubilizer bacteria, mycorrhizal fungi species (*Glomus mosseae*, *G.interaradices* and *G.hoi*). Data analysis of variance showed the significant effect of irrigation on phosphorus amount ( $P \leq 0.05$ ), fertilization system on percentage of colonization ( $P \leq 0.05$ ) and interaction between irrigation and fertilization system on percentage of nitrogen and protein ( $P \leq 0.01$ ). Means comparison indicated that the highest percentage of colonization (51.66%) belonged to plant treated with *Glomoss hoi* and the lowest percentage (32.5%) related to chemical phosphorus. The amount of phosphorus under 80% FC (3.31 mg/L) was greater than 50% FC. The maximum percentage of nitrogen (0.63%) related to interaction between *Glomoss interaradices* and irrigation at 50% FC and the minimum percentage (0.2%) related to interaction between chemical phosphorus and irrigation at 80% FC. The highest percentage of protein (3.96%) belonged to plant treated with *Glomoss interaradices* and the lowest (1.28%) related to chemical phosphorus under 80% FC.



**PP-43**

**EFFECT OF BIOLOGICAL AND CHEMICAL PHOSPHORUS ON PHOTOSYNTHETIC PIGMENTS, WATER CONTENT AND OSMOLYTES OF POT MARIGOLD (*CALENDULA OFFICINALIS* L.) UNDER WATER DEFICIT CONDITION**

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*Calendula officinalis* L. is a fast-growing herb that originated in southern Europe. It is harvested throughout the world, and its pharmaceutical uses are described in many pharmacopeias. The phytochemistry of *Calendula officinalis* has been extensively studied, and it mainly consists of triterpenes, flavonoids, phenolic acids, Faradiol, rutin, caffeic acid and chlorogenic acid have all been isolated from *C. officinalis* and have shown biological activity in the body. In response to abiotic stresses such as water deficiency, plants use different strategies to cope with which include changes in plants biochemical and physiological processes. Adaptation to this stress is associated with metabolic adjustments that lead to the accumulation of several organic solutes like sugars, polyols, betaines and proline. And also causes quantitative changes in photosynthetic pigments such as chlorophylls, anthocyanins and carotenoids. To evaluate the physiological response of pot marigold to water deficit stress in varying Phosphorus, a factorial experiment was conducted based on randomized complete block design with three replications at Urmia university in 2014.

Treatments were irrigation at two levels (50% and 80% FC) and fertilization system (control, super phosphate triple, phosphat solubilizer bacteria, mycorrhizal fungi species (*Glomus mosseae*, *G.interaradices* and *G.hoi*). Data analysis of variance showed the significant effect of irrigation on chlorophyll *a*, chlorophyll *b*, total chlorophyll ( $P \leq 0.05$ ) and interaction between irrigation and fertilization system on prolin and soluble sugar ( $P \leq 0.01$ ). But, there were no significant effect of irrigation and fertilization system on the carotenoid, percentage of relative water content and water saturation deficit. Means comparison indicated that the amount of chlorophyll *a*, chlorophyll *b* and total chlorophyll under 80% FC was greater than 50% FC. The highest content of prolin concentration (2.6 mg/L) belonged to plant treated with chemical phosphorus under 50% FC and the lowest content (0.57 mg/L) related to *Glomoss mosseae* under 80% FC. The maximum concentration of soluble sugar related to *Glomoss hoi* (783.97 mg/L) and the minimum (356.42 mg/L) belonged to the *Glomoss hoi* under 80% FC.

**PP-44**

**SOME PHYSIOLOGICAL EFFECTS OF COPPER APPLICATIONS IN  
MEDICINAL PLANT ROSEMARY (*Rosmarinus officinalis* L.)**

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In this study, effects of Cu application on some of the physiological effects of medicinal plant rosemary (*Rosmarinus officinalis* L.) were investigated. The plants were acclimatized in growing chamber during three weeks. The plants were treated with 5, 50, 100 and 500 ppm Cu concentrations during 20-days, then harvested. Particularly, a decline in shoot growth and chlorosis in leaves were observed at 100 and 500 ppm Cu concentrations. Copper contents of leaves were increased with increasing Cu concentrations. Although K contents of leaves at 5 and 50 ppm Cu concentrations were decreased as 3.8% and 2.0%, respectively, with respect to control, the contents were increased at 100 and 500 ppm Cu concentrations as 1.6% and 3.7%. Whereas Fe, Mg and Ca contents of leaves were increased with increasing Cu concentrations, Zn content was decreased. Chlorophyll-a and chlorophyll-b contents of leaves were decreased at 500 ppm Cu concentration as 26.4% and 22.8%, respectively, with respect to control. Similarly, the total protein content of the leaves were decreased by Cu the applications, particularly at high Cu concentrations. There were increases in H<sub>2</sub>O<sub>2</sub> amounts, a reactive oxygen species. Observed increases in total amount of phenolic compounds show that such compounds may be related to the roles in Cu tolerance.

**PP-45**

**THE AGROTECHNICS OF CULTIVATION, ILLNESS AND WRECKERS SOME DECORATIVE GRASSY PLANTS**

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In article it is described the agrotechnician of cultivation had been introduced from Holland, America, China some decorative grassy plants in conditions Apsheron, ways of struggle against illnesses and wreckers. In scientific- research work on plants of illnesses it was not observed. Against wreckers have been used agrotechnical, mechanical and chemical ways of struggle. It is revealed that the investigated kinds and sorts well adapted in soil – climatic conditions of Apsheron. These plants can be used at creation of various compositions in gardening.

At studying of bioecological features of decorative grassy plants the great value has the agrotechnics of cultivation, ways of struggle against illnesses and wreckers. In this connection in a Institute of Dendrology National Academy Sciences of Azerbaijan in laboratories «Landscape architecture» scientific- research work on a theme «Studying of bioecological features of some decorative grassy plants and use in landscape architecture» is spent. The main objective of scientific-research work was introduction various kinds and grades of decorative grassy plants from Holland, America, China, studying of their bioecological features, agrotechnics of cultivation, ways of struggle against illnesses and wreckers in the conditions of Apsheron and creation from them compositions in parks, gardens, squares on style of landscape architecture.

**PP-46**

**BOTANICAL IDENTITY AND QUALITY PARAMETERS OF BLOND PSYLLIUM SEEDS GROWN UNDER SEMI ARID ENVIRONMENT OF CENTRAL SUDAN**

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The botanical features, physical and chemical properties and the of the Blond Psyllium seeds were studied in attempt to establish the identity and quality parameters for Blond Psyllium cultivated under the environment of central Sudan. The study included seed morphology, microscopic description of the seed tissue, physical and chemical properties of the intact and the powdered seeds. The standards of the International Pharmacopias and the published data from Indian environment were used as reference data for comparison. The result of the botanical features showed that the seed produced under the prevailing environment of Shambat, central Sudan complies with the requirements of the quality standards recommended by the British Pharmaceutical Codex (BPC). Among the quality parameters studied, husk content, total carbohydrate and fixed oil percentages were lower than the range reported for some of the Indian genotypes; while mucilage content, total ash and acid insoluble ash were within the range the range recommended by the WHO.

**PP-47**

**CULTIVATION PRACTISES ON WINTER SOWN FENUGREEK  
(*Trigonella foenum- graecum L.*) UNDER ANKARA ECOLOGICAL  
CONDITIONS**

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Fenugreek (*Trigonella foenum- graecum L.*), an annual legume, has 45 species naturally growing in Turkey. It has laxative, carminative, digestive, antipyretic, bronchitis and milk enhancer effect. It also helps reduce the blood sugar and treatment of the cancer. Present research aims to determine the winter sowing possibilities for CV 'Gürarşlan' and recording the yield parameters and chemical constituents in Ankara ecological conditions. The field trials was conducted in 2014 with three replicates. The plant height was 48.5 - 57.5 cm, the number of pods was 9.0 - 19.25, the number of seeds at pods 12.1-15.88, the number of branch 2.0-3.25 and the thousand seed weight was recorded as 23.71-24.33 g. The biological yield was 7.917-10984.8 kg/ha and the seed yield was found as 886-1433 kg/ha. The fixed oil ranged between 3.43-4.09%. The main fatty acids were determined as follows; 41.09% linoleic acid, 29.54% linolenic acid, 12.15% oleic acid, 8.93% palmitic acid and 3.98% stearic acid.

**PP-48**

**ECOLOGICAL STUDY OF SOME HYPOGLYCAEMIC PLANTS AND  
IMPACT OF ATMOSPHERIC POLLUTION ON QUALITATIVE AND  
QUANTITATIVE ASPECT OF THEIR ACTIVE SUBSTANCES, CASE OF  
*EUCALYPTUS GLOBULUS LABILL***

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No one can put in doubt the therapeutic value of medicinal plants. Their traditional use serves currently as reference for various pathologies treatment. Despite the manufacturing synthetic drugs appeared in overabundance and their reputation, the medicinal plants, active ingredients inexhaustible source, constitute currently the main source and the basis of numerous pharmaceutical specialities. To be able to use them wisely, after identification, it is imperative to choose a place of clean and healthy harvest. In this context, we tried through this study to bring our contribution on one hand to the realization of an inventory and to the ecological study of some hypoglycaemic plants often used in diabetes treatment, a disease characterized actually as the evil of the century and affecting a large proportion of the world population, and on the other hand, after extraction and gas chromatography analysis (G.C) of leave extracts, to determine the impact of the atmospheric pollution on some physicochemical characteristics of essential oils of plants living near to the pollution source, case of eucalyptus :*Eucalyptus globules* Labill, a very abundant species on busy roads and commonly used in diabetes treatment and other affections.

**PP-49**

**EFFECTS OF DIFFERENT APPLICATIONS ON *IN VIVO* AND *IN VITRO* GERMINATION OF *TCHIHATCHEWIA ISATIDEA* BOISS\***

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*Tchihatchewia isatidea* Boiss generally grows on eroded hills and slopes and spread out from east of Anatolia to the border of Iran and is also used as medicinal and dye plant in Turkey. Total 60 accessions were collected from Sivas, Tunceli, Erzurum, Gümüşhane, Malatya and Erzincan provinces located at east of Turkey. Fourty plants from each accession were taken and mixed to make the bulk samples for seed germination studies. The seeds of the collected accessions were kept for 0-25-35-45-60-75 days at 4 °C. Then, the seeds were sown at the box containing peat and perlite mixture in growth cabinet at 20 °C under *in vivo* conditions. The highest germination ratio (17.24 %) was achieved at kept 60 days at 4 °C. The seed were kept at 4 °C for 7-14-21-28-35-42 days then immersed in liquid medium containing 1000 and 2000 ppm GA<sub>3</sub>, for 48 h. The seeds were also surface sterilized in 30% commercial bleach (Axion) for 20 min rinsed four times and transferred to on 1/2 MS medium supplemented with 10 mg/l GA<sub>3</sub>, 2% (w/v) sucrose and 0.7% (w/v) agar or placed between sterile filter papers immersed sterile water at 4-8-12-16 °C. The best germination ratio (81 %) was achieved on the seeds kept for 42 days and immersed in liquid medium containing before culturing 2000 ppm GA<sub>3</sub> on 1/2 MS medium supplemented with 10 mg/l GA<sub>3</sub> under *in vitro* conditions.

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**PP-50**

**CULTIVATION OF ENDEMIC AND ENDANGERED *MUSCARI AUCHERI* (BOISS.) BAKER (LILIACEAE) UNDER FIELD CONDITIONS\***

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*Muscari* genus which is one of the important geophytes species belong to Liliaceae family are valuable ornamental plants because of their attractive flowers which open in early spring. *Muscari aucheri* (Boiss.) Baker is also important species with their attractive flowers among these species and may be used as a ornamental plant. *The species* is also endemic and endangered species of Turkey and threatened by complete extinction. The natural medium propagation rate of the species also may hamper the cultivation of this plant. The aim of the study was to develop growing techniques the species under field conditions. The bulbs of *M. aucheri* were planted according to bulb size (bulb size 2-3 cm) on the different sowing densities (1, 2 and 4 cm row spacings) for two years. The highest bulb forming bulblet (100 %) ratio was determined at 2 and 4 cm row spacings and 2 cm bulb size at the second experimental year. Moreover, the best number of bulblets per mother bulb (mean 5.43) in *M.aucheri* was also found at 2 cm row spacing and 3 cm bulb size and at the second experimental year. It was also observed that as bulb size and sowing densities were increased, plant height, leave length, fruit formation ratio enhanced.

\*This study was supported by TÜBİTAK Project (code 106O034)



**PP-51**

**BIOLOGICAL AND ECOLOGICAL STUDY OF MEDICINAL PLANTS  
USED IN EASTERN ALGERIA: EXTRACTION AND ANALYSIS OF  
LAVENDULA ESSENTIAL OIL**

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By its geographical location and its diversity bioclimatic, the Algerian guerrillas present a wide range of aromatic and medicinal plants. Among these plants Lavender: *Lavandula Vera* who was appointed following a study conducted ethno botany in the region of Annaba plant, as "hypotensive" was the theme of our work Biological and ecological study of two samples taken in different biotopes a semi arid area Tebessa and sub humid area Batna The extraction of essential oils and their analysis by GC demonstrated that both samples have similar components but a higher return for the sample of the semi arid area: Tebessa

**PP-52**

**STUDY OF LIPOSOMES AS A MODEL FOR PHOTOSYNTHESIZING MEMBRANES\***

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During the last two decades liposomes switched from a laboratory research topic to a powerful industrial tool, the technical evolution allowing the researchers to obtain such forms with characteristics closed to the targeted ones. Chlorophylls liposomes could be used as model for photosynthesizing membranes, to assess the transport phenomena through lipid membranes (chlorophyll being the marker, due to its absorptions and emission spectral properties) as well as to assess the photoelectric and photovoltaic phenomena. The objectives of this work were the comparative study of the liposomes containing chlorophyll a and chlorophyll b from *Anthriscus sp.* The chlorophylls were obtained using Strain and Sweck method and liposomes by thin films hydration method. The physico-chemical characteristics of the liposomes were investigated comparatively and the influence of pH on the liposomal suspensions was evaluated. The fluorescence techniques were proposed for the determination of energy transfer between chlorophyll b and chlorophyll a entrapped in liposomes. The experiments performed showed that chlorophylls had the main influence on the formulations sensitivity and the highest stability is recorded for chlorophyll b loaded liposomes. Also, only approximately the same quantities of the two chlorophylls entrapped in the same liposomal suspension qualitatively indicated the energy transfer.

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**PP-53**

**COLLAGEN-LAVANDULA OIL-NIFLUMIC ACID DELIVERY SYSTEMS\***

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An important issue that has to be considered in the cutaneous wound healing is the management of the post-lesion inflammatory response. The non-steroidal anti-inflammatory drugs (NSAIDs) represent a reliable strategy for treating the inflammation and consequently the pain at wound level. In many cases, the healing is delayed by the wound bacterial infections and could be fatal in case of severe wounds. Nowadays, medicinal plants are used as an important source of bioactive principles with a broad pharmacological activity. Among these, a large variety of essential oils proved antimicrobial properties. The aim of this paper was the design and characterize some collagen hydrolysates with niflumic acid as a NSAIDs model with two antimicrobial essential oils of *Lavender officinalis L.* and *Lavender stoechas L.* subsp. *stoechas*. The wettability capacity of collagen hydrolysate powder was assessed by the contact angle measurement. Niflumic acid release was investigated using a modified Franz diffusion cell, and the diffusion coefficient, time-lag and drug flux were determined. The kinetic parameters were influenced by the different concentrations of essential oils and their type. These collagen hydrolysates based on therapeutical drug association with a synergistic effect, anti-inflammatory and antimicrobial, could have potential biomedical application in wound healing treatment.

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**PP-54**

**PROTECTION AND CULTIVATION OF MEDICINAL AND AROMATIC PLANTS IN WEST MEDITERRANEAN REGION IN TURKEY: PROJECT RESULTS**

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The project “*Protection and Cultivation of Medicinal and Aromatic Plants in West Mediterranean Region in Turkey*” is funded by the FAO/Turkey Partnership Programme and assisted by the FAO Subregional Office for Central Asia (FAO-SEC). The project was sign and begin May 2012 and finished October 2014.

The project focused on conservation and efficient utilization of medicinal and aromatic plant genetic resources, contributed to improve rural livelihood and food security via cultivation and sustainable wild-collecting. Three awareness raising workshop realized in three pilot site, Antalya-Akseki Kuyucak Village, Isparta-Eğirdir Sariidris Village and Burdur-Bucak Melli Vilage. Trainings about wild collecting and cultivation technics as seed-bed preparation, planting, management, harvesting and post-harvest processing of MAPs for farmers also carried out both theoretical in pilot sites and practical in BATEM project demonstration field.

One of the most important aim of the project was build a bridge between stakeholders. In several project meetings researchers, industrials and farmers coming together and had a chance for discussing about their needs. A number of trainings were carried out about increasing the staff capacities of “Medicinal and Aromatic Plants Central Laboratory” in BATEM.

As a result of this project, we noticed that trainings about wild collecting and cultivation of MAPs must be continuous in much more sites. This could assist farmers for cultivating industries needs and the bridge between researchers, industrials and farmers would getting stronger.

**PP-55**

**CULTIVATION STUDY OF ENDEMIC *SIDERITIS TMOLEA* P.H. DAVIS  
(LAMIACEAE)**

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Lamiaceae family is cosmopolite and has approximately 700 species belong to 250 genera. One of these genera is *Sideritis* (Labiatae), represented by 46 species and 53 taxa in Turkey, 39 taxa being endemic (77% endemism ratio). *S. tmolea* is distributed on Bozdağlar Mountain chain at an altitude of 1450-2100 m. *Sideritis* species are widely used for medical purposes and as herbal tea in Turkey. While *Sideritis* species are known under various names in Anatolia, they are usually referred to as “Dağ Çayı”, “Yayla Çayı” and “Ada Çayı”. *S. tmolea* is known as “Sivri Çay”. This plant is consumed extensively by the people of the region and is carried by trade collected from natural populations. In order to solve the problems that have the potential assessed in terms of these plants in Turkey is not enough for breeding and agronomy studies.

In this study, in vitro seed germination of endemic *S. tmolea* species have been made and the seedlings obtained were transferred to three different localities (E.Ü. Botanical Garden, Bornova/İzmir, E.Ü. Bengisu Conservation Garden, Ödemiş/İzmir and E.Ü. Ödemiş Vocational School, Ödemiş/İzmir ) in addition to them measure a team with some agronomic characteristics were studied to determine in this species. In conclusion, this type of plants to demonstrate the agronomic characteristics and cultivation will prevent the destruction of natural populations.

**PP-56**

**THE IMPORTANCE OF SAFFLOWER (*CARTHAMUS TINCTORIUS* L.),  
A MEDICINAL PLANT, REGARDING IT'S ACTIVE SUBSTANCES**

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More than 200 components are isolated from different parts (leave, flower and seed) up to now. The most known components are: flavanoids, phenylethanoids, cumarins, fatty acids, steroids and polisaccarides. 7 serotonin derivatives were isolated from safflower oil. The main components of safflower flowers is carthamin, an important flavanoid glycosides. Its flowers contains also arthamidin, isocarthamidin, quercetin, kaempferol, 6-hydroxykaempferol and its glikosides and hydroxysafflor yellow A, safflor yellow A, safflamin C, safflamin A, safflomin-A. Also, lauric, miristic, palmitic, linoleic, arachidic and flavon luteolin and luteolin 7-O-beta-D-glucopyranoside and luteolin-7-O-(6"-O-acetyl)-beta-D-glucopyranoside are presents in *Carthamus tinctorius* flowers. Nikotiflorin, are present as a natural flavanoid in in the petals of *C. tinctorius*. An seconder metabolite, alkan-1,3-diols, was isolated from dried petals of safflower. The main essential oil componens of safflower flowers were determined as Caryophyllene, p-allyltoluene, 1-acetoxytetralin and heneicosane.

An new quinokalkon C-glikoside, tinctormine was determined in safflower. The potentail use of safflower in phytotherapy and developments in its use as healing agent was discussed in detail. It was determined that safflower has antioksidant, analgezic, antidiabetic, hepatoprotektic ve antihperlipidemic activities.

**PP-57**

**THE MULTIPLICATION OF *SALVIA VERTICILLATA* L. SUBSP *VERTICILLATA* COLLECTED FROM RIZE HIGHLANDS WITH SEED AND PERLITE**

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The aim of this study was to determine the multiplication potential of seeds and cuttings of *Salvia verticillata* L. subsp *verticillata* Collected from the highlands of Rize. Cuttings were obtained from material collected from nature and cuttings were cut from the 2nd and 3rd node and were implemented with 1000 ppm IBA for 1 min and transferred to peat containing. Seeds were directly transferred to peat containing soil and the results showed us that success rate was 30 % in seed multiplication and 75 % in multiplication with cuttings.

**PP-58**

**PRIMING SEED INFLUENCES ON THE SUBSEQUENT SECONDARY METABOLITE PRODUCTION IN PLANTS**

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Studies on the modulation roles of priming solution in response to plant growth and development under favourable and non-favourable conditions have been well documented and consequently, elicitor or signal molecule roles of priming received considerable attention in the adaptation plants to the environment or in overcoming stress conditions. In addition to the optimal growth, plant behaviour can change with respect to the secondary metabolite synthesis, production, secretion, and storage when subjected to priming treatments. Plant secondary metabolites are great interesting and natural alternative sources for food, pharmacology and medicinal sectors. For this reason, desired quantity and quality of potential secondary metabolites are great interest for many purposes. In this context, accumulation of such metabolites may be enhanced with priming solutions but it is worthy to note that more production of metabolites does not always correspond to the required or desired properties for uses. This brief review summarizes the influence of different priming treatments on secondary metabolites in plants associated with the stimulation of priming in addition to the physiological and molecular approaches.



**TOPIC II**

**PHYTOCHEMISTRY & BIOACTIVITY**

**PP-59**

**BIOLOGICAL AND CHEMICAL EVALUATIONS OF *PISTACIA ATLANTICA***

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The pistachio atlas is fairly common throughout Algeria. It is encountered in a dispersed state Saharan Morocco and Algeria and even in the Hoggar. A tree that adapts to the climate arid floor and can live in the harshest environmental conditions. Fixed oil of this plant has been the subject of numerous studies<sup>1</sup> for their chemical composition, while the biological activity was never shown.

Promising results have been found. The antioxidant activity of seed oil from our plant was tested *in vitro*, using two free radical DPPH and ABTS. It had a strong activity. In other side, tests kinetic of growth and respiratory metabolites don't show any anomaly. Secondary metabolites such as flavonoids and tannins were isolated from this plant, and then separated using preparative TLC and finally identified by spectroscopic methods UV-Visible and <sup>1</sup>H NMR. In conclusion, this plant opens promising avenues for depth research.

**PP-60**

**EVALUATION OF BIOLOGICAL ACTIVITY OF SOME EXTRACTS  
FROM *RUMEX VESICARIUS* AND *GOSSYPIUM HERBACEUM***

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As part of the valuation of the Algerian flora, we are interested in the study of two Saharian plants growing in the spontaneous state in the region of Bechar, *Rumex vesicarius* that are part of the *Polygonaceae* family, whereas *Gossypium herbaceum* belongs to the *Malvaceae* family. In this context, our work is based on the study of antibacterial activity and antioxidant activity of the extracts of these medicinal plants. " The antibacterial activity was tested of *Pseudomonas aeruginosa*, *Escherichia coli*, *Enterococcus faecalis*, *Citrobacter freundii* and *Staphylococcus aureus* by the disc method and antioxidant activity of the free radical trapping.

Results of the evaluation of the antibacterial activity by the use of the method of disc it was found that the ethanolic extract of *Gossypium herbaceum* to a concentration of 9.52 g / ml gave an area inhibition for 11.75 mm *Citrobacter freundii*, 11.3mm of *Escherichia coli* and *Enterococcus faecalis* for 10.5 mm. The aqueous extract of *Rumex vesicarius* has a maximum antibacterial activity at concentrations of 14.8 micrograms / ml for *Citrobacter freundii*: 10.75 mm. The results of the antioxidant activity of ethanol extract of *Rumex vesicarius* showed good activity with a concentration of 1258 mcg / ml, which is 85.70 %.

**PP-61**

**ASSESSMENT OF ANTIOXIDANT AND ANTIMICROBIAL ACTIVITIES OF THE ALGERIAN *PISTACIA LENTISCUS* L.**

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This study aims to assess the capacity of leaves extracts of the Algerian *Pistacia lentiscus* L. in scavenging free radicals as well as their efficiency against eight bacterial strains and one yeast. The strains included opportunistic nosocomial pathogens and foodborne illnesses causing bacteria, and a yeast, *Candida albicans*, an agent of opportunistic oral, genital and nail plate infections in humans. The results of the assessment of the antioxidant activity using DPPH• free radical clearly demonstrates that our extracts revealed considerable free radical scavenging properties. Tannins showed the best results with an IC50 value of 0.102 mg/mL, which is very close to the IC50 of Ascorbic acid (0.077 mg/mL) (Krishnaiah et al., 2010). The results of the antimicrobial assays showed that all extracts were most active at a concentration of 320 mg/mL. The ethyl acetate fraction (EAF) was the most effective against the tested bacteria followed closely with n-butanol fraction. The methanolic and hydromethanolic crude extracts exhibited various degrees of growth inhibition. *E. coli* was the only strain that showed no inhibitory zones in both agar diffusion assays, while it displayed some sensibility with a MIC of 80mg/mL under the influence of EAF in the dilution method. Saponins extracted from *P. lentiscus* L. leaves were found to be highly active against the clinical *C. albicans* with an inhibition zone of 20mm at a concentration of 320 mg/mL and a MIC of 160 mg/mL (Benhammou et al., 2008; Cherbal et al, 2012). In light of these results, one could say that extracts from *Pistacia lentiscus* L. leaves can be a veritable source of antioxidants and possibly of antimicrobial agents.

**PP-62**

**ANTIOXIDANT PROPRIETIES OF SWEET CHERRIES (*Prunus avium* L.) FROM TUNISIA**

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Thanks to the health benefits attributed to various fruits, numerous studies have been conducted in recent years to evaluate their proprieties in terms of quality and bioactivity. Fruits are considered a natural source of antioxidants, including anthocyanins and polyphenols compounds that can reduce the risk of degenerative diseases caused by oxidative stress, such as cancer and cardiovascular diseases. Red fruits including cherries are considered to be one of the richest sources of phenolic compounds.

The aim of this study was to evaluate the content of phenolics, the antioxidant activity and nutriments in five sweet cherry cultivars (*Prunus avium* L.) in the northwestern of Tunisia (Ain Drahem village)

The five varieties are: Stella; Sunburst ; Van; Moreau ; Napoleon

Total polyphenols were determined colorimetrically using Folin-Ciocalteu reagent, and the measurement of antioxidant activity with 2,2- Diphenyl-1-picryl-hydrazyl (DPPH) assay. The examined cultivars possess a high antioxidant capacity; also the study indicated that the growing and climate conditions in the Tunisian northwestern are convenient for introducing sweet cherry cultivars.

**PP-63**

**THE ANTIFUNGAL EFFECT OF *ASPHODELUS TENUIFOLIUS* ON MOLD MYCOTOXINOGENICS**

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Its geographical characteristics and its regional diversity status, Algeria offers a wide variety of climatic conditions allows the biodiversity of flora and shape. As part of the development of natural substances in plants of the Algerian Saharan flora and evaluation of the antifungal effect.

The results of phytochemical screening and antifungal activity of *Asphodelus tenuifolius* of region Bechar and Tindouf against some kind of mold mycotoxigenics shows that our plant with an antifungal effect on almost all molds used in our work because the *Asphodelus tenuifolius* contains a very large diversity of natural substances with which the flavonoids, alkaloids, tannin, etc...inhibition effect of mold concentration depends to the extracts used.

**PP-64**

**INVESTIGATION OF ANTIBACTERIAL ACTIVITY OF "KABA NAVRUZ" *Iris galatica* Siehe ENDEMIC PLANT GROWNING IN TURKEY**

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*Iris galatica* Siehe locally named as “kaba navruz” in Anatolia has distributed in Middle and East Anatolia Region, Turkey, is a perennial herbaceous plant, flowering in April or May, it is an endemic species. In previous studies, biological activity work of *I. galatica* Siehe plant has not been determined. In this study, we used n-hexane, dichloromethane, methanol and water extracts of several parts (root, flower, leaf) of *I. galatica* Siehe and we studied their antibacterial activity. To determine antibacterial activity of the all extracts of *I. galatica* Siehe we used MIC (Minimal Inhibition Concentration) method against 9 different bacteria strains according to CLS (Clinical Laboratory Standards).

In conclusion, it was investigated that n-hexane, dichloromethane, methanol and water extracts of root, leaf, flower parts of *I. galatica* endemic plant have got well an antibacterial activity. We herein report the first study about antibacterial feature of “kaba navruz” *I. galatica* endemic plant growing in Turkey.

**PP-65**

**AN INVESTIGATION ON ANTIBACTERIAL ACTIVITY OF ‘TOROS SÜSENI’ (*Iris junonia* Schott.)**

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*Iridaceae* is a cosmopolitan family included 92 genus, 6 of them are spreading in our country, Turkey. Fourty six *Iris* species including 16 endemic grow in Turkey. Their rhizoms are used in traditional medicine, on all of Earth. ‘Toros süseni’ (*Iris junonia* Schott.) is an endemic plant growing in Turkey. In this study, we used n-hexane, dichloromethane, methanol and water extracts of several parts (root, stem, flower, leaf) of ‘toros süseni’ (*I. junonia* Schott.) and we studied their antibacterial activity. To determine antibacterial activity of the all extracts of ‘toros süseni’ (*I. junonia* Schott.), we used MIC (Minimal Inhibition Concentration) method against 9 different bacteria strains according to CLS (Clinical Laboratory Standards).

In conclusion, it was invastigated that the n-hexane, dichloromethane, methanol and water extracts of endemic plant species *I. junonia* Schott. have got active metabolites related to antibacterial activity. We herein report the first study on bioactivity of *I. junonia* Schott. endemic plant.



**PP-66**

**DETERMINATION OF ANTIMICROBIAL ACTIVITY OF *Iris sari* Schott.  
ENDEMIC PLANT GROWING IN TURKEY**

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An endemic species *Iris sari* Schott. is distributed in Southeastern Anatolia Region, Turkey and is a perennial herbaceous plant. In previous studies, biological activity work of *I. sari* Schott. plant has not been determined. For this reason in present work, we used four different solvents, n-hexane, dichloromethane, methanol and water to determine antimicrobial activity of *I. sari* Schott. In this way we obtained extracts of several parts (root, leaf and flower) of *I. sari* Schott. To determine antimicrobial activity of the all extracts of *I. sari* Schott., we used MIC (Minimal Inhibition Concentration) method against 9 different bacteria strains according to CLS (Clinical Laboratory Standards).

In conclusion, it was determined that all extracts of root, leaf, flower parts of endemic *I. sari* Schott. have got well a antimicrobial activity. We herein report the first study about antimicrobial feature of *I. sari* Schott. endemic plant growing in Turkey.

**PP-67**

**CHEMICAL COMPOSITION AND ANTIOXYDANT ACTIVITY OF  
*THYMUS FONTANESII* ESSENTIAL OIL FROM ALGERIA**

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This work aims to study the chemical composition and evaluation of the antioxidant activity of *Thymus fontanesii* essential oil, against three samples from different regions in the north of Algeria. The essential oils were obtained by hydrodistillation (yield: 2.1-3.1%) and investigated by gas chromatography (GC) and gas chromatography coupled to mass spectrometry (GC/MS). 37 compounds were identified. The main constituents were: carvacrol (54.6 - 63.9%), p-cymene (10.4 - 17.5%) and  $\gamma$ -terpinene (8.7- 14.8%). The antioxidant activity of essential oils extracted was evaluated by two additional tests: scavenging free radicals (test of DPPH) and inhibition of lipid peroxidation ( $\beta$ -carotene bleaching). The three samples showed strong antioxidant activity with  $IC_{50} = 93.4 \pm 0.4 - 206.7 \pm 0.2$   $\mu$ g/ml and a moderate inhibition of lipid peroxidation of the linoleic acid emulsion ( $62.9 \pm 0.3\% - 72.8 \pm 0.4\%$ ) compared with other thyme species of literature.

**PP-68**

**ANTIOXIDANT ACTIVITY OF HONEY MIXED WITH OLIVE OIL**

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The oxidative stress is responsible of the appearance of numerous pathologies such as cancer and cardiovascular diseases. The human body profit of the protective effect of a set of antioxidant substances brought by the food (supply). It is thus important to be interested in these substances.

In this study, we estimate the antioxidant activity of honey, olive oil, as well as their mixture. The made analyses allowed the determination of the main antioxidants of the various samples and their antioxidant activity. The results obtained by this study reveal that the extracts of the honey are the richest in phenolic and flavonoid compounds. On the other hand, the olive oil obtained high levels of carotenoids.

**PP-69**

**ANTI-PROLIFIRATION INHIBITORY EFFECT OF GALBANIC ACID DURING HYPOXIA AND NORMOXIA IN TUMORS**

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Hypoxia Inducible Factor-1 plays key transcriptional role in the adaptation of hypoxic solid tumors to low oxygen environment. Galbanic acid (GBA) showed anti-cancer activities via different molecular pathway previously. Here, we aimed to investigate GBA inhibitory effects on HIF-1 activation during hypoxia. MTT survival was used to evaluate GBA cytotoxicity against CaOV-4 cell line, and quantitative real time PCR and western blotting were used to estimate mRNA expression and translational protein, respectively. Results showed that GBA dose- and time-dependently decreased the in vitro growth of CaOV-4 cells with an IC50 of approximately 37, 12 and 10  $\mu$ M GBA at 24, 48 and 72 h, respectively. In addition, we found that GBA inhibit HIF-1 activation in both cell lines through down-regulation of its alpha and beta subunits mRNAs in both hypoxia and normoxia. To determine the mechanism of action of such inhibitory effects, we showed that GBA did not inhibit mRNA expression of Akt and EGFR, yet protein degradation investigation showed that GBA shortened the half-life of EGFR through decreasing its stability with a decrease of nearly 2 and 3 hour in A549 and CaOV-4 cell lines, respectively. We also found that downstream genes contributed in glycolysis, including Eno 1 and GluT-1, are underexpressed in GBA treated cells in hypoxia. Conclusively, GBA may inhibited HIF-1 activation in hypoxia through down-regulation of its subunits expression and, also via increasing EGFR degradation and inhibiting of EGFR/HIF-1 $\alpha$  signaling pathway in normoxia. Our results indicated that GBA may be a valuable natural compound for hypoxic solid tumors prevention and treatment.

**PP-70**

**RESEARCHES ON ANTIBACTERIAL ACTIVITIES OF ENDEMIC PLANT *Iris kirkwoodii* C.**

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Maras Kurtkulagi (*Iris kirkwoodii* C.) is one of endemic species spreading in Turkey. This annual herbaceous plant germinates in spring, especially in May. In previous studies about biological activity working of *I. kirkwoodii* C. species has not been determined. In this study, we used several solvents to separate phenolic components such as n-hexane, dichloromethane, methanol and water. These extracts were obtained from root, leaves, flowers parts of *I kirkwoodii* C. Their antibacterial activities were studied. To determine antibacterial activity of the all extracts of *Iris kirkwoodii* C., we used MIC (Minimal Inhibition Concentration) method against 9 different bacteria strains according to CLS (Clinical Laboratory Standards).

In result, it was found that endemic plant species *I. kirkwoodii* C. has got active metabolites related to its antibacterial activity. Thanks to present study might be shed light on further researches for determining of potential active compounds against resilient microorganisms.

**PP-71**

***ASPHODELUS TENUIFOLIUS* « TAZIA OF BECHAR AND TINDOUF»;  
ANTIFUNGAL AND ANTIMYCOTOXICOGENICAL EFFECT OF ON  
MYCOTOXIGENIC FUNGI ISOLATING FROM THE IMPORTED  
FRANCE SOFT WHEAT MARKETED IN THE NORTH AND SOUTHERN  
OUEST OF ALGERIA**

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Within the framework of our research of medicinal plants a phytochemical and biological study of *Asphodelus tenuifolius* has been achieved. The study consist of evaluating the antifungal and antimycotoxigenical activities of most of the chemical constituents extracted from leaves by many solvants ( ether de petrol, chloroform, ethyl acetate and methanol) and tested on mycotoxigenic fungi (*Aspergillus flavus*, *Aspergillus parasiticus*, *Aspergillus ochraceus*, *Aspergillus fumigatus*, *Aspergillus niger*, *Penicillium expansum*, *Fusarium oxysporum*, *Alternaria sp.*)

The inhibitory activity was evaluated on mycotoxigenic fungi isolating from the imported France soft wheat marketed in the North and southern Ouest of Algeria, according to two methods: in agar medium and Y.E.S medium. In Y.E.S medium, the results of antimycotoxigenical assays indicated that all the tested fungi were affected, both in agar medium antifungal activity of extract varied as species changed.

The results also showed that the crude extract have an effect on fungal development and subsequent mycotoxin production in wheat grains. The extent of inhibition of fungal growth and mycotoxin production was dependent on concentration of extract of plant used.

**PP-72**

**PHYSICO-CHEMICAL EVALUATION OF THREE VARIETIES OF OLIVE OILS AS WELL AS THEIR MIXTURES HARVESTED IN BEJAÏA (ALGERIA)**

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Our work was undertaken with an aim of evaluating the physicochemical quality of three varieties of olive oil collected in Bejaia, like carrying out cuttings between these different varieties. According to the results, for the quality indications, while referring to the COI (2003), our oils can be classified as follows; those resulting from the varieties *Chemlal* and *Iswal* in the category of extra virgin olive oil and the *Azeradj* variety in the category of virgin olive oil. The contents of pigments, total phenolic compounds and *ortho*-diphenols are strongly influenced, in particular, by the cultivar and the stage of maturity of the olives, of which the *Chemlal* variety is distinguished from the other varieties by its yield as well as by its wealth in pigments and in phenolic compounds. However, *Iswal* is the richest in *ortho*-diphenols, contrary to the *Azeradj* which reveals the lowest content. Concerning the mixtures, indeed, the sample *Azeradj-Iswal* gives the highest quantity in phenolics compounds and the *Azeradj-Chemlal* gives the highest quantity of *ortho*-diphenols nevertheless the *Chemlal-Iswal* these compounds increases when the ration of the mixtures carried out. Unfortunately, this work remains unfinished where from the necessity for completing it by other studies at various levels.

**PP-73**

**THE PROTECTIVE EFFECT OF THE GREEN TEA (*CAMELLIA SINENSIS*) REGARDING THE *METABOLIC* TROUBLES ASSOCIATED OF THE OBESITY**

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Obesity, a key element of the metabolic syndrome, is currently viewed as the first non-infectious disease in history because of its prevalence and of the chronic diseases it causes. The aim of the present study is to evaluate the preventive effects of the green tea that has been incorporated into the diet of rats, according to the emergence of nutritionally induced obesity and its complications. The results show that a high-fat diet for sixteen weeks of treatment has caused a highly significant increase in body weight (19.21%) and in adipose tissue (159%). There has also been a visible increase in plasma glucose (53.11%) and triglycerides (27.50%). This diet affects the antioxidant status; it has provoked a significant decrease in plasma reducing power (47.82%) and liver (37.83%). It promotes lipid accumulation in the liver thereby generating steatosis. All those metabolic imbalances appear to be redressed by the supplementation of the green tea and this confirms the beneficial preventive effect of tea in regard to biochemical disorders and obesity. Indeed, the group of rats under the high-fat/tea regime has undergone a significant reduction in body weight (16.24%) and adipose tissue mass (48.56%). Tea has significantly restored blood glucose levels (34.68%) and triglycerides (11.11%). It exerts an antioxidant effect by increasing the plasma reducing power (84.82%) and liver (39.42%), and inhibits the formation of lipid vacuoles. All our results indicate that green tea with its biological activities has a beneficial preventive action against the nutritionally induced obesity effect and can modulate metabolic disorders associated with it.



**PP-74**

**ERICA ARBOREA L. (ERICACEAE) EXTRACTS INHIBIT *BACILLUS*  
AND *STAPHYLOCOCCUS* SPECIES**

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Species of the *Ericaceae* family are represented by four taxa in Algeria, *Erica arborea* L. (tree heath), is the most spread and grows especially in cork oak and Zen oak forests and maquis. This species known as “Khelndj” in Algeria is widely used in Folk medicine and recommended in treatment and prevention of either acute or chronic urinary tract infections, such as cystitis. Our study addresses the antibacterial activity of aqueous and methanolic extracts of *Erica arborea* revealed by well diffusion assay against *Bacillus subtilis* CLAM 20302, *Bacillus cereus* CLAM H300., *Escherichia coli* ATCC 25922, *Staphylococcus aureus* ATCC 25923, *Enterococcus faecium* CLAM H421, *Pseudomonas aeruginosa* ATCC 27853 and two fungi: *Aspergillus flavus* and *Aspergillus niger*. The results clearly show the inhibition of Gram positive bacteria, whereas, Gram negative bacteria and fungi were resistant. Aqueous and methanolic extracts of leaf and flower plant parts have a remarkable inhibitory potential towards sensitive bacteria. Furthermore, leaves derives extracts were significantly more active (15-23 mm) than those of flower extracts (16-20 mm). In addition, MICs values ranged from 0.195 mg/ml to 3.125 mg/ml for leaves extracts and from 0.390 mg/ml to 6.25 mg/ml for flower extracts. In fact, *Erica arborea* is considered a promising medicinal plant and suitable source for phyto-pharmaceuticals.

**PP-75**

**GC/MS ANALYSIS OF ESSENTIAL OIL OF *VITEX AGNUS-CASTUS*  
FROM ALGERIAN SAHARA**

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*Vitex agnus-castus* is a large deciduous shrub, native to Mediterranean countries and central Asia, and is also used in America as an ornamental plant. Traditionally, it has been used for spasmodic dysmenorrhea, for certain menopausal conditions, and for insufficient lactation and for the treatment of acne. The Essential oils were obtained by hydrodistillation from leaves of *Vitex agnus-castus*. GC/MS analysis of the oil revealed the abundance of oxygenated monoterpenes and sesquiterpenes hydrocarbons (39.69 % and 22.83 % respectively). The major constituents of the oil were; 1,8-cineole (18.27 %), Caryophyllene (8.60 %), N-(M-Fluorophenyl)-Maleimide (6.30 %), (+)-Epi-bicyclosesquiphellandrene (6.00 %), Terpinen-4-ol (5.57 %), Pyrrolo (3,2,1-jk)carbazole (5.43 %), Caryophyllene oxide (4.79 %), and Phenol (4.09 %). In conclusion, in this study 43 compounds were identified amounting a total of 98.02 % of the composition of *Vitex agnus-castus* essential oils .

**PP-76**

**THE CHEMICAL COMPOSITION OF ESSENTIAL OIL OF *WARIONEA SAHARAE* BENTH & COSS. FROM SOUTHERN ALGERIA**

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The Essential oils were obtained by hydrodistillation from leaves of *Warionea saharae* and analyzed by GC-FID and GC-MS. Oxygen-containing terpene were the main group of constituents in both oil. This essential oil is rich in  $\beta$ -Eudesmol (32.87%), isomenthol (6.27%), Terpinyl butyrate (5.51%) , Trans-nerolidol (5.31%), Linalool (4.99%), Terpinen-4-ol (3.55%) and Caryophyllane a (3.36%). In conclusion, the number of the compounds identified in the essential oil of *Warionia saharae* in literature research fluctuates between 25 at 52, amounting in general 93% of the oils and in this study we have added new compounds amounting 94.03%.

**PP-77**

**THE EFFECT OF *NIGELLA SATIVA* (NIGEL) AND *TRIGONELLA FOENUM-GRAECUM* (FENUGREEK) FROM THE SOUTH OF ALGERIA ON BACTERIAL URINARY TRACT INFECTIONS.**

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Bacterial resistance to antibiotics appeared soon after their introduction in the treatment of infectious diseases. This resistance is a major factor complicating the treatment of bacterial infections and the spread of multi-resistant strains<sup>1</sup>. For the treatment of urinary tract infections, medicinal plants are a source of new molecules with antimicrobial activity economically available to deal with the emergence of resistance patterns of bacteria to antibiotics. Urinary tract infections are very common and are a major concern for public health in developing countries: Approximately 50% of women develop at least once a symptomatic urinary tract infection in their lifetime. Urinary tract infection is, in order of frequency, the first non-infectious epidemic disease.

So we during retrospective studies the year 2008/2009 in the southern region of Algeria to identify the germs responsible for urinary tract infections, to better inform the user of herbal remedies, we chose two plants: *Nigella sativa*; (Nigel) and *Trigonella foenum-graecum* ( Fenugreek). The results obtained in this work show a significant decrease in the sensitivity of Enterobacteriaceae to B-lactam antibiotics except penicillin justified by the high production of B-lactamases. However, some antibiotics are still very effective, such as, Amoxicillin, Imipenem, Oxacilline in B-lactamine family and chloramphenicol. Preliminary tests of these plants revealed the presence of varying amounts of tannins, flavonoids, glycosides, alkaloids and saponins, the absence of anthracene derivatives, and the absence of quinone except the Nigel witch shows us the presence of this substance. Our flavonoic extract of the *Nigella* shows a bacteriostatic effect against *Pseudomonas aeruginosa* and *E. coli*. But the fenugreek has a bactericidal effect against *Pseudomonas aeruginosa* and *Proteus mirabilis* and bacteriostatic on *E. coli*. However the alkaloid has no effect on all strains.

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**PP-78**

**NEW ANTHRANILIC ACID DERIVATIVES FROM *ONONIS PUSILLA***

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The genus *Ononis* belongs to the Fabaceae family (tribe Trifoleae) that includes 75 species within the Mediterranean region, the Canaries, Europe and Central Asia. In folk medicine, several plants of this genus have been used in the treatment of jaundice, urinary tract disorders, skin cancer, necrosis and herpes. *Ononis pusilla* L. is a perennial plant, growing in the rocky ground and scrublands in Algeria<sup>1</sup>. The genus *Ononis* is known to produce flavonoids and isoflavonoids, resorcinol derivatives, isocoumarins and dihydroisocoumarins, pterocarpan, triterpenoids and anthranilic acid derivatives<sup>2</sup>. Extracts of *Ononis natrix* showed interesting antibacterial and antimicrobial activities. Only few phytochemical investigations were performed on *O. pusilla* and led to the isolation of  $\alpha$ -onocerin from roots and aerial parts as well as the sterol contents analysis<sup>1</sup>.

The present study describes the structure determination of three new anthranilic acid derivatives: *N*-(*R*)-3'-hydroxydocosanoylanthranilic acid (**1**), *N*-(*R*)-3'-hydroxytricosanoylanthranilic acid (**2**) and *N*-(*R*)-3'-hydroxytetracosanoylanthranilic acid (**3**), isolated from the ethyl acetate extract of *Ononis pusilla* L. The structures of isolated compounds were assigned by spectroscopic methods, including 1D and 2D homo and heteronuclear NMR experiments, mass spectrometry ESI-MS, chemical transformation and comparison with literature data.

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**PP-79**

**CHEMICAL COMPOSITION AND ANTIBACTERIAL ACTIVITY OF  
*THYMUS CAPITATUS* L. ESSENTIAL OILS AGAINST THE WOOD OF  
THE VINE (ESCA AND BDA) DISEASES**

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Grapevine Trunk Diseases (GTDs) causes a decline in grapevine vigour that generally ends in plants death. Particularly, Esca and Black Dead Arm (BDA) are two major actors of GTDs. These diseases are among the most important diseases in vineyards and, over the past few decades, the world wide frequency of their symptoms has increased steadily. The lack of pesticides to control GTD, new pruning practices and the necessary protection of the environment. In this context, we try to operate more Tunisian flora rich in medicinal and aromatic plants and exclusively to study the effects of the antibacterial activities of essential oil of *Thymus capitatus* against the pathogens responsible for the wood of the vine diseases.

So, our study was conducted to valorize essential oils of *Thymus capitatus* of three Tunisian provenances (Elkrib, Wed Ezzarga and Korbos). Essential oils have been obtained by the technique of steam distillation and chemical composition was identified by gas chromatography coupled with mass spectrometry (GC-MS). The results obtained showed a fluctuation of yields of essential oil (1.52 % for Korbos, 1.46 % for Wed Ezzarga and 1.02 % for Elkrib). Twenty compounds were identified representing 99.98 %, 99.72 % and 98.97 % of the composition of the three essential oil of *Thymus capitatus* of Wed Ezzarga, Korbos and Elkrib respectively. The major compound was the carvacrol, with 74.82 %, 70.91 %, and 65.90 % for the Essential oil of Korbos, Elkrib and Wed Ezzarga respectively. In addition, essential oils of thyme showed an interesting antibacterial activity against strains of pathogenic bacteria for about 2,5 µl of essential oil.

**PP-80**

**ANTIBACTERIAL EFFECT OF *ARBUTUS UNEDO* L. FRUIT AND ITS ESSENTIAL OILS ON *SALMONELLA TYPHI* (ATCC 14028) AND *PSEUDOMONAS AERUGINOSA* (ATCC 27853)**

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In the recent years, there is considerable use of plants, especially fruits. These fruits are attracting more and more interest growing among both consumers than among dietiticians and nutritionists. They are important for human health because of richness in vitamin C, antioxidants (polyphenols), minerals and enzymes that fight against certain diseases. Our choice is focused on the study of *Arbutus unedo* L, which is a wild fruit which is located in the north of Africa mainly in Algeria, and characterized by its very higher nutritional value and antioxidant and antimicrobial properties.

The objective of our research is to study the antibacterial effect of this fruit and its essential oils on selected bacterial pathogens; *Salmonella typhi* (ATCC 14028) and *Pseudomonas aeruginosa* (ATCC 27853). The obtained results show that *Arbutus unedo* L. fruit and its essential oils have no inhibitory effect on the selected bacteria. This resistance is due to the composition of the cell wall of Gram-negative bacteria, which is rich in lipopolysaccharides.

**PP-81**

**EFFECT OF PECTIN EXTRACT OF DATE (*PHOENIX DACTYLIFERA*)  
AGAINST LEAD NEUROTOXICITY: NEUROBEHAVIORAL STUDY**

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Lead is a neurotoxicant with know behavioral and neurochemical effects, is causing oxidative burst in the exposed individuals leading to brain damage. In previous work, we reported that ingestion a pectin of date (*Phoenix Dactylifera*) may decrease effect toxic of this heavy metal, Here, we evaluated the potential detoxifying effect of pectin after oral Pb exposure in male rats.

For this purpose, the young rats received for 30 days of lead acetate by gavage, the treatment with pectin of date started after one month of intoxication. Oral administration of pectin after intoxication with lead acetate caused a lower locomotor activity as observed in the open field test which was higher in rat exposed by lead only, while for the dark and light test we had observed a decrease in the time past in dark room of exposed rat compared to the control, while the treatment with pectin extract of date enhance the time past in light room and increase the time in obscure room whiche represent a depression behavior. Therefore, pectin of date provided a significant protection to thiobarbituric acid reactive substances (TBARS) level in brain, while cause a decrease in catalase and phosphatase alkanin (PAL) levels.



**PP-82**

**ANTIOXIDANT POTENTIAL OF *CITRUS* ESSENCE LOCAL TO CHLEF REGION (ALGERIA)**

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Essence was extracted by cold expression methods from four varieties of *Citrus* harvested in Chlef region: *C. Sinensis*, *C. paradisi*, *C. reticulata* and *C. aurantium*. The characterization of the essence was done by gas chromatography coupled to mass spectrometry (GC/ MS) in order to evaluate the quality and composition of these molecular species. The antioxidant activity of the investigated essence was evaluated by testing their ability to scavenge 1, 1-diphenyl-2-picrylhydrazyl (DPPH) radical, and bleachability of  $\beta$ -carotene in linoleic acid system. A significant difference was noticed in the antioxidant activities of the studied essential oils.

For the essence of *Citrus*, values IC<sub>50</sub> vary from  $1,9068 \pm 0,0912 \mu\text{g ml}^{-1}$  for *Citrus reticulata*,  $6,2086 \pm 0,0308 \mu\text{g ml}^{-1}$  for *Citrus aurantium*,  $12,7662 \pm 0,0736 \mu\text{g ml}^{-1}$  for *Citrus sinensis*, and  $19,1567 \pm 0,00499 \mu\text{g ml}^{-1}$  for *Citrus paradise*, inferior to IC<sub>50</sub> of synthetic antioxidant widely used in agro-alimentary industry: quercetin (IC<sub>50</sub>  $15,9938 \pm 0,01284 \mu\text{g ml}^{-1}$  and BHA (IC<sub>50</sub>  $21,9938 \pm 0,01284 \mu\text{g ml}^{-1}$ ). The results obtained showed that essence extracted from *Citrus* species present a significant antioxidant activity which is confirmed by the bioautographic method and which can be attributed to the synergic effect of the active compounds present in it. In conclusion we find that the essence of *Citrus* can be considered as good sources of natural antioxidants and can be incorporated into the drug formulations.

**PP-83**

**EFFECT OF *PIMPINELLA ANISUM L.* AQUEOUS EXTRACT AGAINST LEAD INDUCED NEUROTOXICICTY**

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Lead is a potent neurotoxin agent that causes brain damage and cognitive deficit. The aim of this study was to investigate the possible beneficial effect of *Pimpinella anisum L* aqueous extract against earlier intoxication with this heavy metal. Pregnant rats were exposed to 0,2% of lead acetate during gestation and lactation .the pups received P.anisum aqueous extract after weaning .The effect of the extract was evaluated through behavioral test : open field and forced swimming test (FST), and analysis of some biochemical parameters : TBARS , catalase and Phosphatase alkaline ( PAL). Lead impaired the behavioral of the intoxicated rats beside it's caused a significant modifications in the Biochemicals parameters compared to the control. Whereas Oral treatment with aniseed aqueous extract was effective in improvement of the rats' behavior and reducing the levels of this biochemical parameter. In conclusion; *Pimpinella anisum L.* might have a protective effect against neurological damage induced by lead.

**PP-84**

***CUCUMIS MELO* L. SEED OIL: A NEW PROMISING UNCONVENTIONAL BIO-OIL FROM BY-PRODUCTS FOR THE PHARMACEUTICAL AND COSMETIC INDUSTRY**

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The *Cucurbitaceae* is a family of economically important species which fruits are used for nutrition and medicinal purposes. Most species of *Cucurbitaceae* are oilseeds and their kernels have tremendous food values. *Cucumis melo* L. is consumed in the summer period because the pulp is very refreshing and sweet, with a pleasant aroma. The potential supply of lipid from fruits and fruit by-products may be enormous and should be investigated. In this context, the objective of the present work was to evaluate the chemical composition of *Cucumis melo* L. seed oil. The results of proximate analysis of *Cucumis melo* L. seeds show that the contents of protein and ash were 21.26% and 1.95%, respectively. Besides, the *Cucumis melo* L. seeds were rich in fat (29.95%) and have good potential as a source of oil. However, the content of moisture was low (5.16%), which was beneficial for prolonging the shelf life of the seeds. The high iodine value of the seed oil (139.5 g I<sub>2</sub>/100g oil) is due to its high content of unsaturated fatty acids and indicates that it has a good quality of edible oil. The main fatty acid of the seed oil is linoleic acid (68.98%) followed by oleic acid (15.84%). These fatty acids constitute an important class of phytochemicals due to their beneficial health effects in the prevention of cancer and coronary heart diseases. Further, the linoleic acid is an essential fatty acid which has favorable properties for the skin including anti-inflammatory, acne reduction and moisture retention properties. Therefore it could be used in making soaps, creams and emulsifiers. There is a close relationship between the fatty acids and triacylglycerol content of the oil. In fact, the LLL (linoleic–linoleic–linoleic) and the OLL (oleic–linoleic–linoleic) triacylglycerols were the major triacylglycerols existing in the melon seed oil (27.7% and 23.94%, respectively). In addition, *Cucumis melo* L. seed oil contained many bioactive compounds such as phenolic acids, carotenoids and tocopherols. Thus, *Cucumis melo* L. seeds are important oil sources for nutritional, cosmetic and pharmaceutical uses.

**PP-85**

**ANTIBACTERIAL EFFICACY OF ESSENTIAL OIL OF *Thymus capitatus*, LACTIC ACID AND ACETIC ACID AGAINST *Escherichia coli* IN FRESH CHICKEN MEAT**

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Essential oils (EO) and their component are known by their antimicrobial activity and therefore might be used as ingredients in certain food products to preserve them against spoilage and prolong their shelf life. It was the purpose of this work to evaluate the antibacterial efficacy of EO of *Thymus capitatus*, alone and in combination with lactic acid and acetic acid against *Escherichia coli* ATCC 25922 in fresh chicken meat experimentally contaminated. The protocol applied in the current study has been inspired of the works of Solomakos et al. (2008)<sup>1</sup>. EO and both organic acids were tested at concentrations ranging from 0.1 to 1% (v / v) and 0.5 to 1.0 % (v/v), respectively. The antibacterial effect was demonstrated by counting the colony forming units (cfu) after culturing of the ground meat in mixture with appropriate antibacterial agent on McConkey agar medium. The results showed a reduction in microbial charge ranged between 1.0 and 2.21 log cfu/ml, at the concentrations of essential oil cited above. Acetic acid was ineffective at 0.5% and 1.0%, while 1% lactic acid led to a reduction of 2.03 log cfu/ ml. The combination effect of 0.5 % EO and 0.25 % of each organic acid used was comparable to these of 1.0 % EO when employed alone. In order to preserve the chicken meat against deterioration possibly due to *E. coli*, EO of *T. capitatus* could be employed at lower concentration if combined with lactic acid and acetic acid.

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**PP-86**

**COMPARATIVE STUDY OF THE EFFECTS OF *ZINGIBER OFFICINALE* AND ATORVASTATIN ON LIPID PARAMETERS IN WISTAR RATS WITH FATTY DIET**

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Ginger (*Zingiber officinale*) is known for its cholesterol-lowering and antioxidant properties<sup>1</sup>. The use of traditional medicine reduces the use of drugs with a risk of toxicity<sup>2</sup>. This study aims to compare the effects of aqueous solutions powdered ginger and Atorvastatin on lipid parameters in rats with fatty diet. The experiment was carried out on 40 rats during 9 weeks. The animals were divided into 4 groups, B (fatty diet), C (ginger), D (Atorvastatine) and group A (tape water). From the 7th week of experimentation, group C was treated orally with ginger (500 mg / kg body weight/ day) and group D, in the same conditions, with Atorvastatin (20 mg / kg bw/ day ). The results showed, respectively in groups C and D, a stable body weight (289 vs 282 g) and a highly significant reduction of cholesterol (295,9 vs 275,1 mg / dL), total triglycerides (46,8 vs 41,9 mg /dL) and LDL (278,2 vs 259,1 mg /dL), but not a significant increase in HDL (8,6 vs 7,8 mg /dL). Results showed that ginger is as a cholesterol-lowering agent as Atorvastatin in the treatment of patients exposed to risk of obesity and cardiovascular disease.

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**PP-87**

**CHEMICAL COMPOSITION OF MEDICINAL PLANT *THYMELAEA MICROPHYLLA* AND BIOLOGICAL EVALUATION**

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Medicinal plants have a promising future because there are about half million plants around the world, and most of them have not investigated yet to determine their medical activities. These latter could be decisive in the treatment of several diseases such as cancer, hepatitis, infertility,.... The plant *Thymelaea microphylla* Coss. et Dur. called locally “*Methnane*” is a medicinal plant belonging to *Thymelaea* genus of Thymelaeaceae family. This species is used in traditional medicine for the treatment of wounds and various dermatoses as erysipelas, skin cancer, abscess and pimples. Also, the decoction of the leaves is known to be useful in cases of infertility and as a purgative. The plant *T. microphylla* is a Saharan plant and represented in Algeria by 8 species.

The investigation of ethyl acetate extract of the roots of *Thymelaea microphylla* led to the isolation and characterization of five secondary metabolites 1-5. The structures of these compounds were determined using physical and spectroscopic techniques: <sup>13</sup>C NMR and <sup>1</sup>H NMR, especially 2D NMR (COSY, HMBC, HSQC, NOESY, ROESY), ESI mass spectrometry, UV, IR, [ $\alpha$ ]<sub>D</sub> and the comparison with data of the literature. In the biology part, we are interested in the evaluation of the antibacterial activity of the EtOAc extract of the roots of *T. microphylla*. This evaluation was performed on three bacterial strains: Gram negative (*Pseudomonas aeruginosa* and *Escherichia coli*) and Gram positive *Staphylococcus aureus*, by the diffusion method on agar medium. The obtained zones of inhibition indicated moderate antibacterial activity.

**PP-88**

**PHYTOCHEMICAL CONSTITUENTS AND STUDY OF  
ANTIBACTERIAL OF PUMPKIN SEEDS**

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Study phytochimique pumpkin seeds give an idea of its main components and their inhibitory effects. Seeds pumpkin studied by phytochemical reactions reveals:

- Presents the cathéniques tannins.
- The Flavonoids anthocyanins.

The use of aqueous extracts from pumpkin seeds, medicinal plant used in traditional pharmacy, allowed us to scientifically find the sensitivity of bacteria responsible for urinary tract infections such as *Escherichia coli*, *Staphylococcus* and *Candida* extracted by various organic solvents and also gives very interesting results. The antibacterial activity of the extract of pumpkin seeds gives a remarkable inhibition that is observed in *Escherichia coli* with a diameter ranged between 15 and 22 mm, the most important areas are Dichloromethane extracts.

**PP-89**

**CHEMICAL COMPOSITION AND ANTIMICROBIAL ACTIVITY OF  
*THYMUS ALGERIENSIS* (BOIS ET REUT) AND *LAVANDULA STOECHAS*  
ESSENTIAL OILS**

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The aim of this study is the determination of chemical composition by GC/MS and antimicrobial activity of *Thymus algeriensis* and *Lavandula stoechas* essential oils, against 18 bacterial and fungal strains. *Thymus algeriensis* essential oil was characterized by the presence of thymol (45,076%), methylthymolether (9,033%) and carvacrol (2,356%) as major components.

*Lavandula stoechas* essential oil was characterized by the presence of fenchone (40,89%), camphor (18,759%) and 1,8 cineol (9,0724%) as major components. Antimicrobial activity of *Thymus algeriensis* essential oil was higher than the same activity of *Lavandula stoechas* essential oil. This effect is due to its phenolic composition, because these components are the the most efficacious against microorganisms.



**PP-90**

**ANTIOXIDANT ACTIVITY AND NUTRIENT COMPOSITION OF  
*SORGHUM BICOLOR* L. AND *SECALE CEREALE* L. IN ALGERIA**

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Whole grain products are recommended for healthy diets as being recognized sources of dietary fibers. In the present study, two types of secondary cereals (rye and sorghum) which are adapted to the growth conditions of Algeria were evaluated for their composition in dietary fibers, sugars, proteins, total phenols and antioxidant properties<sup>1</sup>. Antioxidant activity was evaluated by radical DPPH scavenging capacity, ferric reducing power assay (FRAP) and  $\beta$  carotene-linoleate bleaching assay<sup>2</sup>.

The adapted rye grains exhibited better nutritional quality compared to sorghum. Sorghum was exceptionally high in antioxidant activities followed by rye. The nutritional data obtained suggest that the selected grain, particularly sorghum, is promising as healthy food.

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**PP-91**

**STUDY OF THE CHEMICAL COMPOSITION OF RYE, MILLET AND SORGHUM FROM ALGERIA**

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Cereals are the most important source of dietary fiber in the Nordic diet. The fiber in cereals is located mainly in the outer layers of the kernel; particularly in the bran. Improved diet can help unlock the door to good health. Whole grains are an important source of nutrients that are in short supply in our diet, including digestible carbohydrates, dietary fiber, trace minerals, and other compounds of interest in disease prevention, including phyto-oestrogens and antioxidants<sup>1</sup>.

The objective of this study is to know the composition of whole grain cereals (rye, millet, white and red sorghum) which a majority pushes in the south of Algeria. This shows that the millet has a high rate of the sugar estimated at 67.6%. The high proportion of proteins has been found in the two varieties of sorghum and rye. The millet presents the great percentage in lipids compared with the others cereals. And at the last, a red sorghum has the highest rate of fiber<sup>2</sup>. These nutrients, as well as other components of whole grain cereals, have, in terms of health, an increased effect if they are consumed together.

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**PP-92**

**ANTI-INFLAMMATORY ACTIVITY OF THE AQUEOUS EXTRACT OF  
*ARTEMISIA ABSINTHIUM* IN INFLAMMATORY PAW EDEMA MODEL  
IN MICE**

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*Artemisia absinthium* (Asteraceae) is a medicinal plant used in the treatment of many diseases including inflammatory diseases component. The purpose of this study was to evaluate the anti-inflammatory activity oral administration of aqueous extract of *Artemisia absinthium* leaves at doses of 150 and 300 mg / kg PC, by carrageenan induced paw edema in mouse model. At the end of the experiments, histological study is conducted.

Our results show that the injection of the carrageenan causes a significant increase in paw volume of the mice. Oral administration of diclofinac (50 mg / Kg bw) causes a reduction in paw volume of the mice over the six hours of experimentation. Moreover, H1, the percentage inhibition of the aqueous extract of *Artemisia absinthium* at a dose of 150 mg / kg bw was 43%, the activity increases up to the sixth hour (90%). Similarly, at a dose of 300 mg / Kg bw the inhibitory effect of the extract of *Artemisia absinthium* starts and gradually increases to H1 H6 (77% to 96% by H1 and H6).

Histological examination of treated diclofinac the cuts and the aqueous extract of *Artemisia absinthium* (150 and 300 mg / kg bw) confirm that these treatments have anti-inflammatory activity. Furthermore, at a dose 300 mg / kg bw, the inflammatory infiltrate disappears almost completely. The results of this study showed the aqueous extract of *Artemesia absinthium* has an efficacy in acute paw edema in mice induced by carrageenan, with greater effectiveness at a dose of 300 mg / kg bw vis-à-vis that of 150 mg / kg and that of the non-steroidal anti-inflammatory.

**PP-93**

**COMPARISON OF TOTAL ANTHOCYANIN AND TOTAL CAROTENOID CONTENTS OF DIFFERENT EXTRACTS OF *PISTACIA TEREBINTHUS***

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Carotenoids and chlorophylls, which are found in plants and algae are extremely important in photosynthesis and growth. They are also powerful antioxidants that are beneficial to human. Previous studies have suggested that they can prevent or delay cancer and degenerative diseases in humans and animals by contributing to anti-oxidative defenses against metabolic oxidative by-products. Anthocyanins occur in all tissues of higher plants, including leaves, stems, roots, flowers and fruits anthocyanins also act as powerful antioxidant. *Pistacia terebinthus* is family Anacardiaceae. *Pistacia terebinthus* has a lot of pharmacological activity, such as antioxidant, antimicrobial, antifungal, anti-enflamatuar ve anti-fosfolipaz neuro-protective potential etc. This work performed to comparison of total anthocyanin and total carotenoid contents of different extracts (methanol, ethanol, water chloroform, acetone, n-hegzane) of *Pistacia terebinthus*. Total anthocyanin content was determined by the method of different pH<sup>1-2</sup>. Total carotenoid contents were determined by method(Britton; 2005)<sup>3</sup>. All analysis spectrometric. Consequently; while the highest total anthocyanin content found in the methanolic extracts(26.63 mg/L), the highest total carotenoid content determined in acetone extract (35.036 ± 0.0083 µg/g).

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**PP-94**

**EVULATION OF BIOCHEMICAL COMPOZITION OF PEGANUM HARMALA SEED**

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*Peganum Harmala* is a plant of the family Nitrariaceae. *Peganum Harmala* has been used to treat pain and to treat skin inflammations, including skin cancers<sup>1,2,3</sup>. Seed extracts also show effectiveness against various tumor cell lines, both *in vitro* and *in-vivo*<sup>2</sup>. *Peganum Harmala* has antioxidant and anti- mutagenic properties<sup>4</sup>. All these medicinal effects are due to its content. In, this work; *Peganum Harmala* seed were studied some biochemistry content. Fatty acid composition was determined by minor changed the method outlined<sup>5</sup>. Total protein amount were determined according to method<sup>6</sup>. Total carbohydrate amount<sup>7</sup>, total fat amount<sup>8</sup>. Cellulose amount<sup>9</sup>, the ash and moisture amount<sup>10</sup>, pH and acidity were determined. Consequently; identify that myristic acid 1.211%, palmitic acid 34.757 %, palmiteloic acid 2.554%, stearic acid 13.696%, oleic acid 34.007%, linoleic acid 2.415%, linolenic acid 1.433%, arachidic acid 1.518% and eruric acid 0.223% levels. Total fat amount 28.77%, total protein amount 25,39, total carbohydrate 35.32%, cellulose amount 36,33%, ash amount 7.461% and moisture amount 3.05%, acidity 1.5%, pH 5.156± 0.33 were calculated. Mineral profile; N 4820 mg/100gr, P 200mg/100g, 2190mg/100g, 340mg/100g, Mg 270mg/100g, Fe 5.426, Mn 3.364mg/100g, Zn 3.196mg/g, Cu 804mg/100g were determined.

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**PP-95**

**EVULATION OF SAPONIN AND TANNIN CONTENTS OF ELEAGNUS  
ANGOSTOFOLIA, FRUCTOUS JUJUBAE, CELTIS TORTUFENII**

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The increasing interest in the powerful biological activities make them interesting in term of their phytochemical contents. Saponin and tannin are effective phytochemical agents in plants. They have a lot of pharmacological activity such as anticancer, antioxidant, antimicrobial, antibacterial etc. This work performed to evulation of saponin and tannin contents *Eleagnus angostofolia*, *Fructous jujubae*, *Celtis tortufenii*. Saponin contents were determined according to (Obadoni and Ochuko; 2001)<sup>1</sup>. Tannin contents were determined as spectrometric<sup>2</sup>. Consequently; saponin contents were determined for *Fructous jujubae* 106.2534 mg/g, for *Celtis tortufenii* 104.5588 mg/g, for *Eleagnus angostofolia* saponin 104.5123mg/g. Tannin contents were determined for Fructous jujubae 300.1023±0.0033mg/g, for *Eleagnus angostofolia* 291.6407±0.032mg/g, for *Celtis tortufentii* 170.6153±0.00033mg/g.

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**PP-96**

**AMELIORATIVE EFFECTS OF STINGING NETTLE (*URTICA DIOICA*)  
ON FERTILITY MARKERS OF WISTAR RAT**

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*Urtica dioica* (UD) is commonly known as stinging nettle of the urticaceae family. It is of great nutritional and medicinal values, but the plant is undervalued by scientific community. It has been reported to possess marked immunostimulation, anti-inflammatory, antioxidant; antiulcer, antiviral activities<sup>2</sup>. The aim of the present study is to clarify the protective effects of fresh nettle leaves (UD) on fertility markers when rats are exposed to mercury intoxication. Therefore, adult male rats were chronically exposed either to (0.8 g HgCl<sub>2</sub>/kg diet) alone, or combined with UD (0.8g/kg diet+1.5 ml UD/rat) for a period of 30 days. The epididymal sperm (concentration, motility and viability) were evaluated together with the testicular histological profile. The data showed a significant reduction in spermatozoa concentration, motility and viability of Hg group compared to the control. Moreover, testicular histological architecture demonstrated a slight seminiferous tubular degenerationin accompanied with low sperm density when exposed to mercury. In contrast, the fertility markers and the histological profile of the combined group were comparable to that of the control. In conclusion, the supplementation of UD together with mercury has protected testicular fertility markers, which is possibly related to its antioxidant capacity.

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**PP-97**

**HEMATO-IMMUNOLOGICAL PARAMETERS IN WISTAR RATS  
FOLLOWING THE DIET SUPPLEMENTED WITH NETTLE  
(*URTICA DIOICA*)**

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*Urtica dioica* (nettle; Urticaceae family) is a native herb northern Africa. It has been reported to possess marked immunostimulation, anti-inflammatory and antioxidant, activities. [1]. The present study has been carried out to elucidate the preventive effect of the nettle (UD) on hemato-immunological parameters in Wistar rats chronically exposed to inorganic mercury for a period of 30 days. 28 healthy rats were randomly allotted into 4 experimental groups: A (control), B (HgCl<sub>2</sub> -treated), C (HgCl<sub>2</sub> + UD treated) and D (UD treated). The results of the hemato-immunological parameters show a very significant increase in the white blood cell and lymphocytes in the (Hg-treated) group compared to control. While, no difference was recorded between group treated (Hg+ UD) and the control. A very significant reduction in the red blood cell, hemoglobin was recorded in the Hg-treated group. In the conclusion, this plant has a great power to eliminate the adverse effect of mercury to purify and renew blood.

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**PP-98**

**ESSENTIAL OILS COMPOSITION FROM ARIAL PARTS OF *Centaurea sphaerocephala* L. FROM ALGERIA**

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*Centaurea sphaerocephala* L., belonging to the tribe Cynarea of the Asteraceae family is widespread in the entire Mediterranean region. Several medicinal uses have been reported for *Centaurea*. Essential oils were obtained by separate hydrodistillation from arial parts of *Centaurea sphaerocephala* L. (Compositae). were analyzed by means of gas chromatography – mass spectrometry ( GC-MS ), the main constituents of the essential oil from the arial parts were Caryophyllene oxide (18.3%) , benzaldehyde ( 16.1% ) , spathulenol (07.5%) , humulene oxide II (07.5%), phenylacetaldehyde (05.3%) , and  $\alpha$ -terpineol (05.2%) . This analyzed is the first study of composition of the essential oil obtained from the arial parts of *Centaurea sphaerocephala* L. growing in Algeria.

**PP-99**

**STUDY OF THE PHARMACOLOGICAL EFFECT OF A DRUG FORM (PASTE) FORMULATED WITH ESSENTIAL OIL *LAURUS NOBILIS* L. GROWING IN ALGERIA**

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The *Laurus nobilis* L. is particularly widespread in the Mediterranean region, especially in (Algeria, Tunisia, Morocco, Spain, France....). The laurel oil has different therapeutic properties: general antiseptic, antibacterial, fungicide, insecticide, relieves the hemorrhoids and against rheumatic pains, etc. The abundance and all the therapeutic properties of the plant *Laurus nobilis* L. are strongly attracted our interest. The main organoleptic and physicochemical characteristics obtained and GC-MS analysis showed that the essential oils extracted are conform to AFNOR and they can be used as pharmaceutical products. The main component of the essential oil is 1,8-cineole, which has been shown to be useful in treating the symptoms of respiratory diseases, their very important antifungal and bactericidal effect may be mentioned. Based on these properties, we made an antifungal ointment. The Ointment formulated contains more essential oil of *Laurus Nobilis* L, other active ingredients and adjuvants. The local tolerance tests were necessary to give the areas recommended for the application of the ointment. All the organoleptic and microbiological parameters of this formulation were be determined.

**PP-100**

**IN VITRO ANTI -FUNGAL ACTIVITEY OF MORINGA OLEIFERA LAM ON SOME PATHOEGNIC FUNGI**

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The moringa olifera lam is one species of moringa in Sudan, local name is (ALROWAG) the term mean purifying agent which the use as purifying agent for water in Sudanese folk medicine. The present study was conducted to investigate the antifungal activity of *Moringa oleifera* seeds and leaves to test the antifungal activity by different solvent systems extract, and to compare the antifungal activity of seeds and leaves with commercial antifungal agent. The petroleum ether, methanol and water extract of moringa oleifera, used to extract the bioactive compounds from seeds and leaves of moringa oleifera to screen the antifungal activity by different concentration from extracts against selected control pathogens: *Candida albicans*, *Aspergillus flavus*, *Trichophyton mentagrophytes*, *Trichophyton verrucosum* and *Trichophyton violicium*, using poisoning food technique and cup plate methods. The maximum antifungal activities was observed in water seed extract (27 mm) with *Candida albicans*, the activity of water seed extract was found to be better than commercial anti fungal Nystatin (20 mm). Also the water seeds extract inhibited the growth of the *Trichophyton mentagrophytes*. leaf not seen any antifungal activity but may be help in growth of fungi. The possibility therapeutic use of moringa oleifera seeds as antifungal is recommended. Methanolic seeds extract inhibited growth of *Trichophyton verrucosum* and *Trichophyton violicium*. *M. basitethanolic* leaves extract of moringa oleifera showed higher zone than commercial anti fungal Nystatin against *Candida albicans*. Other leave extracts not showed any antifungal activity. Incoculsion *Moringa oleifera* seeds revealed antifungal activity rather than leaves which we suggest that leaves help in growth of fungi. so we can use oil seeds for fungal infections.

**PP-101**

**ANTIBACTERIAL ACTIVITY AND CHEMICAL COMPOSITION OF THE LEAF ESSENTIAL OIL OF *ARTEMISIA HERBA ALBA* FROM ALGERIA**

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The essential oil of the leaves of *Artemisia herba alba* grown in Algeria was determined by hydro distillation method and analysed by chromatography (GC) and gas chromatography coupled with mass spectrometry (GC-MS). The antimicrobial activities were tested in Vitro by in a bioassay on collection of strains: *Escherichia coli*, *Staphylococcus aureus*, *Klebsiella pneumonia*, and were evaluated using two methods; agar disc diffusion and minimum inhibitory concentration (MIC). The results of the study revealed that the major component was Camphor (29%), other predominant constituents were: chrysanthenon (13%), and Davanon (5%).

Essential oil extracted from *Artemisia herba alba* showed high activity against *Escherichia coli*, *Staphylococcus aureus*, and *Klebsiella pneumonia*, with strong inhibition zone 17, 36 and 17mm respectively

Keywords: *Artemisia herba alba*, essential oil composition, GC/MS, antibacterial activity, Camphor.

**PP-102**

**ANTIBACTERIAL AND ANTIFUNGAL ACTIVITY OF ALGERIAN THYMUS NUMIDICUS POIRET'S ESSENTIAL OIL - ROLE OF MUSHROOMS ENDOPHYTES**

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*Thymus Numidicus* Poiret is an Algerian-Tunisian endemic medicinal plant from Lamiacea family. Essential oil contained in leaves of this plant was extracted by hydrodistillation. Antibacterial activity of this oil was studied on *Escherchia Coli*, *Staphylococcus Aureus* and *Pseudomonas Aeruginosa*. Also Antifungal activity was led on *Albicans Candida*. Results show that antimicrobial power of this oil is very important. It is characterized by bactericidal action on three stumps and fungicide one on the yeast. This activity is probably due to Thymol present at 40.40% in essential oil and other bioactive molecules. Indeed this essential oil is produced by glandular hairs present on surface of leaves. Microscopic observation of leaves of this species after trypan blue staining shows the different ranges of colors ranging from blue to red brick and even brown. This effect can due to presence of mushrooms endophytes. These are located mainly on the limb with its various compartments. Glandular trichomes present on the leaves appear colored. The metabolism of these mycoendophytes is probably the origin of listed compounds unidentified.

**PP-103**

**SOME PHYSICAL AND PHARMACODYNAMIC PROPERTIES OF  
TABLET FROM JUJUBE POWDER**

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The research task undertaken relates to the valorization of the jujube fruit variety *Ziziphus jujuba* in order to lead to a better transformation into tablet of the functional type. In this context, the possibility to produce tablets from powder of jujube was established. The jujube powder has many good pharmacodynamic properties such as: flowability (65S), very weak retention of water (0,016%). Physical properties of the obtained tablets are generally similar to those expected for pharmaceutical drug delivery such as: hardness = 45KP, friability = 0,01% and disintegration time = 60 min). The extract of the flavonoids of dried pulp is characterized with: 1) a bactericidal action against *S.aureus* ATCC6538 and *E.coli* with an intermediate zone of inhibition (10, 66, 09,33 mm) ; 2) a fungicidal action counters *A. niger*: intermediate zone of inhibition (10,66mm). Moreover, the second extract from dried peels presents significant zones of inhibition (21, 20 and 21,33mm) screw -with-screw *S.aureus* ATCC6538, *E coli* and *A.niger* respectively. The ethnobotanic investigation enabled us to confirm the use of the jujube as a plant in traditional medicine. Indeed, it can treat 13 diseases whose mode of treatment varies according to various parts of the fruit. Generally pulp is used initially to cure anemia, diarrhea, etc... Consequently, the jujube powder based food tablets could be of various functionalities: consumption as such by swallowing, or dissolving in mouth without swallowing or chewing, reconstitution as juice... On the other hand, the tablets can be employed as natural and cheap drug delivery matrix in pharmaceutical industry.

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**PP-104**

**ANTIBACTERIAL ACTIVITY OF *CENTAUREA DIMORPHA*  
(ASTERACEAE)**

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The research interests concerns the chemical composition and some biological activities such as antibacterial of *Centaurea dimorpha*, an endemic species that belongs to Asteraceae family which includes about 1300 genera and 25000 spices (Bremer, 1994).

The large genus *Centaurea* (Asteraceae) comprises about 500 spices which are predominately distributed around the mediterranean area and Western Asia (Mabberlay, 1997). The antibacterial activity of *Centaurea dimorpha* extracts (ethyl acetate and n-BuOH) were determinate using disk diffusion method against standard and clinical bacterial strains.

**PP-105**

**EVALUATION OF THE INHIBITORY ACTIVITY OF NATURAL EXTRACTS FROM SPONTANEOUS PLANT ON THE  $\alpha$  - AMYLASE AND  $\alpha$  – GLUCOSIDASE AND THEIR ANTIOXIDANT ACTIVITIES**

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Plant materials constitute an important source of natural bioactive molecules. Thus plants have been used from antiquity as sources of medicament against various diseases. These properties are usually attributed to secondary metabolites that are the subject of a lot of research in this field. This is particularly the case of phenolic compounds plants that are widely renowned in therapeutics as anti-inflammatories, enzyme inhibitors, and antioxidants, particularly flavonoids.

With the aim of acquiring a better knowledge of the secondary metabolism of the vegetable kingdom in the region of Laghouat and of the discovering of new natural therapeutics, 10 extracts from 5 Saharan plant species were submitted to chemical screening. The analysis of the preceding biological targets led to the evaluation of the biological activity of the extracts of the species *Genista Corsica*. The first step, consists in extracting and quantifying phenolic compounds. The second step has been devoted to studying the effects of phenolic compounds on the kinetics catalyzed by two enzymes belonging to the class of hydrolase (the  $\alpha$  - amylase and  $\alpha$  - glucosidase) responsible for the digestion of sugars and finally we evaluate the antioxidant potential. The analysis results of phenolic extracts show clearly a low content of phenolic compounds in investigated plants. Average total phenolics ranged from 0.0017 to 11.35 mg equivalent gallic acid / g of the crude extract. Whereas the total flavonoids content lie between 0.0015 and 10.,96 mg / g equivalent of rutin.

The results of the kinetic study of enzymatic reactions show that the extracts have inhibitory effects on both enzymes, with IC<sub>50</sub> values ranging from 95.03  $\mu$ g / ml to 1033.53  $\mu$ g / ml for the  $\alpha$  - amylase and 279.99  $\mu$ g / ml to 1215.43  $\mu$ g / ml for  $\alpha$  - glucosidase whose greatest inhibition was found for the acetone extract of *June* (IC<sub>50</sub> = 95.03  $\mu$ g/ml).

The results the antioxidant activity determined by ABTS, DPPH and phosphomolybdenum tests clearly showed a good antioxidant capacity comparatively to antioxidants taken as reference the biological potential of these plants and could find their use in medicine to replace synthetic products.



**PP-106**

**QUERCETIN REDUCES AFLATOXIN B1 HEPATOTOXICITY IN ALBINO'S RATS**

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This study treats the preventive effect of Quercetin (QE); one of the most abundant bioflavonoids, against aflatoxin B1 (AFB1) hepatotoxicity. We find that AFB1 at the amount of 50mg/Kg altered liver functions. Lactate dehydrogenase, alkaline phosphatase, alanine and aspartate aminotransferases were found to be significantly increased in the serum of AFB1 administered rats, suggesting hepatic damages. The hepatic tissue from AFB1 treated rats showed a marked depletion in reduced GSH content, a significant increase in malonedialdehyde (MDA) levels and inhibition in superoxide dismutase (Mn-SOD), (Cu-Zn SOD) catalase (CAT) and glutathione S transferase (GST) enzymatic activities. Pretreatment with quercetin (10 mg/kg body mass, orally) reverted conditions to near normalcy. The results of this study indicate that quercetin reduces AFB1- hepatotoxicity by the reinforcement of enzymatic and non enzymatic antioxidant defenses.

**PP-107**

**CHEMICAL COMPOSITION AND PHENOLIC COMPOUNDS  
OF CITRUS AURANTIUM SEED OIL**

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**Abstract :**

Sour orange (*Citrus aurantium*) is a tree of the family Rutaceae, native to Southeast Asia. It is cultivated today in many parts of the world. The fruit, leaves, twigs and flowers have numerous applications in food and perfumery.

*Citrus aurantium* used in this study originate from Tlemcen in North East of Algeria

Our study focused on the physicochemical analysis of seed oil of bitter orange namely the determination of physicochemical indices [1] and the determination of polyphenols.[2]

The seed oil of *Citrus aurantium* dark yellow and a bitter taste obtained by Soxhlet extraction revealed a high yield of 33.83%.

The results of the physicochemical indices of the oil showed index values of density, acid value, ester value, saponification value and refractive index which is an indicator of purity estimated respectively: 0926; 1.212, 190.39, 191.52, 1467.

The yields of total phenolic extract 0.45% obtained from oil of *Citrus aurantium* seed and the rate of total polyphenols assayed by the Folin Ciocalteu level of oil is estimated at 0.219 mg GA / g DW

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**PP-108**

**ANTIDIABETIC ACTIVITY OF METHANOLIC EXTRACT OF  
*HYOSCYAMUS ALBUS L.* LEAVES IN WISTAR RATS**

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Diabetes mellitus is a metabolic disorder constituting a major health concern today whose prevalence has continuously increased in the world. The aim of this study is to evaluate the anti-diabetic potential of methanolic extract of *Hyoscyamus albus* (HAMEOH) in diabetic rats. *Hyoscyamus albus* (Solanaceae) is an herbal medicine traditionally applied as a parasympatholytic and nervous sedative. The oral glucose tolerance test (OGTT) was carried out by administering glucose (2 g/kg, b.w), to non-diabetic rats treated with HAMEOH at oral doses 100 and 200 mg/kg, b.w and glibenclamide 5 mg/kg. Also, Streptozotocin-induced diabetic rats, these diabetic rats were administered (100 and 200 mg/Kg b.w) and standard drugs glibenclamide was given to rats for 30 days. The oral administration of both doses of HAMEOH significantly reduced the levels of blood glucose and glycosylated hemoglobin in diabetic rats. Determination of plasma insulin levels revealed the insulin stimulating action of the leaves extract. It is concluded that HAMEOH have significant anti-diabetic activity.

**PP-109**

**EVALUATION OF DIURETIC ACTIVITY OF METHANOLIC EXTRACTS OF *HYOSCYAMUS ALBUS* (SOLANACEAE) AND *UMBILICUS RUPESTRIS* (CRASSULACEAE)**

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The aim of the present study is to evaluate the diuretic activity of the methanolic extract HAMEOH and URMeOH 1 of leaves of two plants *Hyoscyamus albus* and *Umbilicus rupestris* in animal model. This activity is assessed using furosemide (40 mg / kg bw) as a reference standard and HAMEOH and URMeOH (100 and 200 mg / kg b.w.), these were administered orally to experimental rats. Diuretic effect of the extracts HAMEOH and URMeOH was assessed by measuring the urine volume (ml / Kg), urine pH, Na<sup>+</sup> excretion, K<sup>+</sup> excretion and Cl<sup>-</sup>. The results show that extracts HAMEOH and URMeOH also the furosemide increased significantly ( $P \leq 0.05$ ) the urine volume and also increased the excretion of electrolytes Na<sup>+</sup>, K<sup>+</sup>, Cl<sup>-</sup> compared to the control group.

**PP-110**

**ANTIDIABETIC AND *IN VIVO* ANTIOXIDANT PROPERTIES OF *MARRUBIUM VULGARE* LEAVES EXTRACT IN ALLOXAN-INDUCED DIABETIC RATS**

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Hyperglycemia causes oxidative stress, which further exacerbates the progression of diabetes mellitus and its complications. *Marrubium vulgare* is used in traditional medicine in Algeria for the treatment of diabetes. On the other hand, previous studies reported *in vitro* antioxidant effect of *Marrubium vulgare* extract due to its flavonoid content.

The current study was designed to investigate the antidiabetic property of the 80% methanolic extract of the aerial parts of *Marrubium vulgare* by evaluating its effects on blood glucose, cholesterol, triglycerides, and insulin levels in alloxan-induced diabetic rats. Moreover, its effect on the oxidant status was estimated in both rat liver and pancreas by measuring enzymatic and non-enzymatic antioxidant systems.

*Marrubium vulgare* extract exhibited a significant decrease in blood glucose as well as cholesterol and triglyceride levels and caused a significant increase in plasma insulin. Furthermore, the extract of *Marrubium vulgare* showed a potent antioxidant effect in both pancreatic and liver tissues.

Based on its strong antidiabetic and antioxidant activities, *Marrubium vulgare* extract appears to be a potential herb for the treatment of diabetes and can be further explored for isolating the active component(s).

**PP-111**

**FORMULATION OF A DRUG FORM (OINTMENT) ANTISEPTIC ESSENTIAL OIL OF CINNAMON ALGERIA**

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Cinnamon is known since ancient times, and it was used by the ancient Egyptians in the process of embalming. The Bible, Herodotus, the Arab-Muslim physicians and other classical authors refer to it.

Essential oil extracted analysis (hydrodistillation) by GC-MS showed that the Algerian cinnamon is composed of 65-67% cinnamic aldehyde, 7-10% of phenols (especially eugenol) and the following compounds: camphor, beta -caryophyllène, benzaldehyde Cuminaldehyde, cineol, phellandrene, etc.

The main physico-chemical, organoleptic obtained and GC-MS analysis showed that the essential oils extracted from Algerian cinnamon complies with AFNOR standards and can be used as pharmaceuticals. The principal components of the essential oil are cinnamic aldehyde and eugenol, which have antifungal and bactericidal very important. Based on these properties, we made an antifungal ointment and against the cold. The formulated ointments contain more cinnamon HE other active ingredients and adjuvants. Local tolerance tests were necessary given the areas recommended for the application of the ointment. All the organoleptic and microbiological parameters of these formulations were determined.

**PP-112**

**FREE RADICAL SCAVENGING CAPABILITY, ANTIOXIDANT ACTIVITY AND CHEMICAL CONSTITUENTS OF *Anvillea radiata* Coss. & Dur.**

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In the present study, the hydroalcoholic extract (HAE) and its fractions (viz., hexane (HF), chloroform (CF), ethyl acetate (AF), n-butanol (BF) and water (WF)) obtained from *Anvillea radiata* flowers were prepared and their antioxidant activities were investigated by using different *in vitro* antioxidant assays. The content in pigments (carotenoids and chlorophylls), total phenolics and flavonoids were also determined using spectrophotometric methods. Experimental results obtained show that *A. radiata* is a good source of  $\beta$ -carotene (38.831  $\mu\text{g/g}$  DW), lycopene (48.911  $\mu\text{g/g}$  DW) and chlorophyll a (48.889  $\mu\text{g/g}$  DW). The ethyl acetate fraction showed remarkably strong antioxidant activities on 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging, ABTS radical scavenging and reducing power, which were almost comparable to capacities of the positive controls (Vit E and BHT), whilst the hexane fraction exhibited the highest inhibition of linoleic acid oxidation. The total phenolic content based on gallic acid equivalents (GAE) confirmed the presence of total soluble phenolics in the different fractions and showed strong association with antioxidant activity. At last the ethyl acetate fraction was analyzed by HPLC and eleven compounds, including procatechuic acid (3.21%), caffeic acid (3.83%), naringenin-7-O-glucoside (1.46%), morin (27.09%) and coumarin (1.64%), were identified, some of them not previously reported in *A. radiata*. The present findings suggest the beneficial effects of *Anvillea radiata* organic extracts which could be used as a valuable new flavor with functional properties for food or nutraceutical products.

**PP-113**

**PHYTOCHEMICAL STUDY AND EVALUATION OF ANTIOXIDANT ACTIVITY OF *AMMODAUCUS LEUCOTRICHUS* FRUITS**

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*Ammodaucus leucotricus* Coss et Dur (Endemic plant) belongs to the *Apiaceae* (Umbelliferae) family, and to the *Apioideae*, trib *Caucalideae* subfamily. It is the only one existing specie in Algeria. It is used by the Saharan and sub Saharan population in traditional medicine.

For the reason to valorise natural sources, in this study, we have contributed to study the antioxidant activity of the essential oil of *Ammodaucus leucotrichus* fruits.

The *Ammodaucus Leucotricus* Coss et Dur fruits are collected in April 2014 in Ghardaia region of Algeria. The selected plant is identified, dried, and after that a phytochemical study is performed.

Essential oils are obtained by dried fruits hydrodistillation using a Clevenger-type apparatus for 3h. After that it is dried and stored at 4°C.

The phytochemical study of the plant has proved rich in essential oils and flavonoids, moderately rich in mucilage and poor in saponins and starch, the extraction yield is 1.23%.

We evaluated the reducing power using DPPH method. The obtained results are compared to those given by the Ascorbic Acid standard.

The antioxidant activity method showed the essential oil of *A. Leucotricus* Coss. et Dur. Present the antioxidant properties and the percentage inhibition of the free radical increases with the concentration used.

The obtained values ranged between 3.02% and 63.05%. The IC<sub>50</sub> value is 0.24mg/ml that means 31.52%. This value is very close to the given value using Ascorbic Acid.

Finally, we can say that *Ammodaucus leucotricus* essential oil can be considered as a powerful antioxidant.



**PP-114**

**CHANGES IN LIPID METABOLISM IN STREPTOZOTOCINS INDUCED DIABETICS RATS FED A DIET WITH *CITRULLUS COLOCYNTHIS* OIL.**

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The aim of present study was to determine how the fatty acids composition of liver Lipids and plasma lipids are influenced by the diabetic condition b dietary treatment

In type 2 diabetes. However the relationship between abnormalities in levels of plasma free fatty acids, cholesterol and triglycerides and the occurrence of complications in type 2 diabetes has extend .(*Citrullus colocynthis*) seeds are traditionally used as an antidiabetics medication of Mediterranean countries. The present work was aimed at studying differential effects of *Citrullus colocynthis*, sunflower and olive oil –enriched diet in glucidic and lipid metabolism particularly on fatty acids metabolism in streptozotocin (STZ) –induced diabetic rats. STZ injection induced a rapid hyperglycemia in all groups. However, two months later, hyperglycemia was significantly less pronounced in *Citrullus colocynthis* oil-enriched diet fed rats compared to other group's olive and sunflower oil-enriched diet fed rats, respectively. And results showed a decrease about liver and plasmatic lipids said atherogenes parameters, and any metabolic perturbation of fatty acids in diabetic's rats fed with a diet. So, from these results , we can say that *Citrullus colocynthis* oil had a protector and regulator power on glycaemia and lipids most causes of cardiovascular diseases ,and theses result are confirmed by histological study of pancreas (neogenesis of B cell) data are not shown in this paper.

**PP-115**

**CHEMICAL AND PHENOLIC COMPOSITION IN TWO PHENOLOGICAL STAGES OF ORIGANUM MAJORANA AND OCIMUM BASILICUM GROWN IN TUNISIA AND THEIR ANTIOXIDANTS ACTIVITIES**

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*Origanum majorana* and *Ocimum basilicum* are two aromatic and medicinal species of Lamiaceae family commonly known for their therapeutic and medicinal virtues. Variation of chemical composition of essential oil and phenol of *O. majorana* and two varieties of *O. basilicum* (Genovese and Fine) cultivated in Tunisia and their antioxidant activities have been studied during vegetative and flowering stages. *O. majorana* is rich in essential oils particularly during the flowering stage. 19 and 42 compounds of EO were revealed in the vegetative and flowering stage respectively. Oxygenated monoterpenes are the most present components represented mainly by terpinene-4-ol ( $31.81 \pm 1.06$  %). The levels of polyphenols are more important during the vegetative stage ( $38.17 \pm 2.57$  mgEAG/gMS) while the levels of flavonoids are higher in the flowering ( $18.13 \pm 1.22$  mgEAG/gMS).period.

EO of Fine variety of *O. basilicum* is constituted by 22 compounds representing 71.68% of total oil in the vegetative stage. Germacrene D (10.07%), Bicyclogermacrene (6.07%) and  $\beta$ -elemene (4.88 %) are the most present components. In the flowering stage, 40 components representing 98.01% of total oil are identified. The oxygenated monoterpenes (78.4%) are the majority fraction represented by linalool (40.1%) and 1.8 cineole (30.96%).The Genovese variety at the vegetative stage is represented by 26 components (82.54% of the total oil) whose 22.19% are oxygenated monoterpenes represented mainly by the linalool (15.18 %) and 1.8 cineole (6.36%).15 Components (95.6% of total EO) of this variety at the flowering stage have been revealed which 64.69% are esters mainly represented by the methyl cinnamate (64.69 %), and 16.83 % of oxygenated monoterpenes. Linalool (12.7 %) is the major component. Genovese variety is the richer in polyphenols (42.81 and 53.14 mgEAG/gMS during the vegetative and flowering stage respectively) that the variety Fine (23.28 and 16.81 mgEAG/gMS to the vegetative and flowering stage respectively). The two varieties are rich in flavonoids during flowering period (10.67 and 16.46 mgEAG/gMS for the variety Fine and Genovese respectively).

Antioxidant activity of *O. majorana* assessed by reduction of DPPH radical is important during the vegetative stage ( $31.51 \pm 1.97$ ). However activity evaluated by

test of beta-carotene is higher during flowering stage ( $122.42 \pm 15.94$ ). The 2 varieties of *O. basilicum* have good antioxidant activity. The best anti radical power is noted for Genovese variety in vegetative stage ( $IC_{50DPPH} (\mu g/ml) = 6.13 \pm 4.8$  and  $IC_{50 \beta\text{-carotene}} = 400$ ) and in the flowering stage ( $IC_{50 DPPH} = 133.33 \pm 23.09$  and  $IC_{50 \beta\text{-carotene}} = 560 \pm 40$ ). It is faintly low in the two stages for the variety Fine ( $IC_{50 DPPH} = 110 \pm 10$  and  $IC_{50 \beta\text{-carotene}} = 460 \pm 20$  in the vegetative stage and  $IC_{50 DPPH} = 153.33 \pm 30.5$  and  $IC_{50 \beta\text{-carotene}} = 566.66 \pm 23.09$  to the flowering period).

These important antioxidant activities are mainly due to the wealth of *O. majorana* and *O. basilicum* in chemical and phenolic components. Its properties offer prospects for their use as a source to extend new medicines based on natural bioactive molecules.

**PP-116**

**SELECTIVE FRACTIONATION OF BIOACTIVE TRITERPENES FROM ROSEMARY LEAVES BY SUPERCRITICAL CO<sub>2</sub>**

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Supercritical fluids (SCFs) are alternative solvents in the field of Green Chemistry that are being developed as advanced separation techniques. When using conventional solvent extraction methods it is very difficult to control the selectivity of the extraction process. For this reason supercritical fluid extraction with fractionation is a very attractive option for extracting selective compounds from herbs and plants.

In this work, Supercritical carbon dioxide (SC-CO<sub>2</sub>) was applied to fractionate rosemary supercritical extracts in order to produce fractions with high concentration of pentacyclic triterpenes, these triterpenes are promising leading compounds for the development of new multi-targeting bioactive agents. Supercritical rosemary extraction was carried out by operating at 180 bar and 50 °C in the extraction vessel, and on-line fractionation in a two-step depressurization system to selectively precipitate the pentacyclic triterpenes. Phytochemical composition of extracts were analyzed by means of GC-MS and HPLC. The results indicated that SFE and fractionation is an advantageous method over Soxhlet extraction in terms of recovery of target compounds.

**PP-117**

**EFFECTS OF ALGERIAN MINT EXTRACTS ON 7-KETOCHOLESTEROL (7KC) AND CYTOKINES PRO-INFLAMMATORY PRODUCTION IN THE MACROPHAGE CELL LINE RAW 264.7**

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The present study was conducted to evaluate the *in vitro* effects of three *Mentha* species (*M. spicata* L. (MS), *M. pulegium* L. (MP) and *M. rotundifolia* (L.) Huds (MR) (Lamiaceae)) extracts on 7-ketocholesterol (7KC) and cytokines pro-inflammatory production in the Macrophage Cell Line RAW 264.7. Measurement of total phenolics and flavonoids contents of the aqueous ethanolic extracts of these species was achieved using Folin-Ciocalteu and chloride aluminum reagents respectively. The quantification of carotenoids using colorimetric assay. The extracts were assessed for their antioxidant activity using the KRL biological test. The highest content of total phenolics was determined in *M. spicata* (30.8 ± 3.0 mg EAG/g DM), which also demonstrated the highest antioxidant capacity, whilst *M. rotundifolia* was characterized with the lowest content of total phenolics, as well as the lowest antioxidant capacity. 7-Ketocholesterol (7KC) has been suggested to induce a complex mode of cell death on monocytic cells. RAW 264.7 macrophage murine were cultured in the presence of 7KC associated with mint extracts. The results indicated that there were a mortality rate diminution in a concentration-dependent manner whose profiles varied among the different extracts. Since cytokines is one of the inflammatory mediators, the effects of various *Mentha* extracts on cytokines production in LPS-activated RAW 264.7 cells were evaluated *in vitro*. The mint extracts affect the inflammatory process of these cells and possess anti-inflammatory activity.

**PP-118**

**ACUTE AND SUB-CHRONIC TOXICITY STUDY OF *HAMMADA SCOPARIA* IN LABORATORY RAT.**

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*Hammada scoparia* (POMEL) ILJIN, is a small and highly branched shrub, which grows in desert and semi-desert of Algeria, and other Mediterranean area. It has taken an important place in laboratory, especially as source of new hepatoprotective and antioxidant agents<sup>1</sup>; it's rich in alkaloids and flavonoids <sup>2</sup>. Our experimental work aimed to investigate *H. scoparia* acute and sub-chronic toxicity in rats. For this purpose, aqueous and methanol extracts were prepared and given either orally or by intraperitoneal injection to female rats at different doses. In acute toxicity study, no death has been recorded either with aqueous or methanol extracts when given orally till dosage of 2000 mg/kg, however intraperitoneal injection has showed the death of some animals and the LD<sub>50</sub> has been calculated for methanol extract, and estimated to be 588.84 (549.54 to 630.95) mg/kg. In the other hand, oral sub-chronic toxicity study of methanol extract undertaken for 21 days, showed no signs of toxicity, no negative effects on body weight, water and food intake and no fluctuations of biochemical parameters as urea, creatinine, ALT and AST. This study showed that *H. scoparia* is safe in rat when given orally till 2000mg/kg and even after 21 days of treatment.

<sup>1</sup> Bourogaa E, Nciri R, Mezghani-Jarraya R, Racaud-Sultan C, Damak M, El Feki A. Antioxidant activity and hepatoprotective potential of Hammada scoparia against ethanol-induced liver injury in rats. J Physiol Biochem .2013;69(2): 227-237.

<sup>2</sup> Benkrief R, Brum-Bousquet M, Tillequin F, Koch M. Alkaloids and flavonoid from aerial parts of Hammada articulata ssp. scoparia. Ann Pharm Fr. 1989 ;48(4): 219-224.

**PP-119**

**SEASONAL VARIATION OF THE ESSENTIAL OILS OF *CORIANDRUM SATIVUM L* AND *PIMPINELLA ANISUM L* CULTIVATED IN (ALGERIAN SAHARA)**

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Many industries are involved by using essential oils such as food, flavour, and beverage, pharmaceutical, cosmetic and fragrance.

Apiaceae species are usually herbs, rarely shrubs characterized particularly by its inflorescence typical umbel. Many species of this family have been widely used in folk medicine throughout the world. The most characteristic natural compounds in this family are the essential oils secreted in schizogenous canals in all organs with remarkable variability chemical composition. As a part of our investigation into medicinal plants growing in Algerian Sahara. In this study we investigate the chemical composition of the essential oils extracted from two Apiaceae species: *Coriandrum sativum L* and *Pimpinella anisum L* cultivated in the Sahara. The plants were selected on the basis of their use by local people to treat infectious diseases as determined in our previous ethnopharmacological study. Wild samples of *Coriandrum sativum L* and *Pimpinella anisum L* cultivated in an experimental field at the university. The harvest was made during the year 2011 according the growth cycle stage of the plants. The essential oils of different fresh aerial parts, obtained by hydrodistillation were analysed by GC. The results showed that the essential oils yields are not uniform among the different cycle stage. The percentage of components is significantly affected by the harvesting period of the plant material.

PP-120

## ANTI INFLAMMATORY AND BACTERICIDAL OINTNMENT USING OLIVE OIL AND IBUPROFEN

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The aim of the present work had consisted of using olive oil and leaves extract from *Olea europea L (Kabylia-Algeria)* in an anti inflammatory and bactericidal ointment formulation containing also Ibuprofen.

Its organoleptic characteristics are: specific odor and flavor, appearance (20°C for 24hours): clear,; acid value: 1.06 (standard  $\leq 2.0$ ), peroxide value: 14.06 (standard  $\leq 20.0$ ). The absorbance in the UV: 0.2087 ; standard (max 0.20) was carried out at  $\lambda = 270$  nm on UV-170 and UV-Vis Shimadzu Spectrophotometer.

The chemical composition of the oil: Palmitic, Palmitoleic, Stearic, Oleic, Linoleic and Linoleic acids (14.44 ; 1.79 ; 2.20 ; 67.64 ; 13.56 and .37%w. respectively).

The sesame oil test is negative. The formulation contains Oleocanthal from olive oil, Ibuprofen. Its pH is 4.3. Anti-inflammatory activity (method of oil croton):

%edema =  $(w.r.e - w.l.e).100\% / w.l.e$  (1) w: weight; e: ear; r: right; l: left %

red.edema =  $(\%edema\ control - \%edema\ treated\ mice).100\% / \%edema\ control$  (2)

%edema: 87.73 (Control); 62.54 (Reference); 54.08 (Treated mice)(3) % reduction

= --- (Control); 28.71 (Reference); 38.35 (Treated mice) (4) The Skin irritation test

IP=0.16. The Rheological Study was led It is efficient on bacteria *Escherichia coli* and *Staphylococcus aureus* and *Candida albicans*.

T. Perrinjaquet-Moccetti, A.s Busjahn, C.Schmidlin, A. Schmidt, B. Bradl, C. Phytotherapy Research Volume 22, Issue 9, Pages1239 – 1242

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**PP-121**

**EVALUATION OF THE COMPOSITION OF ANTI-NUTRITIONAL FACTORS IN THE FRUITS OF *Ceratonia siliqua* L.**

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The carob (*Ceratonia siliqua* L.) is one of the most useful native Mediterranean trees, used for the afforestation and the reforestation of the zones affected by erosion and the turning into a desert. Moreover, this tree is of considerable economic importance, its pods are used in food industry like additive (E410), stabilizing, gelling, and like substitute of the cocoa. In pharmacology, it is used as anti-diarrheal remedy, antioxidant, and against the gastrite.

Within the framework of the valorization of the species hermaphrodite, we were interested by the evaluation of the composition of its fruits (pods, seeds) out of polyphenols, condensed tanins and hydrolysable tanins, regarded as anti-nutritional substances.

The obtained results confirmed that the fruits (pods, seeds) of the carob (species hermaphrodite) are characterized by very low values in anti-nutritional factors with the percentages according to respectively: condensed tannins (0, 04% - 0, 13%), hydrolysable tanins (0, 32% - 1, 04%) and total phenols (0, 18% - 0, 31%).

**PP-122**

**EFFECT OF VERAPAMIL AND PROPOLIS EXTRACT ON DOXORUBICIN INDUCED CARDIOTOXICITY IN RATS**

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Verapamil, Pgp blocker, is used in combination with cytostatic drugs in order to increase the intratumoral concentration of cytostatic drugs without increasing their dose. However, since cardiotoxicity is a severe side-effect in chemotherapy, especially in the case of the very frequently used drug doxorubicin, increased problems by co-administration with Pgp blockers might be expected. In this context, findings are controversial. The aim of our study was to assess the preventive effect of the Algerian propolis ethanolic extract and the effect of verapamil given in association with doxorubicin on cardiac toxicity in hearts of rats. Animals were divided into 04 groups. Group I served as vehicle treated control. Group II rats were given doxorubicin (15 mg/kg) as a single intraperitoneally administration. Group III animals received doxorubicin and verapamil at the same dose (15 mg/kg IP). Group IV animals received propolis ethanolic extract (100 mg/kg) orally followed by doxorubicin-verapamil (15 mg/kg IP). Our results revealed that doxorubicin induced marked biochemical alterations characteristic of cardiac toxicity including elevated activities of serum total LDH, AST and CPK, enhanced lipid peroxidation and mitochondrial superoxide anion production. It has also reduced the cardiac enzymatic activities of superoxide dismutase (SOD), glutathione-S-transferase (GST) and catalase (CAT). Besides, it reduced significantly the reduced glutathione (GSH) level. Combination of doxorubicin and verapamil enhances these alterations. Prior administration of propolis ethanolic extract (PEE) ahead of doxorubicin or combination doxorubicin-verapamil challenge ameliorated all these biochemical markers. Taken together, one could conclude that doxorubicin-verapamil combination is cardiotoxic but propolis ethanolic extract has a protective role in the abatement of cardiotoxicity.

**PP-123**

**CONTENT PHENOLIC COMPOUNDS OF TWO PLANTS OF COASTAL DUNES.**

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In plants, polyphenols synthesis and accumulation are generally stimulated in response to biotic or abiotic stress [1]. As part of this approach and to understand the role of phenolic compounds in response to various stresses generated by the maritime dune environment. The present study is about the comparative of the levels of phenolic compounds (total polyphenols, total flavonoids, anthocyanins) present in the crude methanol extracts of two plants *Matthiola tricuspidata* (Brassicaceae) and *Cakile maritima* (Brassicaceae) of coastal dunes area Zemmouri El Bahri, and their concentrations were determined by spectrophotometric methods. The results of quantitative analysis showed that the methanol extract of the leaves of *Matthiola tricuspidata* is richer in total polyphenols ( $72.72 \pm 0.45$  mg EAG .g<sup>-1</sup> MS), total flavonoids ( $7.36 \pm 0.09$  mg ERu .g<sup>-1</sup> MS) and anthocyanins ( $0.23 \pm 0.02$  mg. g<sup>-1</sup> MS).

[1] Ksouri.R, Megdiche W, Debez A, Fellah H, Grignon C, Abdelly C, Salinity effects on polyphenol content and antioxidant activities in leaves of the halophyte *Cakile maritima*, Plant Physiology and Biochemistry 45 (2007) 244-249.

**PP-124**

**CHEMICAL COMPOSITION AND ANTIOXIDANT ACTIVITY OF THE ESSENTIAL OF *BUPLEURUM PLANTAGINEUN* DESF.**

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The essential oil obtained by hydrodistillation of the leaves of *Bupleurum plantagineum* Desf. (Apiaceae) which is endemic to north Africa collected from Bejaïa (Algeria) were analyzed by GC/MS. Seventy five compounds were identified accounting for 99.8% of the total oil, the main constituents of the essential oil were *cis*-chrysanthenyl acetate (33.6%),  $\alpha$ -pinene (18.4%), myrcene (16.5%) and (*E*)-Anethol (4.9%). In vitro antioxidant activity of the Essential oil were assayed using DPPH (1,1-diphenyl-2 picrylhydrazyl) radical scavenging assay, the results indicated that *Bupleurum plantagineum* oil recorded a moderate capacity.

**PP-125**

**VARIATIONS IN ALGERIAN WORMWOOD PHENOLIC CONTENTS AND THEIR EFFECTS ON ANTIOXIDANT ACTIVITIES**

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The phenolic and flavonoid compounds present in the plants are natural antioxidants (1). They also have anti-mutagenic and anti-carcinogenic properties, cardioprotective, anti-inflammatory (2), and antimicrobial activity. In humans, oxidative stress resulting in free radicals contribute to more than one hundred disorders including atherosclerosis, arthritis, ischemia and reperfusion injury of many tissues, a central nervous system injury, gastritis and cancer (3).

The aim of present study was to evaluate the phytochemical and in vitro antioxidant properties of Wormwood extract. DPPH assay and reducing power assay were the method adopted to study antioxidant potentials of extracts. Standard methods were used to screen preliminary phytochemistry and quantitative analysis of tannin, phenolics and flavanoids. Aqueous and alcoholic extracts were showed good antioxidant effect with IC<sub>50</sub> ranges from 62µg/ml for aqueous and 116µg/ml for alcoholic extracts. Phenolic compound, tannins and flavonoids were the major phytochemicals present in both the extracts. Percentage of inhibition increased with the increased concentration of extracts. The aqueous and alcoholic extract yielded 20, 15 & 3, 59 mg/g gallic acid equivalent phenolic content 2, 78 & 1,83mg/g quercetin equivalent flavonoid and 2, 34 & 6, 40 g tannic acid equivalent tannins respectively. The aqueous and methanol extracts of the aerial parts showed a positive correlation between the total phenolic content and the antioxidant activity measured in the plant samples. The present study provides evidence that both extracts of *Artemisia absinthium* is a potential source of natural antioxidant.

(1). (Oboh et al., 2008; Bahramikia et al., 2009)

(2). (Canadanovic-Brunet et al., 2006)

(3). (Pourmorad et al., 2006)

**PP-126**

**MARINE CHLORELLA IMPROVE TRIGLYCERID AND COLESTEROL LIVER TO RATS WISTAR OBESE GESTANTE**

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The obesity is a world problem of expanding public health. [2]However the current researches aim at introducing complements food which warn of this metabolic disorder. The use of marine algae springs of food comes from ancestral practice, Chinese used algae Nostoc to insure the food more than 2000 years [1]. Algae can accumulate until 80% of lipids «EPA» and «DHA» who possede of excellent medical property in the decrease cholesterol. It's in this context the goal of our study the induction of the obesity and added algae chlorella during the gestation and studies its effects.

Materials and Methods. 02 shares of rats are feed during a diet cafeteria to achieve obesity, the addition of 10% of chlorella during gestation .As soon as the births rats was killed, organs are taken weighed and aliquots. preparation of the homogenat 0.1g liver, then assay of triglycerids and cholesterol was make by biochemical and enzymatic methods.

The main feature of this study reported on the administration of chlorella to rats at dosages of up to 10% shows a decrease of triglyceride and some hepatic cholesterol with analyses to compared with rats not consumers of chlorella.

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[2] Scapuso J, Dosso M, Rapin A (2012). Obesity and grosses. Module Immersion in community.

**PP-127**

**DEVELOPMENT, EVALUATION AND WOUND HEALING ACTIVITY OF TOPICAL FORMULATION COMPRISING *CYNODON DACTYLON* EXTRACT**

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*Cynodon dactylon* (Linn.) Pers. is a rapid growing perennial creeping herb of Poaceae family. It has a variety of medicinal properties. Hydroalcoholic extract of *C. dactylon* showed effective antibacterial activity against the tested microorganisms (*S.aureus*, *S.albus*, *E.coli* and *P.aeruginosa*). Four *C. dactylon* ointments (F1-F4) were prepared by mixing hydroalcoholic extract of *C. dactylon* in four ointments bases viz. Acacia base, Guar gum base, Tragacanth base and Pectin base. Evaluation of each ointment was done as per the USP Biopharmaceutics Expert Committee guidelines established in 2004<sup>1</sup>. In-vitro drug release testing of the ointments was done by using the permeation apparatus (a modified form of Franz diffusion cell) and the ointment F1 was found superior as compared to the other ointments. Further, the ointment F1 was examined for its wound healing activity on the experimentally induced open wound excision model in male albino wistar rats<sup>2</sup>. It was found that both the standard and test groups showed better wound healing pattern as compared to the control group. 100% wound contraction was achieved in the standard and test groups on 20<sup>th</sup> and 22<sup>nd</sup> day of the treatment respectively. Whereas, the control group showed only 81% wound contraction on the 22<sup>nd</sup> day of the treatment.

References:

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PP-128

**IN VITRO ANTIMICROBIAL AND CYTOTOXIC ACTIVITY OF AERIAL PARTS METHANOL EXTRACT OF *ARTEMISIA HERBAALBA*.**

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The methanol extract of the aerial parts of *Artemisia herba alba* belonging to the family Asteraceae were screened for their antimicrobial activity against four standard bacteria:two Gram positive (*Bacillus subtilis* ,*Staphylococcus aureus*),two Gram negative (*Escherichia coli*, and *Pseudomonas aeruginosa*) and two fungi (*Aspergillusniger*and *Candida albicans*) using the Disc diffusion method. The methanol extracts of two parts showed high activity against the bacteria and fungi tested .The minimum inhibitory concentrations of the methanol extracts of aerial parts were determine against standard bacteria and fungi using the agar plate dilution method. The minimum bactericidal concentrations and minimum fungicidal concentrations were determined using the macro- broth dilution method .The antibacterial activity of five reference drugs and the antifungal activity of two reference drugs were determined against four bacteria and two fungi and their activities were compared with the activity of the plant extracts. The extract was also evaluated for its cytotoxic activity using brine shrimp lethality bioassay method.



**PP-129**

**HYPOCHOLESTEROLEMIC EFFECT OF GREEN TEA LEAVES INFUSION ON RATS FED HYPERCHOLESTEROLEMIC DIET**

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This work fits in the context of an assessment of the effect of the concentrated aqueous extract of green tea on Wistar rats made hypercholesterolemic by gavage cholesterol 1.5%. Material and methods: The extraction of polyphenols was obtained by decoction. The phenolic and flavonoid content of green tea extract and antioxidant capacity were evaluated. Animal experimentation was conducted during five months. Healthy male rats; wistar strain (*Rattus norvegicus*) were provided from Pasteur Institute of Algeria, were randomly divided into three experimental groups (normal group "NG", control group "high cholesterol diet HCDG" curative group "CG", consisting of six animals each. The lipid profiles were performed (Total Cholesterol "TC", Triglyceride "TG", high density lipoprotein HDL; low density lipoprotein LDL-C and Very Low Density Lipoproteins VLDL-C). Results: The green tea extract is rich in polyphenols and flavonoids, which are especially known for "catechins" as it reveals a strong antioxidant activity with a rent of 70%. After 4 weeks of experimentation, the TC, TG and LDL-C plasma levels were significantly increased in the groups fed 1,5% Cholesterol (HCDG and CG) when compared to the no treatment group but plasma high-density lipoprotein level was decreased. After 8 weeks of treatment, the high-density lipoprotein level was decreased in the CG administered orally by gavage polyphenols extracts green tea while the TC and LDL-C plasma levels were decreased when compared to the HCDG. Conclusion: Green tea is one of the most popular beverages worldwide. It also provides a dietary source of biologically active compounds that help prevent a wide variety of diseases.

**PP-130**

**ANALYSIS AND EXTRACTION OF ESSENTIAL OILS FROM MEDICINAL PLANT: THE CAMPHOR, HARVESTED AT THE PNEK**

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Plants contain hundreds and thousands of active chemicals. Furthermore, although it is helpful to know the active ingredients of a plant, this information can be misleading. We have our work considered a medicinal and aromatic plants used in traditional medicine and the pharmaceutical industry: *Cinnamomum camphora* (Camphor) belonging to the family Lauraceae.

We performed an extraction of essential oils of this tree using the method of steam distillation (stripping with steam). To complete our work, we performed a histological study of leaves in order to locate the synthesis sites and storage of these oils.

The quantitative and qualitative analysis of essential oils extracted was made by thin layer chromatography (TLC) and gas chromatography (GC). The results showed the difficulty of obtaining essential oil of camphor, including oil crystalline state prevents its recovery, losses were found, which will affect the rate of return. Chromatographic analysis shows that the oil is made up of several components

**PP-131**

**ANTIFUNGAL ACTIVITY OF THE ALGERIAN LAWSONIA INERMIS (HENNA)**

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*Lawsonia inermis* Linn. (Lythraceae) or henna has been used since the earliest times as a medicine, preservative, and cosmetic. It has long been recommended in traditional medicine as an astringent, purgative, and abortifacient. In this work, Lawsone and six extracts of *L. inermis* plant, used by Algerian traditional healers to treat infectious diseases, were screened for their antifungal activity against filamentous fungi. Water and five organic extracts – DMSO, ethanol, chloroform, ethyl acetate, and di-ethyl ether – of *L. inermis* leaves, collected in the area of Adrar (Algeria), were prepared by soaking 25 g of powdered plant in 100 mL of solvent. The extracts were screened for antifungal activity using the poisoned food technique against five filamentous fungi. Results demonstrated that the best yield (8.03%) was obtained with the ethanol extract. The commercial lawsone showed potentially interesting MICs against the strains *Fusarium oxysporum* (12 µg/mL) and *Aspergillus flavus* (50 µg/mL). The ethanol extract showed the only interesting MIC (230 µg/mL of crude extract) against the strain *F. oxysporum* compared with other extracts. In conclusion, our results suggest that the Algerian *L. inermis* plant has antifungal activity that can be related to the presence of lawsone in the leaves plant. The results can be exploited largely in research of new antifungal drugs.

PP-132

**POLYSACCHARIDE COMPOSITIONS OF ENDOCARP OF ARGAN FRUITS (*Argania spinosa* L. Skeels) FROM ALGERIA**

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(1) Department of Biotechnology. Faculty of Science. Laboratory of productions, microbial and vegetal valorizations, University of Science and Technology Mohamed Boudiaf UST- Oran, Algeria

(2) CERMAV Research Centre on plant macromolecules, Grenoble. France Xylitol is a pentahydric sugar alcohol with high sweetening power and unique pharmacological properties. It occurs naturally in low concentrations in fruits, berries, and vegetables. Xylitol prevents tooth decay and it can be used clinically as sugar substitute for diabetic patients and as parenteral nutrition for post-trauma patients. Clinical studies have also shown that xylitol can prevent ear infection in children, it also prevents skin roughing when used in cosmetic products, and it limits the tendency to obesity when continuously supplied in diet. Xylitol is found in many fruits and berries, but its commercial extraction from these sources is not considered. It is extracted from wood, corn, sugar cane pulp, seed pods, straw, and hulls of coconuts. These sources contain 20-35% xylan, which is converted by acid hydrolysis into xylose, and then hydrogenated to obtain xylitol. Kernels fruit of the argan tree is rich in xylan and can be used as a source of xylose. The argan tree "*Argania spinosa* L.Skeels" is a tree of the Sapotaceae family. It is endemic to Morocco and Algeria. In Algeria, its geographic range covers a relatively large area in the northwest of Tindouf where this species is the second forest essence after Acacia. The harmonious development of the Algerian population and the success of sustainable development program are intimately dependent on the knowledge of natural resources of the country. The present study was to examine the polysaccharide compositions of the endocarp of argan fruits for their uses in local pharmaceutical industry.

The polysaccharide compositions of cell walls isolated from the endocarp of *Argania spinosa* were investigated. The walls were fractionated progressively with hot water H<sub>2</sub>O<sup>(1)</sup>, EDTA<sup>(2)</sup>, 0.5N NaOH, 1N NaOH, 2N NaOH Monosaccharide and linkage analyses ( Chromatography CPG)of the polysaccharides in the wall fractions indicated that the proportions of pectic polysaccharides were particularly low. These included pectic arabinans and or type I arabinogalactans. Evidence for rhamnogalacturonan I. In contrast, the proportions of cellulose, and xylans, probably homoxylans were particularly high. The cell wall preparations contained smaller amounts of xyloglucans.

(1) J.F. Thibault., 1980. Separation of alpha-0-galacturonic acids by chromatography on polyacrylamide gel. J. chromatogr., 194, 315-322.

(2) D.T.A. Lamport, 1970. Cell wall metabolism. Annu Rev Plant hysiol 21:235-270

**PP-133**

**THE EFFECT OF DIFFERENT LEVELS OF *ZATARIA MULTIFLORA* ESSENTIAL OIL SUPPLEMENTATION ON BLOOD PARAMETERS AND ENZYME ACTIVITY OF BROILER CHICKENS**

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The objective of present research was the study of the effect of different levels of *zataria multiflora* essential oil on blood parameters and enzyme activity of broilers chickens. 360 one-d-old Ross 308 broiler chicks assigned in a completely randomized design to four treatments (0, 100, 200, 400 ppm of *zataria multiflora* in diet) with six replicate pens and fifteen birds per pens. Blood concentrations of glucose, total protein, albumin and globulins was measured also activity of some liver`s enzymes including ALP and ALT was determined. Results indicated that globulins (that estimated from differences between total protein and albumins) decreased in 400 ppm of *zataria multiflora* in diet and therefore caused an decrease in immune system. The concentration of total protein and albumins significantly increase by 200 ppm treatment but globulins just numerically increase by this treatment. The blood concentration of glucose and enzyme activity of ALP and ALT were not affected by treatments.

In conclusion in order to meet high benefit of supplementation of *zataria multiflora* in broilers diet, the usage of it, should limited up to 200 ppm in diet.

**PP-134**

**PHYTOCHEMICAL STYDY OF SAHARAN PLANT *ATRACYLIS FLAVA***

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The genus *Atractylis* L. belongs to the tribe Cardueae of the Asteraceae family. This family is one of the most important botanical families of vascular plants; it contains more than 25000 species. This genus widely used in folk medicine in Mediterranean basin, is represented with 16 species in the flora of North Africa, from which 5 are found in the Sahara like *Atractylis flava* Desf. The phytochemical studies realised on this species led particularly to the isolation of flavonoïds and triterpenoids.<sup>1</sup>

The present work describes the isolation by chromatographic methods of five flavonoids from *n*-butanol extract of *A. flava* including two new compounds (*Atraflavoside A* and *Atraflavoside B*), two di-*C*-glycosylflavonoids (vicenin 3 and schaftoside) and one flavonoid diglycoside (narcissin). Their structures were determined by spectroscopic analysis including 1D and 2D NMR (<sup>1</sup>H, <sup>13</sup>C, COSY, TOCSY, HSQC, HMBC, and NOESY) and mass spectrometry (ESI-MS) and comparison with literature data. The evaluation of the biological activity of different extracts of *Atractylis flava* showed a moderate antibacterial activity against some bacteria strains.

<sup>1</sup>Sonia Chabani, Hamada Haba, Catherine Lavaud, Mohammed Benkhaled, Dominique Harakat, 2013. Flavonoid glycosides and triterpenoids from *Atractylis flava*. Phytochemistry letters 6, 9-13.

**PP-135**

**ANTIMICROBIAL ACTIVITY OF THE ESSENTIAL OIL FROM THE SAHARA MYRTLE *MYRTUS NIVELLEI***

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The present study was conducted to evaluate the in vitro antibacterial activity of the essential oil from *Myrtus nivellei* Batt. & Trab., an endemic species of Central Sahara, against 6 micro-organisms. Antibacterial activity of essential oils was investigated using disc diffusion and agar dilution methods.

The results showed that *Bacillus subtilis* and *Candida albicans* are more sensitive, they were inhibited from 2.5 / 1000 v / v. This oil is also active against *Staphylococcus aureus* at a concentration of 5/1000 v / v. This bioactivity is mainly due to the richness of this gasoline eucalyptol which is known to be effective against microbial agents. The inhibitory effect of the oil on the bacterial and fungal growth suggests prospects for application in the fields of food industry, cosmetic and pharmaceutical.

**PP-136**

**STUDY OF THE EFFECT OF *ZATARIA MULTIFLORA* ESSENTIAL OIL SUPPLEMENTATION ON PERFORMANCE AND IMMUNE SYSTEM OF BROILER CHICKENS**

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2. Ph.D graduate, University of Tehran

3. Ms. Degree student, Islamic Azad University, Garmsar Branch

4. Animal Science student, Payam e Noor University, Semnan

5. Young Researcher and Elite Club, Karaj Branch, Islamic Azad University, Karaj, Iran

The aim of this research was the study of the effect of *zataria multiflora* essential oil on performance and immune system of broilers chickens. 360 one-d-old Ross 308 broiler chicks assigned in a completely randomized design to four treatments (0, 100, 200, 400 ppm of *zataria multiflora* in diet) with six replicate pens and fifteen birds per pens. Feed intake, BW and FCR were measured in the end of each period (starter, grower and finisher). Three birds from each replicate was killed in the end of experiment and slaughter performance was measured. At d 28,42 antibody titers in response to SRBC were measured. Results indicated that feed intake decrease in 400 ppm of *zataria multiflora* in diet. There was significant increase in BW by 200 ppm treatment ( $P < 0.05$ ). The 200 ppm treatment improve FCR in starter period ( $P < 0.05$ ) in compare other treatments. The slaughter performance and antibody response to SRBC were not affected by treatments. Our results suggest that use of 200 ppm of *zataria multiflora* in diet in starter period can improve performance but no effect on immune system of broiler chickens.



**PP-137**

**HEPATOPROTECTIVE EFFECTS OF *HYOSCYAMUS ALBUS* ON CARBON TETRACHLORIDE-INDUCED ACUTE HEPATOTOXICITY IN RATS**

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The goal of this present work is to evaluate the activity of anti hepatotoxicity *in vivo* of the methanolic extract of *Hyoscyamus albus* (HAMeOH) on Wistar rats against CCl<sub>4</sub> induced liver damage. The animals were divided into seven groups with five rats in each group. CCl<sub>4</sub> (2 mL kg<sup>-1</sup> b.w) was injected subcutaneously in the second and the third day of experiment, and the methanolic extracts of HAMeOH (100/200 mg/ kg body wt.) was given by gavage in five days of the experiment. The extracts prevented liver damage caused by CCl<sub>4</sub>, as noted by the significant decrease in serum aminotransferases release and the alkaline phosphatase activities. This extracts decrease the necrosis effect of CCl<sub>4</sub> in the histological examination. Serum ALT and AST and ALP activities significantly decreased in a dose-dependent manner in treatment groups with extracts. Histological examination showed lowered liver damage in HAMeOH-treated groups.

**PP-138**

**ANTIOXIDANT ACTIVITY OF THE METHANOLIC EXTRACT AND  
ANTIMICROBIAL ACTIVITY OF THE ESSENTIAL OIL OF  
*ROSMARINUS OFFICINALIS* GROWN IN ALGERIA (REGION OF  
BEJAIA)**

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To evaluate the antioxidant activity of the methanolic extract along with the antimicrobial activity of the essential oil of the aerial parts of *Rosmarinus officinalis* L collected in the region of Bejaia (northern center of Algeria). Materials and methods: The polyphenols and flavonoids contents of the methanolic extract were measured. The antioxidant activity was evaluated using two methods: the ABTS method and DPPH assay. The antimicrobial activity was studied by the agar diffusion method against five bacterial strains (Three Gram positive strains and two Gram negative strains) and one fungus. Results: The total polyphenol and flavonoid content was about 43.8 mg gallic acid equivalent per gram (GA Eq/g) and 7.04 mg quercetin equivalent per gram (Q Eq/g), respectively. In the ABTS assay, the rosemary extract has shown an inhibition of 98.02 % at the concentration of 500 ug/ml with a half maximal inhibitory concentration value (IC<sub>50</sub>) of 194.92 ug/ml. The results of DPPH assay have shown that the rosemary extract has an inhibition of 94.67 % with an IC<sub>50</sub> value of 17.87 ug/ml, which is lower than that of Butylhydroxyanisol (BHA) about 6.03 ug/ml and ascorbic acid about 1.24 µg/ml. The yield in essential oil of rosemary obtained by hydrodistillation was 1.42 %. Based on the determination of the diameter of inhibition, different antimicrobial activity of the essential oil was revealed against the six tested microbes. *Escherichia coli* from the University Hospital (UH), *Streptococcus aureus* (UH) and *Pseudomonas aeruginosa* ATCC have a minimum inhibitory concentration value (MIC) of 62.5 µl/ml. However, *Bacillus* sp (UH) and *Staphylococcus aureus* ATCC have an MIC value of 125µl/ml. The inhibition zone against *Candida* sp was about 24 mm. The aromagrams showed that the essential oil of rosemary exercises an antifungal activity more important than the antibacterial one.

**PP-139**

**PROTECTIVE EFFECT OF *HALOXYLON SALICORNICUM* AGAINST OXIDATIVE STRESS INDUCED BY ALUMINUM INTOXICATION IN YOUNG WISTAR RATS**

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The use of aluminum widens continuously daily. The use of this metal can be a decadent cause of health made its accumulation in the organs. This metal is a neurotoxin that can sicken and even kill. The arrival of a large dose of the latter in the brain triggers encephalopathy: neurons die massively. Aluminum has an influence on bone formation and bone structure. The body can defend itself against low doses of this hyper reactive element, but it can also be weakened coping with the disease. This work was carried out to check the protective effect of *Haloxylon salicornicum* in reducing the toxicity of aluminum chloride (AlCl<sub>3</sub>). We used Wistar rats as an experimental model to examine the effect of aluminum in serum. Young male rats were divided into four groups each containing 6 rats. The experimental protocol is based on the administration of AlCl<sub>3</sub> (30 mg / Kg / body weight) by intraperitoneal (ip) every five days for 15 days. The groups treated with the plant receive a daily dose of 0.05g / kg / body weight by gavage: Group 1: control rats, Group 2: animals received three injections of AlCl<sub>3</sub> Group 3: animals received three injections AlCl<sub>3</sub> in addition to the plant and group 4: animals only receive the plant. The results showed that the AlCl<sub>3</sub> induced an increase in serum reactive substances thiobarbituric acid (TBARS) and the activities of transaminases (AST, ALT) While the catalase activity was decreased. The administration of the plant has improved the activity of catalase and decreased the rate of TBARS. We concluded that *Haloxylon salicornicum* may play a protective role against the harmful effects of aluminum in Wistar rats.

**PP-140**

**CHEMICAL STUDY AND ANTIMICROBIAL ACTIVITY OF ESSENTIAL OILS AND FLAVONOIDS OF *URTICA DIOICA***

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Essential oils and flavonoids of the aerial part of *Urtica dioica* L., collected in Algeria were the object of a physico-chemical and microbiological study.

The extraction of essential oils was accomplished by hydro distillation method. The efficiency was 0.24% from 100g of dried plant.

The CG/MS analysis revealed the presence of various components like thymol,  $\alpha$ pinene and others. It should be noted that the major component of this essential oil is the Spathulenol with 64.174%. Moreover, flavonoids were extracted from 60g of vegetal powder(1), and gave a percentage of 14.733%.

The HPLC analysis of flavonoids indicated the presence of Rutin and Quercetin.

The evaluation of the antimicrobial activity of both extracts was made by the method of discs impregnated with different concentrations flavonoids and essential oils, and the measure of MICs.

It was made on bacterial strains isolated from respiratory infections, and identified using specific tests and biochemical galleries.

Bacterial strains used for the antimicrobial activity were: *E. coli*, *Klebsiella pneumoniae*, *Staphylococcus aureus*, *Streptococcus pneumoniae*, *Pseudomonas aeruginosa*, *Pseudomonas fluorescens*. The only yeast for this study was *Candida albicans* Results showed a remarkable effect on different bacterial strains for both extracts. The most resistant bacteria are *Klebsiella pneumoniae*. *Candida albicans* seems to be very sensitive.

(1) Bruneton J. Pharmacognosie et phytochimie des plantes médicinales. 3ème Édition. Paris : Tec & Doc ; 1999. p575.

PP-141

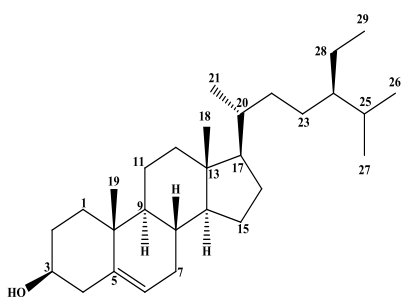
PHYTOCHEMICAL STUDY OF THE PLANT *BASSIA MURICATA*

Ammar Dibi\*, Badra Bouzghaia, Fatma Bitam, Mohamed Cherif Aberkane, Hamada. Haba

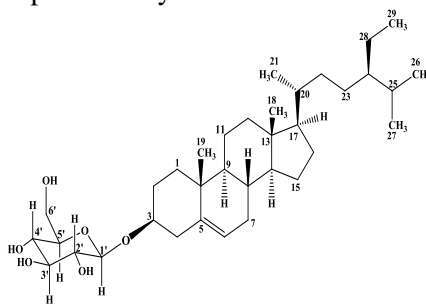
<sup>1</sup>Laboratoire de Chimie et Chimie de l'Environnement (LCCE), Département de Chimie, Faculté des sciences, Université Hadj Lakhdar , Batna 05000. Algérie.

The genus *Bassia* belongs to the family *Chenopodiaceae*. It is distributed in the dry regions in Africa, Asia, and Europe [1-2]. The genus *Bassia* has been found to be a rich source of saponins, flavonoids and triterpenes and some anti microbial activities are described in the literature data [3-4]. In the folk medicine, the species *Bassia Muricata* is used to treat kidney and rheumatic diseases. Our phytochemical study of the chloroform and butanol extracts of the aerial parts of the species *Bassia muricata* resulted in the isolation and identification of two steroids secondary metabolites: 3 $\beta$ -hydroxy-(20R)-24-ethylcholest-5-en-3-ol ( $\beta$ -sitosterol) (1), and  $\beta$ -sitosterol-3 $\beta$ -D-glucopyranoside (Daucosterol) (2).

The structural determination of these two compounds is achieved by using physicochemical and spectroscopic techniques including nuclear magnetic resonance spectroscopy NMR 1D (<sup>1</sup>H, <sup>13</sup>C J-modulated) and 2D dimensional (COSY, HSQC and HMBC) as well as by mass spectrometry ESI-MS.



(1)



(2)

1. P. Ozenda. (CNRS (Ed.), Paris, France, 1991).
2. B. Geoff, F. Sue, G. Denise, G. Sarah, H. Michelle, *Botanica: Encyclopédie de botanique et d'horticulture*, vol: **36**, p. 133 (2005).
3. E.K. Fayez, H.G Mary, Polyphenols from *Cornulaca monacantha*. *Phytochemistry* **58**, 611-613 (2001).
4. S.K. Mohamed, M.M. khaled, A.H. Hashim, O. Kazuhiro, K. Ryoji, Y. Kazuo, Acylated flavonoid glycosides from *Bassia muricata*, *Phytochemistry* **57**, 1259-1262, (2001).

**PP-142**

**ANTIOXIDANT POTENTIAL AND CHARACTERIZATION OF THREE PHENOLIC EXTRACTS OF THE AROMATIC PLANT (*MYRTHUS COMMUNIS L.*)**

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Reactive oxygen species (ROS) have a high capacity to damage various types of cellular components in the body, causing many degenerative diseases. Supplementation of exogenous antioxidants in the body is very useful against these harmful species [1]. In this context, we evaluated the antioxidant activity by trapping radical's method DPPH [2] of four extracts prepared from the leaves of the aromatic plant myrtle (*Myrtus communis L.*) harvested from Honaine region (Tlemcen). Three extraction methods were applied: extraction with solvents of increasing polarity, extraction by maceration with ethanol 80%, and extraction by decoction. The extracts obtained were analyzed and characterized to determine the yield, the contents of total polyphenols, flavonoids and condensed tannins.

The results of this study indicate that the plant used contains significant amounts of compounds which can be operated at many aspects (industrial, pharmaceutical ...). Preliminary screening of the extracts allowed to target the radical scavenger activity of DPPH in the two richest extracts phenolic compounds and the quantitative evaluation of the power scavenging extracts against DPPH in both extracts rich in polyphenols. The evaluation of power scavenger extracts against the DPPH confirms that the extracts MetE and WE have a strong antioxidant power with EC50 = 0.68 and 0,73mg / ml respectively better than the cast two other extracts as well as  $\alpha$ -tocopherol but are still small relative to that expressed by ascorbic acid and quercetin, respectively.

**PP-143**

**HYPOGLYCEMIC AND ANTIHYPERGLYCEMIC EFFECT OF FLAVONOIDS FROM THE LEAVES OF *OLEA EUROPAEA* L. IN NORMAL AND ALLOXAN-INDUCED DIABETIC RATS.**

Benhabyles Narimen<sup>1,2</sup>, Arab Karim<sup>2</sup>, Bouchenak Ouahiba<sup>2</sup>, Afif chaouche Thanina<sup>2</sup>, Boumaza Sarah<sup>2</sup>, and Baz Ahcen<sup>1</sup>.

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Olive tree (*Olea europaea* L.) is one of the most important fruit trees in Mediterranean countries, where they cover  $\approx$  8 million ha, accounting for almost 98% of the world crop. This demonstrates the great economic and social importance of this crop and the possible benefits to be derived from utilisation of any of its by products<sup>1</sup>. The aim of this study was to determine the hypoglycemic and antihyperglycemic activities of the Aqueous Extract (AE) from the leaves of *Olea europaea* in normal and alloxan-induced diabetic rats. The aqueous extract was obtained by confrontation with organic solvents method<sup>2</sup>. The quantitative HPLC analysis yielded two flavonoids compounds, they are quercetin and rutin at the respective concentrations of 0.54 mg/g and 0.53 mg/g. 100 mg/kg of aqueous extract was administered intravenously (i.v.) and produced a significant decrease in blood glucose level ( $P < 0.05$ ). Plasma insulin levels were also determined and the results showed a significant increase of insulinemia ( $p < 0.001$ ). In the other hand, Change in blood glucose in diabetic rats treated in acute treatment (2 h) at doses of 200 mg/kg, 400 mg/kg, 600 mg/kg and in subchronic treatment (28 days) at a dose of 200 mg/kg showed a substantial decrease in blood glucose for all groups treated with different doses of flavonoids in both antidiabetic assays ( $p < 0.001$ ). From the results it can be concluded that flavonoids of *Olea europaea* can be a potential candidate in treating the hyperglycemic conditions.

**PP-144**

**THE PHYTOCHEMICAL SCREENING AND BIOLOGICAL ACTIVITIES OF *WARIONIA SAHARAE* BENTH & COSS GROING IN BECHAR REGION SOUTH WEST OF ALGERIA.**

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Laboratoire de valorisation des ressources végétales et la sécurité alimentaire en région semi arides du sud ouest de l'Algérie.

This work is a part of upgrading of a medicinal plant thrust spontaneously in the region of Bechar «*Warionia saharae* Benth & Coss» to explore its phytochemical composition and its biological activities by knowing antifungal and antioxidant effects in vitro.

The phytochemical screening revealed the presence of reducing compounds, saponins with a index foam of 120, tannins, alkaloids, Anthocyanosides , triterpenes and sterols , fatty acids , volatile oils and free quinones . This wealth of elements is confirmed by yields of: 27.81%, 8.06%, 4.13% and 4.68 % sequentially to aqueous, ethanol, hexane and ethyl acetate extracts.

The antifungal activity of the extracts of this plant was tested on four filamentous fungal strains. The results show that the hexane extract has a potent inhibited activity against the fungal strains where the MICs are of 2.42 mg/ml for *Penicillium sp.* and 3.5 mg/ml for *Fusarium sp.* followed by the ethanol extract. This last is fractionated in column to three fractions which are tested on the same fungal strains and demonstrated an antagonism between the active elements comparatively to the crude extract.

The antioxidant activity was evaluated using the method of reducing free radical DPPH by estimating the IC50 % of 556.80 µg / ml for the aqueous extact, 6.09 µg / ml for the ethanol extract, 3026 µg / ml for the hexane and 423.28 µg / ml for the ethyl acetate extract respectively . While the positive control of the ascorbic acid is of 1.02 µg/ml.



**PP-145**

**CHEMICAL COMPOSITION AND LARVICIDAL ACTIVITY OF ESSENTIAL OIL OF *TETRACLINIS ARTICULATA***

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As part of the search for effective biological control methods against diseases transmitted by mosquitoes, the essential oils obtained by steam distillation of *Tetraclinis articulata* (Vahl) Masters leaves were analyzed and its effectiveness on L4 larvae stage of *Culex pipiens* was determined. Analysis by gas chromatography (GC / FID) and (GC / MS) revealed that *Tetraclinis articulata* essential oil yield is in the order of 0.70 %. The composition of the volatile oil isolated by hydro-distillation from leaves identify forty compounds representing 89.7 % of the total chemical composition of the essential oil with a predominance of oxygenated monoterpenes. Camphor (19.6 %), bornyl acetate (18.7 %), germacrene D (7.6%), trans-caryophyllene (7.1 %) and borneol (6.3 %) are major compounds. Biological tests carried out according to the standard protocol of the World Health Organization (WHO) revealed that these volatile oils have remarkable insecticidal and larvicidal properties. They induce 96.66% mortality of *Culex pipiens* larvae at 16 µl. LC50 values of the essential oil from *T. articulata* leaves against larvae of *C. pipiens* calculated after 24 hours (1 day) was in the order of 8.61 µl. This efficiency could be due to the high proportion of oxygenated monoterpenes and / or the association of phenolic compounds. Therefore, due to its high extraction efficiency and its insecticidal and larvicidal properties against *Culex pipiens* should be strongly recommended for the development of natural biocides.

**PP-146**

**PROTECTIVE EFFECT OF WORMWOOD EXTRACT ON NEUROBEHAVIORAL DISORDER AGAINST CHRONIC LEAD EXPOSURE IN WISTAR RATS.**

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Lead is ubiquitous and a potential factor toxic in brain damages causes several neurophysiological alterations and behavioral problems<sup>1</sup>.

This study was undertaken to investigate the effect of wormwood plant *Artemisia Absinthium L.* (A.Ab) in the levels of proteins, phospholipids, carbonyl and activity enzymes and neurobehavioral parameters of male rats intoxicated by lead.

Eighteen rats (n=18) weighing (36 ± 6) g were assigned into three groups: (1) control group, (2) group was exposed to 1g of lead acetate (Pb) in 1L of drinking water treated for 12 week, (3) group was exposed of (Pb) during 8 weeks who later received aqueous *Artemisia Absinthium L.* extract (A.Ab) (300mg/kg body weight) for 4-weeks (-Pb+A.Ab).

The level activity of catalase, ALT, AST and memorization, anxiety and the state of despair which were evaluated on Elevated Plus Maz test and Light Dark test, forced Swimming test. were determined on male rats in all groups.

The intoxicated group (Pb) has a significant increased levels of carbonyl, enzyme catalase compared with the control group (p<0.05), reduction important was noted in phospholipids, proteins also ALT, AST activity (p<0.05) compared with the control group. The behavioral tests of memorization indicate a significant decreased in the activity of memory, and a significant (p<0.05) increased on the anxiety test in the group Pb compared with the control group.

After treatment with *Artemisia Absinthium L.* extract during 4 week, the group (-Pb+A.Ab) indicate a significant decrease of carbonyl, catalase (p< 0.05) compared with Pb group, the level of phospholipids and proteins were increased significantly (p<0.05) compared with Pb group. An important amelioration was noted in the memorization test and a noticeable decreased level of anxiety behavioral and state of despair compared with Pb group.

These data suggest that administration of wormwood (A.Ab) extract for 4 weeks ameliorate the damage neurobehavioral against lead exposure. Thus, aqueous extract wormwood might be effective to improve some disorders induced by lead.

**PP-147**

**ANTIOXIDANT ACTIVITY OF PHENOLIC EXTRACTS AND ESSENTIAL OILS OF LAURUS NOBILIS IN ALGERIA**

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The study of the medicinal plants presents an essential scientific research, because it is a natural source of the active compounds having therapeutic properties. Within this framework, our work is based on the study of the antioxydant activity of the phenolic extracts and essential oils for a medicinal plant: *Laurus nobilis* known under the name of bay-tree.

The quantitative estimate of total phenols by the method of Folin-Ciocalteu and the total flavonoid by the method of AlCl<sub>3</sub> showed the richness of the parts of the plant of bay-tree to total phenols and total flavonoid.

The analysis of essential oils by GC-MS showed that the essential oil of the sheets of bay-tree is made up mainly of 1,8-cineole. The results of the antioxydant activity by the test of ABTS, DPPH, the test of Phosphomolybdenum, reducing power and chelating went up that it has a good antioxydant activity in comparison with antioxydant of reference.

**PP-148**

**PHYTOCHEMICAL SCREENING AND BIOLOGICAL ACTIVITIES OF  
*HALOXYLON SCOPARIUM* GROWING WILD IN BECHAR (SOUTH  
WEST OF ALGERIA)**

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The present work aimed to valorize a medicinal plant used widely in traditional medicine of Bechar region because of its multiple benefits: *Haloxylon scoparium*, locally known as "R'remt". For this, a phytochemical screening, antioxidant and antibacterial activities of the plant crud extracts were evaluated.

The phytochemical screening, performed on the aerial part of this plant, showed its richness in tannins, saponins and alkaloids.

The antioxidant activity of *Haloxylon scoparium* extracts (aqueous, methanolic, hexanic and diethyl acetate extracts) was evaluated by DPPH test, of which the best reduction percentage of the latter (56 %) was registered by the aqueous extract at a concentration of 0.5 mg/ml.

The antibacterial activity of *Haloxylon scoparium* extracts was assessed using disc diffusion and agar dilution methods against seven pathogenic bacterial strains. Overall, aqueous and methanolic extracts showed stronger antibacterial activity than the other extracts, in which the highest inhibition zones were observed against *Citrobacter freundii* (19 mm) and *Escherichia coli* (18 mm) respectively. In addition, the both extracts exhibited MICs values of 6,178 and 6,568 mg/ml respectively against *Bacillus cereus* and *E.coli*.

**PP-149**

**DETERMINATION OF SOME PHYSICOCHEMICAL PARAMETERS OF  
A MEDICINAL PLANT SEED OIL: *LINUM USITATISSIMUM***

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The present work is a contribution to the determination of some physicochemical indices of oil obtained from a medicinal plant which is widely known in the Maghreb countries: *linum usitatissimum* or flax.

The oil was extracted from the seeds of this plant by the Soxhlet method which gave an average yield of 35.08%.

The physicochemical profile of this oil gave the following indices values: (1.4775), (1.5 % and 2.99%) (8.3 meq O<sub>2</sub> / kg), (159.0435 mg KOH / g of oil) respectively to the refraction index, acid index and acidity, peroxide index and saponification index. The iodine index, determined by a physical assay (reverse assay), gave the value of 4% at a concentration of 8.18x10<sup>-2</sup>g/ml.

**PP-150**

**AN IN-VITRO ANTIOXIDANT ACTIVITY OF FLAVONOIDS FLOWERS  
OF PRICKLY PEAR "*Opuntia ficus-indica*" IN WEST ALGERIAN**

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Much of the research interest is the study of antioxidant molecules of natural origin. The prickly pear "*Opuntia ficus indica*" is a family of Cactaceae plants. This plant and derivative products, including oil and seeds of the fruit are not valued as they should be in the world, particularly in Algeria. This work aims to make a phytochemical study and evaluate the antioxidant activity of phenolic extracts of *Opuntia ficus-indica*. The high content of flavonoids with a rate of 62.67 mg CE /g DM present the majority of total polyphenols 120.22 mg GAE / g DM with a total tannins content equal to 7.68mg GAE / g DM. Then, the antioxidant activity of different extracts flavonoids (n-butanol, ethyl acetate and ethyl ether) was evaluated by four methods, total antioxidant capacity (TAC), the reduction of iron (FRAP), DPPH free radical scavenging and inhibition of  $\beta$ -carotene bleaching. The ethyl acetate flavonoids extracted from flowers showed a great total antioxidant capacity compared to other extracts. This same sample tested by the scavenging of free radical DPPH showed that the extract was the most active with an IC<sub>50</sub> estimated at  $0.27 \pm 0.007$  mg / ml. The ability to reduce the iron is remarkable in the ethyl acetate extract of flavonoids in particular at concentration of 1mg/ml compared with ascorbic acid. Indeed, against the bleaching of  $\beta$ -carotene the flavonic ethyl acetate extract was the best with IC<sub>50</sub> =  $0.39 \pm 0.016$  mg /ml lower than that of gallic acid IC<sub>50</sub> =  $0.43 \pm 0.008$  mg / ml.

**PP-151**

**EVALUATION OF ACUTE TOXICITY AND THE ANALGESIC EFFECT  
OF *INULA VISCOSA* AND *ANACYCLUS VALENTINUS***

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The viscous Elecampane (*Inula viscosa*) and valence anacycle (*Anacyclus valentinus*) are two well known plants in Algeria. They are usually used in traditional medicine. To assess their bioactive compounds, polyphenols extracted by maceration and essential oils by hydrodistillation were performed. The biological assessment is based on the acute toxicity of the extracts *in vivo* in male and female Wistar rats receiving a single dose of the extract by intraperitoneal injection and followed for 14 days. To investigate the analgesic activity of polyphenols and essential oils, the technique of the hot plate was applied on rats with 180-200g.

The results of this study suggest that polyphenols 2000mg / kg and essential oils to 3ml / kg no deaths were recorded. Both plants showed no toxicity. The registered analgesic effect was very important especially for *Inula viscosa*. The methanolic extract thereof at doses of 1500 mg / kg and 2000 mg / kg significantly increases the reaction time on the hot plate (12 sec  $\pm$  0.48 14  $\pm$  0.5 sec) compared to the dose of Aspegic 250 mg / kg and 500 mg / kg (5.80  $\pm$  0.55 sec, 7.50  $\pm$  0.47 sec).

**PP-152**

**INSECTICIDAL ACTIVITY OF THREE ESSENTIAL OILS ON THE COWPEA WEEVIL CALLOSOBROCHUS MACULATUS (F) (COLEOPTERA: BRUCHIDAE).**

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The *Vigna unguiculata* seeds treated with essential oils of thyme (*Thymus vulgaris*), basil (*Ocimum basilicum*) and oregano (*Origanum vulgare*) with various concentrations, were exposed to *Callosobruchus maculatus* adults, in laboratory conditions.<sup>1</sup>

The results showed that the treatments reduce very significantly the longevity, the number of eggs laid, the eggs hatching and emergence of adults in *C. maculatus*.

Thyme essential oil shows a more toxicity against adults of cowpea weevil comparatively with basil and oregano.

<sup>1</sup>A. Kellouche, F. Ait Aider, K. Labdaoui, D. Moula, K. Ouendi, N. Hamadi, A Ouramdane, B. Frerot and M. Mellouk: Biological activity of ten essential oils against cowpea beetle, *Callosobruchus maculatus* Fabricius (Coleoptera: Bruchidae), *Int. J. Integ. Biol.*, 10(2): 86-89, 2010.



PP-153

**SCREENING FOR ANTIMICROBIAL ACTIVITY AMONG *BACILLUS* ISOLATES FROM HYPERSALINE ENVIRONMENTS IN NORTH-EASTERN ALGERIA**

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The recent emergence of multidrug-resistant bacteria over the last decade has led to a renewal in the discovery of new antimicrobial drugs. It is proposed that novel bioactive natural compounds may be produced by novel microbial species. The aim of this study was the identification of new species and screening for bioactive natural products from *Bacillus* isolates. Hundred and fifty seven strains were isolated from the hypersaline lake of Mzouri in Eastern Algeria. Firstly Molecular identification was performed using 16S rRNA gene phylogeny, the screening for the antimicrobial activity was done using cross streak method on MH medium against various bacteria and *Candida albicans*. Molecular identification shows a new species of *Bacillus* genus whose genome has been sequenced and ongoing analysis. Among the 147 *Bacillus* and 10 *Paenibacillus* strains screened 60 strains (38.21%) showed antagonistic activity. Twenty-four strains (40%) exhibited activity against Gram positive bacteria including Methicillin Resistance *Staphylococcus aureus*, while 6 strains (10%) were efficient against vancomycin-resistant *Enterococcus faecium*. Four strains were efficient against negative bacteria including *Klebsiella pneumoniae* resistant to both imipenem and colistin. Lastly, 68.33 % (41 strains) revealed significant antifungal activity against *Candida albicans*.

In conclusion, hypersaline environments are a potential source of bioactive bacteria.

**PP-154**

**ISOLATION OF PRODUCING TYPE-I PKS AND NRPS *STREPTOMYCES* STRAINS WITH HIGH ANTIMICROBIAL ACTIVITY FROM SEDIMENTS OF THE EL KALA LAKES IN NORTHEASTERN ALGERIA**

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Recent reports of new metabolites produced by diverse aquatic streptomycetes have unveiled potential capacity of these strains to produce natural bioactive products. The objective of this study was to screen *Streptomyces* isolates from lacustrine sediments for new antimicrobial activities and to characterize their nonribosomal peptide synthetase (NRPS) and type I polyketide synthase (PKS-I) genes. One hundred and twelve *Streptomyces* isolates were recovered from the sediments of three lakes in El Kala northeastern Algeria. Primary screening for the antimicrobial activities was performed using cylinder plate method on ISP medium 2 against various bacteria and *Candida albicans*. Genomic potential for producing bioactive metabolites was evaluated using specific degenerate primers amplifying fragments of PKS-I and NRPS genes. Among the 112 *Streptomyces* strains screened 27 strains (24.1%) showed significant activities against various bacteria and fungi including vancomycin-resistant *Enterococcus faecium*, Methicillin-resistant *Staphylococcus aureus*, multidrug-resistant Gram-negative bacteria, and *Candida albicans*. Eighteen out of 27 strains yielded type I PKS gene, however NRPS gene was detected in all of the bioactive strains. Preliminary analysis revealed that some of these NRPS/PKS has new sequences that are currently under investigation.

In conclusion, lacustrine sediments are a potential source of streptomycetes producing NRPS and PKS-I metabolites efficient against multidrug resistant bacteria.

PP-155

**STUDY OF THE BIOLOGICAL PROPERTIES OF THE FLAVONIC EXTRACTS FROM THE LEAVES OF A MEDITERRANEAN HERB OF ALGERIA *INULA VISCOSA***

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Since antiquity, plants have always been used by man to heal; they are used either in their natural form or by extraction of compounds or metabolites in the various organs (root, leaf, seed and fruit) of plant. Algerian flora is characterized by its diversity Mediterranean and Saharan estimated at more than 3000 species of several botanical families. *Inula viscosa* is widely used in traditional medicine herb for the treatment of wounds and ulcers, which led us to make a study of antimicrobial activity, skin healing and anti-ulcer (gastric) of flavonic compounds present in the leaves of our plant.

The quantitative and qualitative analysis showed that this plant is very rich in flavonoids, but devoid of anthocyanins. The extraction of large polyphenols families by different solvents (polar and apolar), allowed us to quantify by spectrophotometry UV-visible the following compounds (flavones, flavonols: 0.71 mg / g  $\pm$  0.23, C-glycoside: 0.41 mg / g  $\pm$  0.13, free flavonoid aglycone: 0.62 mg / g and 0.19  $\pm$  glycosides: 1.408 mg / g  $\pm$  0.25). The antimicrobial test mounted that flavonic extracts have varying effects (no effect, medium, high) on different bacterial and fungal strains tested. The results of the study for skin healing activity revealed that the plant powder actually has a healing power on excisional wounds with a percentage reduction in wound area of 86%, with a very good tissue reorganization and re-epithelialization revealed by histological sections. The Antiulcérogénique effect is due to the composition of flavonic from *Inula viscosa*. In fact the results show that this flavonic extract has the lowest ulceration index 12.24. In conclusion these results justify the use of this plant in traditional medicine.

**PP-156**

**CHEMICAL COMPOSITION, ANTIMICROBIAL AND ANTIOXYDANT ACTIVITIES OF THE AERIAL PART OF *Nepeta Nepetella*.**

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The use of aromatic plants and spices in phytotherapy is mostly related to different activities (such as antimicrobial, carminative, hepatoprotective, antiviral, anticarcinogenic) of their essential oils. Many studies point to strong antioxidant activities of aromatic plants and their essential oils. Antioxidant activities are also confirmed for most of the phenolic compounds present in different spices and herbs.

This study was designed to examine the chemical composition and evaluation of of the antimicrobial and antioxidant activities of the essential oil (EO) of aerial part of *Nepeta nepetella* (Lamiaceae). The EO was isolated by the steam distillation method and the chemical composition was analyzed by gas chromatography-mass spectrometry (GC-MS), twenty two compounds representing 88.3% of the total oil were characterized. The oil was predominated by oxygenated monoterpenes (65.8%), nepetalactone 4 $\alpha$ ,7 $\alpha$ ,7 $\beta$  (64.3%), E- $\beta$ - farnesene (7.8%) , E- $\beta$ -caryophyllene (5.2%) were the main components, comprising 77,3% of the total oil. The antioxidant activity was evaluated “in vitro” only by DPPH and  $\beta$ -carotene bleaching tests. The essential oil has been screened for her antimicrobial activity against five bacteria species including Gram-positive bacteria (*Staphylococcus aureus* and *Bacillus cereus*), Gram- negative bacteria (*Escherichia coli*, *Pseudomonas aeruginosa*, and *Klebsiella pneumoniae*) and one yeast species (*Candida albicans*) using agar disc- diffusion method. The essential oil was found to exhibit antioxidant activity by inhibiting  $\beta$ -Carotene bleaching (IC (50) = 14.58  $\mu$ g/ml) and by scavenging DPPH free radical (IC (50) = 860  $\mu$ g/ml). The highest antimicrobial activities were observed against yeast *Candida albicans* followed by bacteria species.

**PP-157**

**ANTIOXIDANT ACTIVITY OF *CRITHMUM MARITIMUM* ESSENTIAL OIL FROM BEJAIA REGION.**

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*Crithmum maritimum* commonly known as sea fennel or rock samphire; widely distributed along coastal areas of the Mediterranean sea and of the Atlantic ocean. The objective of this work was the determination of the antioxidant activities of *C. maritimum* essential oil (EO) harvested from Tighzert region (Bejaia, Algeria) using two tests; the scavenging activity of DPPH free radical<sup>1</sup> and  $\beta$ - carotene bleaching test.<sup>2</sup> The EO of *C. maritimum* shows a lower scavenger effect on DPPH free radical with IC<sub>50</sub> value of 873.83±25.84 (mg/ml), while it exhibits a strong anti-bleaching activity with IC<sub>50</sub> value of 4.21±0.27 (mg/ml). A synthetic antioxidants butylated hydroxyanisol (BHA) and butylated hydroxytoluen (BHT) have been used as standards to compare their antioxidant activities with those obtained for *C. maritimum* EO. BHA shows the powerful scavenger effect on DPPH free radical and anti-bleaching test activity with IC<sub>50</sub> values of 0.40±0.01 (mg/ml) and 0.41±0.04 (mg/ml), respectively. In conclusion, due to the antioxidant activity of *C. maritimum* EO, this latter could be suggested as natural product to avoid food spoilage and increase the shelf-life of food products.

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Koleva, I. I., Teris, A. B., Jozef, P. H., Linssen, A. G., Lyuba, N. E. (2002). Screening of plant extracts for antioxidant activity: a comparative study on three testing methods. Phytochemical Analysis. 13, 8-17.

**PP-158**

**ESSENTIAL OIL COMPOSITION OF *Ferula orientalis* L. (APIACEAE)  
FROM DIFFERENT LOCALITIES OF TURKEY**

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Aromatic plants had been used since ancient times for their preservative and medicinal characters, and to impart aroma and flavour to food, the pharmaceutical properties of aromatic plants are partially attributed to their essential oils. Essential oils have been shown to possess antibacterial, antifungal, antiviral, insecticidal and antioxidant properties. *Ferula* L. taxa are generally named Çakşır, Çakşır otu or Çaşır in Turkey. Herbal parts of *Ferula* plants are used as animal fodder for winter months in Eastern Turkey; roots of *Ferula* are used as aphrodisiac and some taxa of *Ferula* have been used in folk medicine as sedatives, for the treatment of rheumatism, digestive disorders, headache, arthritis, toothache and diabetes.

In this study, essential oil composition of *Ferula orientalis* L. from three different localities (Bingöl, Elazığ, Malatya) of Turkey have been studied to determine taxonomic classification and essential oil contents. For this purpose, aerial parts of plant samples were investigated by HS-SPME/GC-MS. 33, 29, 30 compounds were identified in *F. orientalis* from Bingöl, Elazığ, Malatya localities accounting from 92.2%, 96.9%, 96.3% of the whole oil, respectively. In all localities  $\alpha$ -pinene, camphene,  $\beta$ -pinene, sabinene, naphthalene,  $\beta$ -phellandrene were detected among the main compounds.  $\alpha$ -pinene and  $\beta$ -phellandrene were found to be the most percentage of Bingöl (28.4%-5.6%), Elazığ (35.5%-6.4%), Malatya (27.7%-7.4%) localities and these compounds were detected the chemotypes of *F. orientalis*. With this study, essential oil contents of *F. orientalis* was found to be rich and the results were discussed with the genus patterns in means of chemotaxonomy, natural products and usable potentials of the plant as renewable resources.

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**PP-159**

***IN VITRO* EVALUATION OF ANTIMETHANOGENIC ACTIVITY OF ESSENTIAL OILS AND EXTRACTED FROM *ROSMARINUS OFFICINALIS* AND *LAVANDULA OFFICINALIS***

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Methane constitutes the main way of hydrogen elimination in the rumen during the microbial digestion of food. Its eructation by ruminants led to both energy loss for animals and a potent greenhouse gas as it has 25 times more global warming potential than carbon dioxide. The present study was conducted to investigate the effect of essential oils, extracted from rosemary (*Rosmarinus officinalis*) and lavender (*Lavandula officinalis*) in reducing ruminal methanogenesis, comparatively to purified essential oils: carvacrol, cinnamaldehyde and thymol. The aerial parts of plants are used fresh and extraction of essential oils was made by the hydrodistillation process. Antimethanogenic activity of essential oils extracts was measured *in vitro* in batch systems. Essential oils were tested at different doses: 10, 20 and 40 µl. Gas production was monitored at different time intervals: 2, 4, 6, 8, 24, 48 and 72 h.

The results indicate that addition of crude oils of *Rosmarinus officinalis* and *Lavandula officinalis* and the purified oils did not affect significantly the pH values ( $P > 0.05$ ). Addition of essential oils of both plant and for three doses did not affect gas production after 2 hours of fermentation ( $P > 0.05$ ). Between 4 and 6 h of incubation, increasing essential oil dose of *Lavandula officinalis* induces a continuous decline (but not significant) of the gas production compared with the control (no additives). Similarly, addition of *Rosmarinus officinalis* essential oils had not significant effect on gas production for 10 and 40 µl doses compared with control. However, higher gas production was recorded for 20µl dose. Addition of *Lavandula officinalis* essential oil at 40µl level caused significant decrease in gas production after 24h incubation ( $P < 0.05$ ). Methane production was significantly reduced in the presence of essential oil extracted from *Rosmarinus officinalis* (28.1%;  $P < 0.05$ ). Besides, essential oil extracted from *Lavandula officinalis* decrease significantly methane production during 24 hours of incubation for 10 and 40µl doses. In general, essential oils used in our study showed a significant effect on reducing methane. Thus, we can focus future research on composition characterization of each essential (CG—MS) and to determine minimal inhibitory concentration (MIC) allows maximum methane reduction without adverse effects on digestibility.

**PP-160**

**SAPONINS OF *CAMELLIA SINENSIS* AND *TRIGONELLA FOENUM-GREACUM* AFFECT *IN VITRO* RUMEN FERMENTATION OF VETCH-OAT HAY**

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The present study was conducted to investigate the effect of two plants rich in saponins on *in vitro* ruminal fermentation traits of vetch-oat hay using gas syringes as incubators. Two plants, *Camellia sinensis* and *Trigonella foenum-greacum*, were added to 200 mg of vetch-oat hay at levels of 0, 2, 4, 6 and 8 mg and 0, 48, 54, 60 and 66 mg, respectively. Gas production was dose-dependent for both plants and decreased for all incubation times with the increasing doses.. Methane concentration was decreased at all inclusion levels and for each incubation time. The highest methane reduction was observed at 48h of incubation for both plants. This decrease varied between 48.78-52.84% and 45.52-72.35% for *Camellia sinensis* and *Trigonella foenum-greacum*, respectively. Ammonia-N concentrations also decreased significantly ( $P < 0.002$ ) when the plants rich in saponins were included with the vetch-oat hay. In addition, these plants significantly inhibited the protozoa growth in ruminal fluid ( $P < 0.001$ ). At 24h incubation, protozoa counts were reduced by 81.86% and 83.29% for the high levels of *Camellia sinensis* and *Trigonella foenum-greacum*, respectively. Finally, *in vitro* truly dry matter digestibility was significantly affected by the inclusion of plants rich in saponins ( $P < 0.05$ ). It is suggested that addition of these saponin-rich plants to feed could modify the rumen fermentation and inhibit the release of methane and ammonia, which may be beneficial for improving nutrient utilization and animal growth.



**PP-161**

**PROFILING (POLY)PHENOLIC CONTENT AND ANTIOXIDANT POTENTIAL OF SELECTED *MORINGA OLEIFERA* LAM. GERMPLASM'S LEAVES**

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*Moringa oleifera* L., an aromatic plant is a member of the Moringaceae family, which grows naturally at moderate altitude, being used by agro-food and chemical industries as food, fodder, biopesticide, green manure, natural coagulant for turbid water and plant growth enhancer. The present work was aimed to profile the phytochemical content by HPLC-PDA-ESI-MS<sup>n</sup> as well as the enzymatic (superoxide dismutase, catalase and peroxidase) and non-enzymatic (DPPH<sup>•</sup> scavenging and linoleic acid peroxidation) antioxidant power of leaves of different moringa germplasm ('Tumu', 'Sunyaw', 'Kumasi', 'Techiman', 'China' 'Pakistan Black' and 'Pakistan White'), together with the evaluation of their relative interest as a source of crude proteins and minerals in order to identify the most promising varieties. 'Techiman', 'Pakistan Black' and 'Pakistan White' were the best cultivars concerning the content in bioactive (poly)phenols (flavonoids and *ortho*-diphenols). Nevertheless, minor differences were recorded concerning the content in crude proteins and minerals (Ca, P, Mg and K). Based on these results it could be stressed that genetic background constitutes a crucial factor for determining the final aptitude of moringa plants as a source of beneficial bioactive compounds and valuable nutrients, being the recorded information useful to select high quality moringa varieties.

**PP-162**

**ANTIOXIDANT AND ANTIBACTERIAL ACTIVITIES OF EXTRACTS OF AN ALGERIAN MEDICINAL PLANT: HYOSCYAMUS ALBUS**

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Our work has focused on the active substances of a plant traditionally used by the Algerian population to cure certain diseases such as eczema. The extraction is carried out on the seeds and leaves of the medicinal plant *Hyoscyamus albus L.*. The results showed that the methanol extract has a high content of phenolic compounds:  $60.46 \pm 6.07$  in EAG mg/g and the yield of extraction with hexane of alkaloids is equal to 0.65%. The effect of the extract on two bacterial strains (*Staphylococcus* and *Salmonella*) gave inhibition zones of 11.7 mm and 10.6 mm diameter respectively. The determination of the anti-radical activity by DPPH method has yielded percentage of 69.75% and 72.75% for polyphenols and alkaloids, respectively, at a concentration of 100µg/ml. The reducing power showed a dependence on concentrations of phenolic compounds while it is reduced when the alkaloids concentration increase.

**PP-163**

**EVALUATION OF ANTIOXIDANT ACTIVITY, ANTI-INFLAMMATORY AND ANTIMICROBIAL EXTRACTS OF URTICA DIOICA L. HARVESTED DELLYS (FOREST BOUARBI).**

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Natural plant extracts contain a variety of phenolic compounds which are assigned a variety of biological activities. This study focuses on the phytochemistry of the plant, and evaluation of the antioxidant activity and antiinflammatory aqueous extracts of *Urtica dioica* L. leaves harvested in the Dellys region (Boumerdes) north Algeria. A phytochemical screening reveals a wealth of secondary metabolites in the leaves, seeds and roots. The polyphenols extraction yields are 8.34% for roots, 26.7% for the seeds and 28.26% for the leaves. The essential oil extraction yield from fresh leaves is 0.7%, yields fatty oils are 37.37% for seeds, 8.25% to 6.92% for roots and leaves.

Quantitative analysis by UV-visible spectrophotometer indicates a wealth of polyphenol (EAG 126.28 mg / g for leaves, EAG 80.96 mg / g for seeds and 41.56 mg EAG / g powder for roots) , in flavonoids (44.80 mg EQ / g for leaves, 20.80 mg EQ / g for the seeds and 3.44 mg EQ / g roots) Our results also indicate qu'*Urtica dioica* has a powerful non- enzymatic antioxidant capacity by the iron and the method of DPPH and the an anti-inflammatory activity. The analysis shows that the antimicrobial activity of the extracts are effective against the Gram + and Gram- and not on the yeasts. At the end of this work, it appears qu'*Urtica dioica* L. is a medicinal plant that develops a significant importance in medicine. Indeed, different parts of the plant used have many therapeutic properties. The leaves and seeds of dioecious nettle are used for numerous indications, So we can say that this plant can be used as a source of antimicrobial agents, anti-inflammatory

**PP-164**

**STUDY OF PHARMACO-TOXICOLOGICAL PROPERTIES OF THE FRUIT OIL OF MASTIC OF *PISTACIA LENTISCUS***

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*Pistacia lentiscus* is a perennial shrub with fruits containing a fixed oil used as natural remedy well known in traditional medicine in Algeria for the treatment of respiratory disorders and dermal burns.

The aim of this study is to investigate pharmaco-toxicological properties of the fruit oil of mastic of *Pistacia lentiscus*.

To achieve these objectives, this study was conducted in three steps:

I. Study of phytochemical and physicochemical properties of the fruit oil of *Pistacia lentiscus*; II. Study of toxicological properties of the fruit oil of *Pistacia lentiscus* in vivo; III. Study of pharmacological properties of the fruit oil of *Pistacia lentiscus*, this part was conducted in three stages: III.1- Evaluation of healing activity of oil on burnt skin in vivo III.2- Evaluation of healing activity of oil on burnt skin with histopathological technical III.3- Evaluation of antibacterial and the antifungal activities of the fruit oil of *Pistacia lentiscus*. The physicochemical parameters obtained for *P. lentiscus* oil are similar to those reported for similar oils [Density: 0,91; Viscosity: 125.02; pH: between 7.13 and 7.60; refractive index: 1.4710]. The test TLC (Thin layer chromatography) reveals a difference between the qualitative compositions of the three oils tested (extracted oil, the oil obtained by pressing, and the commercial oil). The results of the Draize skin test showed that this oil is mildly irritating, and those obtained by the pharmacological tests and histopathological analysis revealed that the oil is endowed with an inductive effect of skin cicatrization in the burned rat. At the end of this study, we tested the antimicrobial activity of the oil obtained by pressing and that extracted by soxhlet on *A. brasicaeus*, *C. albicans*, *E. coli*, *B. cereus* and *P. mirabilis*. The antibacterial activity was more pronounced with the oil extracted by solvent. However, the antifungal activity against *Aspergillus* was observed only with the oil obtained by pressing.

This results show that fruit oil of *Pistacia lentiscus* has an inductive effect of skin cicatrization in the burned rat, and reveal that oil has antibacterial and antifungal activities.

**PP-165**

***IN VITRO* ANTI-DIABETIC AND ANTI-OBESITY ACTIVITIES OF  
*ORIGANUM GLANDULOSUM* FROM FLORA OF ALGERIA**

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Oxidative stress as well as inflammation processes is engaged in diabetic vascular complications. *Origanum glandulosum* an endemic species of Algeria and Tunisia is widely used to cure effectively various infectious diseases and has been long claimed to have hypoglycemic-hypolipidemic dual effects in folkloric medicine. The current manuscript summarizes a significant amount of work that was undertaken to identify Algerian oregano with potential  $\alpha$ -amylase and pancreatic lipase inhibitory activities. In addition, we have compared the inhibitory activities of purified constituent (Rosmarinic acid) found in *O. glandulosum* to the parent plant. Our results show that both oregano extract and pure compound react with porcine pancreatic amylase and lipase. The ethyl acetate extract of *O. glandulosum* exhibited significant  $\alpha$ -amylase and lipase inhibitory activity respectively with IC<sub>50</sub> values of  $17.22 \pm 0.05$   $\mu\text{g/mL}$  and  $21.10 \pm 0.4$   $\mu\text{g/mL}$ . Rosmarinic acid isolated from *O. glandulosum* showed also that it was able to inhibit the  $\alpha$ -amylase and lipase activities in a dose dependent manner, but not higher than the ethyl acetate extract suggesting that others phenolics compounds or phenolic synergies may contribute to additional inhibitory activity. The observed inhibitions of  $\alpha$ -amylase and lipase suggest that the extract of *O. glandulosum* may be useful in the management of diabetes mellitus, which may due to the presence of active phytochemicals.

**PP-166**

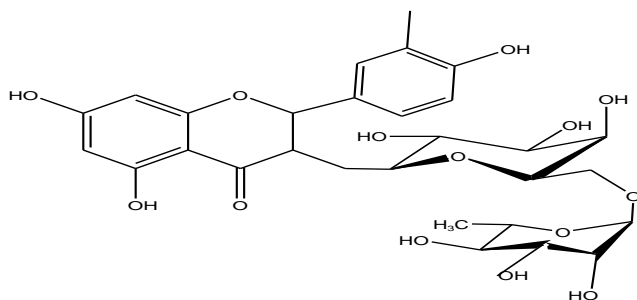
**THE FIRST COMPOUNDS ISOLATED FROM THE EXTRACT OF ETHYL ACETATE OF *ERYNGIUM CAMPESTRE***

Mc. Aberkane; S. Sifouane ; A. Dibi; F.Bitam

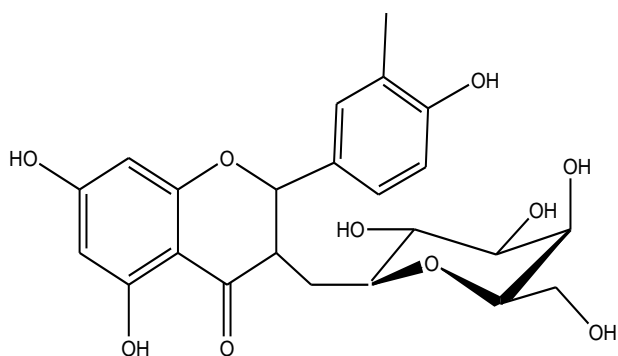
Laboratoire de chimie et chimie de l'environnement. Département de chimie. Faculté des Sciences. Université Hadj Lakhdar, Batna 05000 Algérie

The use of plants in traditional medicine is very old and experiencing a renewed interest to the public. According to the World Health Organization (WHO), nearly 6377 species of plants are used in Africa, where over 400 medicinal plants, which constitute 90% of traditional medicine. In 2004, nearly 75% of Africa's population uses plants that surround it to heal, because it has no access to medicines called modern (Pousset, 1989). Knowing that a plant may contain thousands of different substances, one can realize the natural wealth of the plant kingdom. In the socio-economic context of developing countries, the study of plants may lead to the achievement of adequate therapeutic responses and low prices, joining a proven scientific efficacy and optimal cultural acceptability. In this context, we chose to study a species that belongs to a genus of great importance in traditional medicine. The genus *ERYNGIUM* belongs to the *Apiaceae* family. This work reports a study of the species *Eryngium Campestre*. Our investigation focused on the ethyl acetate extract of the aerial parts of plant. The phytochemical investigation have yielded interesting results. Four secondary metabolites have been characterized and are phenolic, flavonoic and steroidal compounds. These products were characterized by spectroscopic methods of analysis 1D NMR of proton and carbon, 2D NMR (COZY H-H, J-modulated HSQC, HMBC), IR and ESI mass spectrometry.

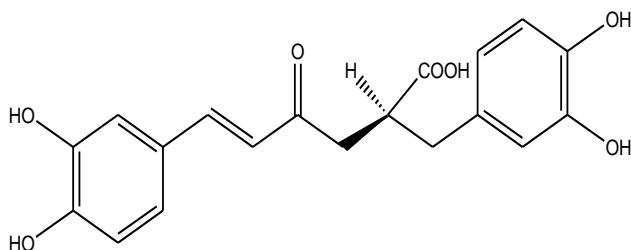
- I Isorhamnetine 3- O-rutinoside (Narcissine)
- II 3-O-  $\beta$ - D- glucopyranosyl Kaempferol;
- III Acide rosmarinique and  $\beta$  sytosterol.



- I Isorhamnetine 3- O-rutinoside (Narcissine)



II 3-O-  $\beta$ - D- glucopyranosyl Kaempferol;



III Acide rosmarinique.

**PP-167**

**METHODOLOGICAL STUDY OF HERBALISTS IN THE TREATMENT OF VIRAL HEPATITIS :HEPATITIS B CASES SUBJECTS TO A PHYTOMEDECINE BASED TREATMENT**

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Currently you can put the success of biotechnology for our scientific research on the plant world in the category of herbal medicine. This small working set of herbal medicine and its evolution medicinal plants, plant pathology, specifically the viral origin, the defense system of the plant and because it is a combination of our plant and Ecballium elaterium virus (HBV) disease the hepatitis B virus in humans that it was a descriptive study of these two cases.

We chose this plant after an ethnobotanical survey was made at the Ibn Sina hospital services gastrology latter is the most used in the treatment of hepatitis by external use by practitioners who treat this plant believe that it decreases the rate of TGO TGP, and confirmed this information it was the experimental study of the effect of plants on the regulation of transaminases. In conclusion, to study the impact of HBV on the plant it was an Ecballium elaterium planting in containers to make the introduction of the virus within the plant for the purpose of testing the ability of the plant synthesized new secondary metabolites used in the fight against this disease from a stimulation of the immune system.



**PP-168**

**CONTRIBUTION TO STUDY EFFECTS OF EXTRACTS FROM  
*PARONYCHIA ARGENTEA* ON THE DISSOLUTION "IN-VITRO" THE  
KIDNEY STONE AND URINARY**

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Using *Paronychia argentea* in infusion, has revealed its effects on the dissolution of kidney and urinary stones. Two types of calculations have been the subject of our study:

The yellow bladder origin, the other brown renal origin. Temporal physicochemical analyzes infusions have we found an increase in the calcium content of teas much more pronounced in brown calculation in Yellow calculation, while the latter is characterized by a much higher magnesium ions in the solution. In both cases, we record dissolution, much more marked in yellow calculation. Bacteriological examination done on herbal clearly denotes the absence of *Klebseilla ozenae* but abundant presence of bacteria in the form of sticks, where the tea is antiseptic.

**PP-169**

***TETRACLINIS ARTICULATA* (VAHL) MASTERS ESSENTIAL OILS:  
CHEMICAL COMPOSITION AND BIOLOGICAL ACTIVITIES**

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Two samples of essential oils from the leaves and cones of wild *Tetraclinis articulata* (Vahl.) Masters from two different sites in Algeria were isolated by hydrodistillation and investigated by GC and GC/MS. A total of forty compounds were identified representing 98.6 - 99.8 % of the oils. The main components of the volatile oils were  $\alpha$ -pinene (19.8 – 24.9 %) and bornyl acetate (40.2 – 59.2 %) for the leaves,  $\alpha$ -pinene (57.5 – 75 %), limonene (10.6 – 20.9%) and  $\beta$ -myrcene (3.6 – 10.6 %) for the cones. The antioxidant efficiency was tested using the DPPH radical-scavenging method. In comparison with BHT and BHA, which were used as positive controls, all samples showed weak activity. The antimicrobial activities of the essential oils were assayed by using the disc diffusion method and agar dilution technique on *Escherichia coli* ATCC 25922, *Pseudomonas aeruginosa* ATCC 27853 and *Staphylococcus aureus* ATCC 25923. All tested microorganisms were inhibited by essential oil samples and the MIC values ranged between 0.2 and 1.0  $\mu\text{g/mL}$ .

**PP-170**

**EFFECT OF TOTAL CALYSTEGINES EXTRACTED FROM *HYOSCYAMUS ALBUS* ON CARRAGEENAN-INDUCED MICE PAW OEDEMA**

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*Hyoscyamus albus* (Solanaceae) is a medicinal plant largely used in the traditional medicine of the Mediterranean countries essentially as antipyretic, analgesic, antispasmodic and anti-inflammatory remedy.

In this study, total calystegines (Nortropane polyhydroxylated alkaloids) were extracted from leaves, flowers and seeds of *Hyoscyamus albus* growing in Bejaia (Algeria) using an ion exchange chromatography.

The three remaining extracts were then investigated for their potent anti-inflammatory activity using the carrageenan-induced mice paw oedema test.

Quantitatively, Seeds of *Hyoscyamus albus* showed the highest yield of total calystegines with an average of 0.51±0.002% in comparison with leaves and flowers that yielded 0.33±0.05% and 0.28±0.0022% of total calystegines respectively.

The evaluation of the anti-inflammatory effect on paw oedema induced by a sub-plantar injection of a carrageenan saline solution indicated in general that total calystegines extracted from *Hyoscyamus albus* produced significant dose–response anti-inflammatory activity inhibiting the paw oedema response compared with the control group at all-time points in the test.

Seeds total calystegines have the strongest anti-inflammatory activity which inhibits 53.65% and 65.30% of the paw oedema at a dose of 100mg/kg and 200mg/kg respectively after 2h of the carrageenan injection.

Flower total calystegines possess also a high anti-inflammatory potential, the extract reduced 44.75% and 64.84% of paw oedema at 100mg/kg and 200mg/kg respectively. Leaves *Hyoscyamus albus* extract was the least active in comparison with the two other extracts, the results showed 45.69% and 46.12% of paw oedema inhibition at the same doses for the 2<sup>nd</sup> hour of treatment.

On the other hand, the anti-inflammatory effect of *Hyoscyamus albus* total calystegines appear to be comparable to the standard Piroxicam at a dose of 20mg/kg but seems to act at different levels of the inflammatory process (63.98% at the 3<sup>rd</sup> hour). The findings in this study suggest that *Hyoscyamus albus* is a rich source of Calystegines that rise great interest in therapeutics, and possesses significant anti-inflammatory activity. These results may support the fact that this plant is used traditionally to cure inflammatory diseases.

**PP-171**

**ANTIBACTERIAL ACTIVITY FLAVONOID SEED OF *LEPIDIUM SATIVUM***

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Plants contain a wide variety of chemical molecules from the secondary metabolism such as terpenes, alkaloids or polyphenols. Among them, flavonoids are distinguished by very diverse properties. They may have biological activities with therapeutic interest namely: antioxidant, antitumor, antibacterial, antiviral and antifungal. Our study was carried out from the seeds of cress of *Lepidium sativum*. This plant is usually used in traditional medicine Algerian. For the realization of this work, we performed extractions flavonoids without hydrolysis and after acid hydrolysis from the seeds cress *Lepidium sativum*. Extracts aglycones and O-glycosides are obtained after separation of ethyl ether and ethyl acetate. The antibacterial activity was determined by the dilution method and the measurement of MIC.

Results obtained showed that both flavonoid classes have antibacterial activity. However, the extract rich in O-glycosides is very active against the tests used bacteria, especially Gram-positive. This study shows that the glycosylation of genins has an important impact on the antibacterial properties of the flavonoids.

**PP-172**

**ANTIOXIDANT AND ANTIMICROBIAL ACTIVITY OF ESSENTIAL OIL OF *AMMODAUCUS LEUCOTRICHUS* SEEDS**

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*Ammodaucus leucotrichus* plays an important role in traditional medicine in North African countries, especially in the southern Algerian Sahara [1]. The seeds of this plant are used to treat diseases related to the digestive apparatus and to ease stomach and liver pain. The leaves are also used for chest complaints [2]. In the Tassili region of Algeria, it is mainly used as powder or as an infusion to treat the symptoms mentioned above. It is also used in the area to recover the appetite or avoid indigestion, by crushing the seeds and mixing them with milk or millet. The leaves are used to aromatize tea. Powdered, it is much appreciated spice food in the Djanet area [3].

A number of studies on various plants reported that some plant extracts and essential oils have antioxidant activity and benefits to the human health in playing an important role in neutralizing free radicals, which can cause several disorders of immune system and gene expression [4, 5, 6, and 7]. For this reason they can be used to protect organisms and cells from damage induced by oxidative stress, the latter being considered a cause of ageing, degenerative diseases and cancer [8]. Essential oils usually show antimicrobial activity against a wide range of microorganisms including antibiotic resistant bacteria and fungi. They can affect both gram-positive and gram-negative bacteria in addition to yeasts and filamentous fungi [9].

The aim of this work is to investigate the antioxidant and antibacterial activities of the essential oil isolated by hydrodistillation. The antioxidant activity was evaluated by 2, 2'-diphenyl-1-picrylhydrazyl radical (DPPH) scavenging method, compared to the synthetic antioxidants (ascorbic acid and BHT). The essential oil showed excellent scavenging activity with an IC<sub>50</sub> value of 29.74mg/ml.

The antimicrobial potentials were determined by the disc diffusion method, the essential oil showed significant antibacterial activity against Gram negative (*Bacillus subtilis*) and Gram positive (*Escherichia coli*) bacteria at doses of 1.29 mg/disc of essential oils. The antifungal results for the essential oil revealed good, clear zones of growth inhibition against *Aspergillus flavus* and *Penicillium escpansum*. On the basis of the results of this work, *A. leucotrichus* seeds can be used as easily accessible source of natural antioxidants and as a possible food supplement or in pharmaceutical applications.

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**PP-173**

**EVALUATION THE ANTIOXIDANT ACTIVITY OF PHENOLIC EXTRACTS THE MEDICINAL PLANT JUNIPERIS OXYDRUSIS IN ALGERIA**

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The antioxidant compounds are the subject of many works because, in addition to their use as conservatives in the foodstuffs by replacing synthesis antioxidants, they intervene in the treatment of many diseases.

Within the framework of discovered new antioxidants from the natural sources, we have investigated in this work, the study of phenolic compounds and the evaluation of the antioxidant properties of the plant *Juniperis oxydrusis*.

The first part of this study concerns the extraction and the quantification of total phenolics and flavonoids by the Folin-Ciocalteu reagent and the aluminium trichloride respectively. The results of this quantification showed the richness of the plant to total phenols and total flavonoids.

The second part is the study of the antioxidant activity of the plants extracts using and techniques: ABTS, DPPH, reducing power, Chelating and phosphomolybdenum tests. The results of the antioxidant activity went up that it has a good antioxidant activity in comparison with antioxidant of reference.

In conclusion, the antioxidant activity by this test went up that it has a good antioxidant activity in comparison with antioxidant of reference. Furthermore, antioxidant activities for the plant using IC<sub>50</sub>, VCEAC and TEAC respectively tests were also evaluated. These findings suggest that *Juniperis oxydrusis* may be considered as an interesting source of antioxidants for therapeutic and for food manufactures.

**PP-174**

**ANTIMICROBIAL ACTIVITY OF ESSENTIAL OILS IN THE LEAVES OF BOTH SPECIES, *EUCALYPTUS* AND *ROSMARINUS*.**

Mokrani Djelloul Karima

This work aims to contribute the highlight of the antimicrobial activity of essential oils in the leaves of both species, *Eucalyptus* and *Rosmarinus*. An extraction by hydrodistillation was carried; the extraction yields obtained are relatively low (0.132% for *Eucalyptus* and 0.004% for *Rosmarinus*).

The extracts of the two plants were used for the detection of antibacterial activity on pathogenic bacterial strains (*S. aureus*, *P. aeruginosa* and *E. coli*) using the method of aromatogram. The results showed antibacterial activity on all strains tested, *E. coli* *P. aeruginosa* were found to be the most sensitive, while *S. aureus* were the most resistant. The minimum inhibitory concentrations (MIC) were determined by the method of dilution in a solid medium. The test results are almost negative.



**PP-175**

**THE CHIMICALS COMPOSITIONS AND ANTIOXIDANT ACTIVITY OF ESSENTIEL OIL OF *RUTA MONTANA*, OBTAINED FROM DJURDJURA, ALGERIA.**

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*Ruta montana L.* is a spontaneous plant, largely spread in North Algeria, especially Djurdjura, called by locals “awermi” or “Fidjel”. It is an aromatic plant belonging to the family of Rutaceae, commonly it is a medicinal plant still used in traditional medicine in many countries as a abortif, anti-epileptic, inflammatory, analgesic, anti-spasmodic, emmenagogue and for the spiritual traitements (rokoa). The phytochemical screening of the plant from the région of haizer, in the wilaya of *Bouira* revealed the présence of coumarins, flavonoids, alkaloids, tannins and sterols and triterpenes. The extraction of essential oil of the whole plant have revealed significant returns. These extract (essentielle oil) have shown a medium powers to reduce Iron and free radical scavenging (DPPH), which means the IC50 is between 2 and 11 mg / ml. The essential oil of the station has a good antibacterial activity against several species including *Bacillus sp*, *Staphylococcus sp* and *Pseudomonas sp*, *Escherichia s*.

**PP-176**

**PHYTOTHERAPY IN TREATMENT OF RENAL CALCULI (KIDNEY STONE)**

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One of the major diseases that affect human population since ancient ages are the kidney stones (renal calculi) which are a solid concretion formed in the kidneys from minerals in the urine. Kidney stones typically leave the body by passage in the urine stream, and many stones are formed and passed without causing symptoms. If stones grow to sufficient size they can cause blockage of the ureter. This leads to pain often known as renal colic .

Many drugs and invasive methods have been developed for the treatment, but many patients are convinced that phytotherapy is potent in preventing and curing renal calculi with fewer side effects and produced satisfactory results in preventing reoccurrence of renal stones. An ethnobotanical survey was carried out in the eastern area of Algeria, in order to inventory the medicinal plants commonly used by Algerian patients for the treatment of Renal calculi. The inventory contains scientific, vernacular, common names and Family of the plants used, the useful parts and method of preparation.

These herbal remedies cause dissolution or breakage of the renal calculi with subsequent expulsion from the body. The phenomenon of dissolution or destruction may be caused by the phytochemicals present in the plants.

**PP-177**

**TERMITICIDAL EFFECT OF AQUEOUS EXTRACTS OF SOME MEDICINAL PLANTS FROM THE SOUTH WEST OF ALGERIA AGAINST *ANACONTHOTHERMES OCHRACEUS*.**

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The flora of the Algerian Sahara has a lot of medicinal and poisonous plants, especially in the Southwest areas, much of the population use herbal medicine to solve their oral health problems or general health. In this study, the anti-termitic activities of aqueous extracts of five medicinal plants from Bechar in the South west of Algeria against *Anacanthothermes ochraceus* were investigated using direct contact application and preservative treatment . The phytochemical screening is tested by Laboratory of Phytochemistry and Organic Synthesis based on test of coloration and precipitation was undertaken by aqueous extracts of the leaves and aerial part of *Acacia raddiana*, *Anabasis aretoïdes*, *Limoniastrum feei*, *Launea arborescens* et *Launea nudicaulis*, the phytochemical screening showed the presence of saponins, flavonoids, steroids, sterols and unsaturated terpenes, tannins and cardiolides in all parts of the plants used , however there is a weak presence of alkaloids in this plants. This study shows that the parts of aqueous extracts of this plants tested showed that the termiticidal effect of this plants was due to its toxicity and its repellent action against termites treated individuals, this activity can be allocated to the bioactive substances of different plant parts.

PP-178

**BIOLOGICAL ACTIVITIES OF SOME VEGETABLE TARS, MADE IN SOUTH WEST OF ALGERIA**

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Biological activities of medicinal plants have been recognized for a long time. In the present study, antioxidant and antimicrobial properties of some vegetables Tars, were investigated for their antimicrobial activities against six strains of Fungi and six strains of bacteria. Its sensitiveness (Minimal Inhibition Concentration), mentioned micro-organisms respectively to tars T1, T2, T3 in the following: *Klebsiella pneumoniae* (0.032,0.084,0.090 mg/ml), *Staphylococcus aureus* (0.05,0.12,0.18 mg/ml), for *Pseudomonas aeruginosa*, *Enterococcus faecalis*, *Escherichia coli*, *Listeria monocytogenes* (0.090 to 0.182 mg/ml). For fungi, and according to these results, the tar has great antifungal activity against all the investigated strains. The growth inhibition rate ranged from 0.006 to 0.1mg/ml with the highest inhibition values observed against *Fusarium oxysporum f.s albedinis*(1) (0.006 mg/ml). The antioxidant capacity of the tars was evaluated using hydrogen peroxide scavenging, 1,1-diphenyl-2-picrylhydrazyl (DPPH), showed potent antioxidant ability respectively to tars T1, T2, T3 (EC50= 1.45±0.16 ; 1.70±0.16 ; 2.10±0.12 mg ml<sup>-1</sup>) compared to the ascorbic acid used as positive control ( EC50=2.19±0.12 mg ml<sup>-1</sup>).

**PP-179**

***HPLC-DAD-ESI-MS ANALYSIS OF FLAVONOIDS AND ANTIOXIDANT ACTIVITY OF AN ALGERIAN MEDICINAL PLANT PARONYCHIA ARGENTEA LAM***

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*Paronychia argentea* Lam. belonging to the Caryophyllaceae family is a perennial plant widely distributed in Algeria. The medicinal uses of this plant are indicated in Algerian popular medicine<sup>1</sup>; nevertheless its phytochemical exploration remains incomplete. In this study, flavonoids profile, *in vitro* antioxidant activity, total polyphenolic and tannin contents of the ethanolic, decocted and infused extracts of *P. argentea* aerial parts are reported. Flavonoids have been determined by high-performance liquid chromatography coupled with diode array detection and electrospray ionization mass spectrometry (HPLC–DAD-ESI-MS<sup>n</sup>). 11 compounds were characterized, 6 of them, including isorhamnetin-3-*O*-dihexoside, quercetin-3-*O*-glucoside, quercetinmethylether-*O*-hexoside, quercetin, jaceosidin and isorhamnetin, were described in this plant for the first time. The ethanol extract showed the highest flavonoids content followed by the decoction and infusion (25.4 ± 0.8 mg/g of DM; 8.4 ± 0.5 mg/g of DM, 0.2mg/g of DM, respectively and the best antioxidant activity was shown by the decoction (RC<sub>0.5</sub>=178µg/ml; IC<sub>50</sub> 27.38µg/ml and 72.38%, for reducing power, scavenging capacity on DPPH radical and inhibition of lipid peroxidation, respectively).

In conclusion: decocted extract of *P. argentea* could be considered as a valuable source of pharmacologically important natural products that might contribute to the reevaluation of its phytotherapeutical potential.

<sup>1</sup>F.U. Afifi, B. Al-Khalidi, E. Khalil, Studies on the *in vivo* hypoglycemic activities of two medicinal plants used in the treatment of diabetes in Jordanian traditional medicine following intranasal administration, *J. Ethnopharmacol.* 100 (2005) 314–318.

**PP-180**

***CHEMICAL COMPOSITION AND ANTIBACTERIAL ACTIVITY OF ESSENTIAL OILS OF LEAVES OF EUCALYPTUS GLOBULUS PLANT AGAINST ORAL PATHOGENS***

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Dental caries and periodontal diseases are multifactorial human diseases that affect a large proportion of the population worldwide. *Eucalyptus* species leaves, roots, bark and fruits have been used as traditional remedies for treatment of various diseases such as pulmonary tuberculosis, influenza, diabetes, toothaches, snakebites, diarrhea and other illnesses<sup>1</sup>. The aim of the present study was to investigate the chemical composition of essential oils of leaves of *Eucalyptus globulus* plant by gas chromatography/mass spectrometry (GC/MS), and to evaluate their antibacterial activity by determining the minimum inhibitory concentration (MIC, µg/ml) against the major cariogenic (Gram positive: *Streptococcus mutans*, *Streptococcus sobrinus*) and periodontopathogenic (Gram negative: *Fusobacterium nucleatum*, *Aggregatibacter actinomycetemcomitans*, *Porphyromonas gingivalis*) bacterial species. The GC/MS analysis allowed the identification of 30 volatile compounds. Monoterpenes and oxygenated monoterpenes represented a high percentage (85.77%) of the volatile compounds, and 1,8-cineol was the major compound (64.92%). Results of antibacterial assays revealed that Gram negative periodontopathogenic bacteria are more sensitive than the Gram positive cariogenic bacteria. The lowest MIC to *E. globulus* essential oils was obtained for *P. gingivalis* ATCC 33277 with a value of 283.1 µg/ml. In conclusion, essential oils from *E. globulus* have a potential for the treatment of oral disease, more specifically periodontal diseases.

<sup>1</sup>Hasegawa, T., Takano, F., Takata, T., Niiyama, M., Ohta, T., 2008. Bioactive monoterpene glycosides conjugated with gallic acid from the leaves of *Eucalyptus globulus*. *Phytochem.*, 69, 747-753.

**PP-181**

**POLYPHENOLS OF OLEASTER LEAF INDUCE APOPTOSIS IN COLON-CANCER CELLS VIA THE MITOCHONDRIAL APOPTOTIC PATHWAY**

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The *Olea europea* L. (olive) leaves have been traditionally used in the treatment of infection, inflammation, prevention of chronic diseases, cardiovascular disorders and cancer. Colorectal cancer is the third most common form of cancer and the second leading cause of cancer deaths in both men and women around the world. In our Work, *in vitro* and *vivo* studies, involving effects and mechanisms of polyphenols-induced apoptosis are discussed.

The Human Colon Cancer Cells (HCT-116, HCT-8) and mouse colon carcinoma cell line (CT-26) were treated with the Phenolic Extracts of the Oleaster "wild olive" Leaf (PEOL) at the concentration of 0, 5, 10, 20, 30, 50 µg/ml for 24h. We have remarked that PEOL has significantly decreased the viability of the cells *in vitro*; Moreover, tumor treatment with PEOL has significantly reduced tumor volume in the mice strain.

Western blot analysis of total cell lysates (HCT-116, HCT-8) revealed that PEOL induced the cleavage of caspase-9 and poly (ADPribose) polymerase (PARP), which are critical markers of apoptosis. Precisely, Caspase-9 is a marker for the intrinsic or mitochondrial pathway for apoptosis. Then, the use of TMRM (tetramethylrhodamine methyl ester) as a probe has shown the decrease in mitochondrial membrane potential.

These results demonstrate that polyphenols, precisely oleuropein and hydroxytyrosol, composing the extract of the oleaster leaf have a strong potential for development as an anti-colon cancer agent. Further, other studies are necessary to check if there is a special oleaster leaf polyphenol that it is the real chemotherapeutic agent or the apoptosis is a result of an interaction between different polyphenols.

**PP-182**

**ANTIOXIDANT PROPERTIES AND PHENOLIC VARIATION IN WILD POPULATIONS OF *MARRUBIUM VULGARE* L. (LAMIACEAE)**

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The phenolic profile of six wild growing *Marrubium vulgare* L. of the family Lamiaceae collected from different bioclimatic zones was investigated. Ethanol, ethyl acetate and residual water fractions were investigated for their antioxidant activity using DPPH assay. Ethyle acetate fraction showed the highest antioxidant capacity with IC<sub>50</sub> values ranging from 68.98 to 118.15 µg/mL.

Eight phenolic acids and five flavonoids were detected in the ethyle acetate fraction and quantified by high performance liquid chromatography (HPLC) coupled to a diode array detector (DAD), among them the concentration of quercetin-3-D-glactoside (5.84-14.46 mg/gDW) was the highest. Phenolic patterns were uniform in all populations. However, a significant quantitative variation for the major component quercetin-3-D-glactoside was noted. On the basis of chemical composition and cluster analysis, *Marrubium vulagre* was classified into two groups. Population grouping was not concordant with bioclimatic appurtenance.

In conclusion, these results indicate that *M. vulgare* can be used in dietary applications with a potential to reduce oxidative stress. The pronounced chemical diversity between populations is discussed to possibly be the result of the variation of soil properties and microclimate conditions.



**PP-183**

**EFFECT OF POPULUS NIGRA FLOWER BUDS EXTRACT ON ALUMINIUM-INDUCED LEARNING AND MEMORY IMPAIRMENT AND ON OXONATE-INDUCED HYPERURICEMIA IN MICE**

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In the present study, was investigated by describing the associated behavioral and brain modifications the effects of *Populus nigra* flower buds extract against Aluminium-induced neurotoxicity in mice. The hypouricemic action of the same extract was evaluated on xanthine oxidoreductase activity *in vitro* and for liver of normal and hyperuricemic mice. The actions of *P. nigra* extract on serum uric acid levels of normal and hyperuricemic mice were also measured.

Co-administration of *P. nigra* extract (200 mg/Kg) and AlCl<sub>3</sub> (100 mg/kg/day) combined with D-galactose (200 mg/kg/day) during four weeks succeeded to antagonize the harmful effects of AlCl<sub>3</sub> by restoring all tested parameters. Moreover, extract restored the pyramidal cells to nearly normal in cerebral cortex of mice.

Bioassay guided fractionation of ethanol extract on xanthine oxidase activity yielded 4 fractions, the most active being that eluted by chloroform/ ethyl acetate that exhibited the highest potency (28.62 ± 6.0%). Extract, when administered three times orally to the normal and oxonate-induced hyperuricemic mice, was able to elicit significantly hypouricemic effect comparable to that of allopurinol.

In this context, *P. nigra* flower buds extract can be considered as food enabling to antagonize AlCl<sub>3</sub> toxicity and to control of uric acid levels.

**PP-184**

**ANTI INFLAMMATORY AND HEALING ACTIVITY OF SEED EXTRACTS OF MORINGA OLEIFERA HARVESTED IN TAMANRASSET**

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The purpose of this study is to test the anti-inflammatory and healing power of polyphenolic extracts and saponosidiques of this plant. The results of the anti-inflammatory activity shows an average efficiency for saponosidiques and polyphenolic extracts with respective values of 28.16% and 23.61%. The results of the healing activity showed that the wounds treated with the extract of polyphenols and saponins mark improved wound healing compared with those treated with Madécassol®. Similarly, the wounds treated with the ointment prepared extract saponins exhibited well compared to the extract of polyphenols healing. In addition, the extracts of the plant *Moringa oleifera* have a significant healing power over Madecassol®.

PP-185

**ANTIFUNGAL ACTIVITY OF THE ESSENTIAL OILS OF WILD-GROWING *MENTHA PIPERITA* L AND *MENTHA SPICATA* L FROM THE MARIOVO REGION, REPUBLIC OF MACEDONIA**

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The antifungal activity of the essential oils isolated by hydro-distillation from the leaves of wild growing *Mentha piperita* and *Mentha spicata* (Lamiaceae) at the region of Mariovo, Republic of Macedonia was tested by disc diffusion method and the micro-dilution broth method (MIC) against six plant pathogenic fungi: *Alternaria alternata*, *Alternaria solani*, *Aspergillus flavus*, *Aspergillus niger*, *Fusarium solani* and *Rhizopus solani*. The results from the disc diffusion method followed by MIC indicated that *M. spicata* essential oil showed maximum antifungal activity with larger inhibition zone (20 – 29 mm) and smallest MIC values (65.8 – 120.3  $\mu\text{g mL}^{-1}$ ) against all the strains tested. *M. piperita* essential oil exhibited good antifungal activity with inhibition zone of 19 and 20 mm and MIC values of 120.3 and 115.4  $\mu\text{g mL}^{-1}$ , respectively against *Fusarium solani* and *Aspergillus flavus* and excellent antifungal activity with inhibition zone of 28 and 30 mm and MIC values of 65.4 and 50.6  $\mu\text{g mL}^{-1}$ , respectively against *Aspergillus niger* and *Rhizopus solani*.

Menthol, menthone, carvone, limonene and 1,8 - cineole, the major constituents of *M. piperita* and *M. spicata*, were also tested for their potential antifungal activity. Posaconazole a triazole antifungal drug was used as a positive reference drug for fungi. Menthol exhibited excellent antifungal activity against *Alternaria solani*, *Alternaria alternata*, *Aspergillus niger* and *Rhizopus solani* (inhibition zone 23 – 31 mm, MIC 36.4 – 76.8  $\mu\text{g mL}^{-1}$ ), which was close to the antifungal activity of standard drug for the strains *Alternaria alternata*, *Alternaria solani* and *Rhizopus solani*. Menthone and carvone showed good antifungal activity against *Aspergillus flavus*, *Aspergillus niger* and *Rhizopus solani* (inhibition zone 20 – 29 mm, MIC 58.3 – 114.5  $\mu\text{g mL}^{-1}$ ). Carvone exhibited better antifungal activity for *Fusarium solani* than menthone. Contrary to these findings limonene and 1,8-cineol exhibited lower antifungal activity for all tested strains (inhibition zone 10-15 mm, MIC 69.3 – 220.6  $\mu\text{g mL}^{-1}$ ). The obtained results for chemical composition of essential oils of *M. piperita* and *M. spicata* were in line with some data reported in literature [1].

[1] Abdullah I Hussain, Farooq Anwar, Poonam S Nigam, Muhammad Ashraf and Anwarul H Gilanif, Seasonal variation in content, chemical composition and antimicrobial and cytotoxic activities of essential oils from four *Mentha* species, J Sci Food Agric 2010, 90 1827-1836

**PP-186**

**FORMULATION AND EVALUATION OF NOVEL LIPSTICK FORMULA BY REPLACING SYNTHETIC COLORANTS WITH FLOWER EXTRACT OF *BUTEA MONOSPERMA***

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Lipsticks are in huge demand to improve the beauty of lips. About 85 % world woman population uses lipsticks daily. Marketed Lipstick formulations uses synthetic colorants like bromo acid, D&C Red No. 21, Calcium Lake such as D&C Red 7, D&C Red 34, D&C Orange No. 17. Pink lipsticks are made by mixing colorless titanium dioxide with other red shades. Most of the colorants used in marketed preparations, are under warning by WHO or being studied for side effects after chronic use. Considering a need of lipsticks in day-to-day life, an attempt was made to formulate and evaluate herbal lipstick by using safe pigments extracted from flower of *Butea monosperma*. We attempted to develop unconventional formula by avoiding use of castor oil because extracted colorant was immiscible with it. The current research supported the use of natural colorants from various sources to bypass side effects of synthetic colors.

In conclusion, current research was successful in making lipsticks safer. Expansion of this research to reduce cost, use of other natural sources of pigments may cause revolution in cosmetic field.

**PP-187**

**BRINE SHRIMP LETHALITY ASSAY OF THE ESSENTIAL OILS OF THREE SELECTED MEDICINAL PLANTS FROM ALGERIA**

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Medicinal plants constitute an important component of flora and are widely distributed in Algeria. The pharmacological evaluation of substances from plants is an established method for the identification of lead compounds which can lead to the development of novel and safe medicinal agents. In the present study, essential oils of three Algerian medicinal plants: *Myrtus communis*, *Salvia officinalis* and *Rosmarinus officinalis* were evaluated for their cytotoxicity using brine shrimp assay. The results showed that essential oil of *M. communis* exhibited potent brine shrimp lethality with  $LC_{50}=1.7 \mu\text{g/ml}$  followed by *S. officinalis* and *R. officinalis* with  $LC_{50}$  values of 2.84 and 3.14  $\mu\text{g/ml}$ , respectively. The observed lethality of these plants to brine shrimp indicated the presence of potent cytotoxic and probably antitumor components.

**PP-188**

**CONTRIBUTION TO THE STUDY OF ANTIBACTERIAL ACTIVITY OF ESSENTIAL OILS FROM THE SEEDS OF *NIGELLA SAVITA* L**

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Laboratory for Evolutionary and Functional Ecology

Essential oils of the most important secondary metabolic products of the plants can be obtained through the extraction or preparation of great economic importance of biological used in the preparation of some medicines and pharmaceutical products. Also have important antimicrobial activities and can replace with success antibiotics witch show their inefficiency against resistant microorganisms. In this study we have tested the antimicrobial activities of the essential oils of *nigella sativa* L.

Essential oil of *nigella sativa* exhibited an antimicrobial effect on *S. aureus*, *escherichia coli* and *P. aeruginosa*. The extraction of essential oils of *Nigella sativa* L by Soxlet showed good yield (26.17%).The antibacterial activity "in vitro" obtained using the agar diffusion method shows that the antibacterial activity of the essential oil differs for tested bacterial strain to another. We see the 3 strains are sensitive to the essential oil of *Nigella Savita* L. The essential oils of this plant are aromatic substances from a complex chemical composition, which confers very interesting antimicrobial properties to capitalize on the list of antibiotics and natural food additives

**PP-189**

**ANTIOXIDANT ACTIVITY AND TOTAT PHENOLIC CONTENT OF  
*PERIPLOCA LAEVIGATA* EXTRACTS**

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*Periploca laevigata* belongs to the family of Asclepiadaceae, known as “el hallaba” and widely used in traditional Moroccan medicine as analgesic and for the treatment of rheumatism. Methanol and dichloromethan extracts obtained from leaves of *Periploca laevigata* were evaluated for their antioxidant activity. Total phenolic content for the two extract was also determined using the Folin-Ciocalteau method. The extract antioxidant activity has been evaluated by two complementary tests: 2,2-diphényl-1-picrylhydrazyle (DPPH) and reducing power (FRAP). For DPPH, the IC<sub>50</sub> values were 0.97 ug/ml and 1.25 mg/ml, respectively for methanol and dichloromethane extracts. For reducing power assay, the IC<sub>50</sub> values for both extracts were 11.86 ug/ml and 0.70 mg/ml respectively. Thus, methanolic extract showed higher antioxidant activity than dichloromethan extract. Furthermore, the quantification of phenolic compounds in both extracts showed significant polyphenol content in the methanol extract (2.79 mg GAE/g Ms) than dichloromethan extract (0.14 mg GAE/g MS). A positive correlation was found between the antioxidant and polyphenol content. Therefore, the total phenolic content can serve as a useful indicator for the antioxidant activities.

**PP-190**

**ANTIOXIDANT AND ANTIMICROBIAL ACTIVITIES OF FLAVONOIDS  
EXTRACTED FROM *GALIUM TUNETANUM* POIRET.**

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For the first time, the evaluation of antioxidant and antimicrobial capacities of flavonoids of *Galium tunetanium* Poiret were studied for the development of therapeutic values, leading to the investigation of the properties of this plant, which is vestige of preexisting rainforests in the mountain of Megriss Setif Algeria. The antioxidant study has been carried out by different methods such as radical scavenging activity (DPPH), the  $\beta$ -carotene bleaching assay and the reducing power. However the antimicrobial activity was tested with six bacterial strain and three fungi including yeast (*Escherichia coli* ATCC 25922, *Salmonella typhimurium* ATCC 13311, *klebsela pneumoniae* ATCC700603, *Shigella flexneri* NCCB1406, *Proteus mirabilis* ATCC35659, *Staphylococcus aureus* ATCC25923, *Aspergillus niger* 2CA936, *Aspergillus flavus* NRRL3357 and *Candida albicans* ATCC1024). Our results exhibit a high antioxidant activity, which makes the flavonoids from this plant better than BHT. However, the antimicrobial results show a low antimicrobial activity of this plant against the strains tested.



**PP-191**

**AN *IN VITRO* INVESTIGATION OF THE EFFECT OF *Pistacia palestina* and *Laurus nobilis* ESSENTIAL OILS AGAINST FOODBORNE PATHOGENS**

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In the new approach of food preservation the use of natural compounds are preferred. Essential oils are a source of bioactive molecules and have been widely used both traditionally and commercially to increase the shelf-life and safety of foods<sup>1,2</sup>. The antimicrobial activity of essential oils of *Pistacia palestina* (Labiatae) and *Laurus nobilis* (Lauraceae) leaves were investigated *in vitro* by Disk Diffusion Assay and Microdilution Broth Test determination against ten strain of *Listeria monocytogenes* (2 type strains and 8 strain isolated from food matrix) and ten strain of *Salmonella enterica* (isolated from food matrix). The chemical composition of essential oils was investigated by gas chromatography-mass spectrometry (GC-MS). Twenty-six components were identified in *L. nobilis* essential oil (97.21% of the total oil), which consisted of 1,8-cineole (35.15%) as the main component and  $\alpha$ -Pinene, sabinene,  $\beta$ -pinene, limonene, and linalool as dominant constituents in the monoterpene fraction. The GC-MS analysis of *P. palestina* essential oil showed the presence of twenty-nine major components, representing 79.26% of the total oil. Sabinene (17.08%) and limonene (8.56%) were the main abundant compounds. In Disk Diffusion Assay both *P. palestina* and *L. nobilis* oils exhibited a weak activity with a maximum diameter of inhibition of 11 mm against *L. monocytogenes*. In Microdilution Broth Test *P. palestina* demonstrated an antimicrobial potential against *Salmonella enterica* strain (S1, S4, S.E.44/06, S.E.44/5/9-3) and *Staphylococcus aureus* (39333). As Gram negative bacteria are usually less sensitive and therefore more difficult to treat than Gram positive, the *P. palestina* essential oil deserves to be further investigated. Although the *in vitro* antimicrobial activity of essential oils has been moderately effective, the potential use of these oils in food preservation technologies should be found in optimal concentrations to ensure the safety of the food, appropriated organoleptic characteristics, and to be accepted by consumers. Studies aiming to elucidate the interaction between essential oils and components of food matrices or additives, stability of oils during food processing, and the standardization of antibacterial methods are still needed.

<sup>1</sup>Sasidharan S. Zuraini Z. Yoga Latha L. Sngetha S. Suryani S. Antimicrobial activities of *Psophocarpus tetragonolobus* (L.) DC extracts. Food Pathog Dis. 2008;5:303-309.

<sup>2</sup>Smith-Palmer A, Stewart J, Fyfe L. The potential application of plant essential oils as natural food preservatives in soft cheese. Food Microbiol. 2001;18:463-470.

**PP-192**

**PHYTOCHEMICAL SCREENING, CHEMICAL STUDY AND EVALUATION OF ANTIOXIDANT POTENTIAL OF (*FRAXINUS DIMORPHA* COSS. ET DUR. = *F. XANTHOXYLOIDES* WALL).**

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This study constitutes a contribution to valorisation of natural substances extracted from plants. We are interested to *Fraxinus dimorpha* Coss. and Hard. = *F. xanthoxyloides* wall (Oliaceae) which are commonly called derdar that is used in traditional Moroccan medicine and as condiments. Our theme of research articulates around two axes. The first one was the extraction and the phytochemical screening of the leaves of *Fraxinus dimorpha*. This analysis aims at having a general idea on the nature of the various chemical components that exist. The second one is dedicated to antioxidant activity of every extract.

In the present study, five dry extracts were prepared from the leaves of these species: methanolic, hexanic, dichlorometanic, ethyl acetate and also aqueous. Yields are respectively 34,91 %; 3,84 %; 0,54 %; 0,46 %; 5,75 % and 22,19 %. Quantitative estimation of total phenol and flavonoid content by a colorimetric assay showed that extracts are rich in these components. Assessment in vitro antioxidant activity using a reductive power of the iron (FRAP) indicated that the ethyl acetate and aqueous extracts presented a good antioxidant activity. The ethyl acetate extract showed the greatest capability in reducing power than the others extract. Finally, this activity is superior to ascorbic acid (positive control).

**PP-193**

**EFFICACY OF *EUCALYPTUS CAMALDENSIS* ESSENTIAL OIL ON IN VITRO RUMINAL FERMENTATION**

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The objective of the current study was to evaluate the potential effect of *Eucalyptus camaldensis* essential oil (EO) on rumen fermentation in sheep. Leaves and twigs were collected from the Eastern Region of Tunisia (Zaghouan) in spring 2011. The EO was extracted using hydro-distillation and its composition was determined by GC/MS. Increasing doses of EO (0, 5, 10, 20, 40, 80, 120 µL/0.5g of substrate) were added to a ration (50% forage and 50% concentrate on DM bases) and incubated in glass syringes simulating rumen conditions and then fermentation parameters were measured. Results showed that the main compounds for Eucalyptus EO are  $\alpha$ -pinene (16.69%), limonene (11.87%) and sabinene (7.95%). After 24h of fermentation, results indicated that, Eucalyptus EO GP didn't decrease significantly for 0, 5 and 10µl (averaged: 99.62 mL) and decreased significantly for 20µl (85.39 ml), 40µl (53.24), 80µl (31.63ml), 120µl (13.70ml) (P<0.0001). The same trend are observed in the SC-FA values wich were equivalent for 0, 5 and 10µl (averaged: 41.36 mg/ml) and decreased significantly for 20µl (35.35 mg/ml), 40µl (21.47 mg/ml), 80µl (12.30 mg/ml), 120µl (4.65 mg/ml) (P<0.0001). There was no significant difference on the organic matter degradation (OMD) for all tested doses (P<0.0001). The efficiency protein microbial yield was estimated by the partitioning factor (PF). This parameter didn't decrease significantly for 0, 5, 10 and 20µl (averaged: 3.12) and decreased significantly for 40µl (4.95), 80µl (8.56) and 120µl (10.95) (P<0.0001). It was concluded that Eucalyptus EO had modified ruminal in vitro fermentation parameters by a negative effect from the dose of 40µl.

**PP-194**

**ANTIOXIDANT POTENTIAL OF ETHANOL EXTRACTS OF *ORIGANUM MAJORANA* L. HERB OF DIFFERENT ORIGIN**

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*Origanum majorana* (marjoram), belonging to Lamiaceae family, has widely been used as culinary and medicinal herb. The aim of the present work was to evaluate antioxidant properties and total phenolic content of four marjoram ethanol extracts cultivated in Serbia, Greece, Libya and Egypt, and purchased from the local markets. For evaluation of antioxidant activity, ABTS (as mg of ascorbic acid equivalents/g of dry extract) and FRAP assays (as  $\mu\text{mol Fe(II)/g}$  dry extract) were used. Total phenolic content (TPC) was measured by Folin-Ciocalteu reagent and expressed as mg of gallic acid equivalents/g of dry extract. Samples were performed ABTS activity ranged as 1.30-2.26 mg ascorbic acid equivalents/g. FRAP capacity of samples was measured from 260.32 to 796.83  $\mu\text{mol Fe(II)/g}$ . Total phenolic content of the samples was quantified in range 58.62-139.98 mg GAE/g. All of the measured parameters were the highest for sample from Egypt and the lowest for sample from Libya. Strong linear correlation was established between ABTS assay and TPC ( $r=0.954$ ) as well as FRAP assay and TPC ( $r=0.890$ ). Based on these findings, marjoram herb, especially the one from Egypt, could be highly recommended as a plant possessing strong antioxidant potential which is correlated to high total phenolic content.

**PP-195**

**ANTIOXIDANT AND ANTIBACTERIAL ACTIVITY OF DIFFERENT EXTRACTS OF CRETAN SAGE**

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*Salvia pomifera* L. (Cretan Sage, Apple Sage) (Lamiaceae), has been traditionally used as spice, as well as for preparing tea and delicacy called "Sage Apples" in Crete. This study was designed to examine antioxidant and antibacterial activities of four successively obtained extract fractions (dichloromethane, chloroform, ethyl acetate and ethanol) of *S. pomifera* herb collected in Crete. Antioxidant activity was evaluated by free radical scavenging DPPH assay and results were expressed as IC<sub>50</sub> (µg/ml). Antibacterial activity was studied against *Bacillus subtilis* and *Listeria monocytogenes* using microdilution method and results were presented as MIC (mg/ml). Ethanol extract showed the strongest activity against DPPH radical (43.71 µg/ml), followed by ethyl acetate, dichloromethane and chloroform extracts, respectively. Conversely, dichloromethane extract was the most effective against tested bacteria (MIC values 0,078 mg/ml for *B. subtilis* and 0.3125 mg/ml for *L. monocytogenes*), followed by chloroform, ethyl acetate and ethanol extracts. Therefore, more polar fractions of this plant showed stronger free radical scavenging activity, while less polar fractions performed more effective antibacterial activity. The presented findings indicate that *S. pomifera* herb can be exploited as source of bioactive compounds for medicinal uses.

**PP-196**

**ESSENTIAL OILS OF *THYMUS VULGARIS*- ALGERIAN NORTHEASTERN VARIETY: BROAD SPECTRUM ANTIBACTERIAL ACTIVITY.**

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*Thymus vulgaris* plant of lamiaceae, *Thymus* (genera) includes several varieties, wide, highly aromatic, it is also the main source of thyme as an ingredient in cooking. Widely used in traditional medicine for its therapeutic properties.

Aromatherapy is the art of healing with essential oils, it is based on the classification of these oils, according to their ability to inhibit microorganisms. The use of essential oils as alternative in human and veterinary health faced to increased foodborne and pathogenic bacterial resistance against antibiotic.

The aim of the study was to test the antimicrobial activity of essential oils obtained by hydrodistillation from a variety of *Thymus vulgaris* leaves collected from Algerian northeastern arid areas, quantifying by the plate counting technique, their inhibitory effects against Gram positive: (*Bacillus anthracis*, *Staphylococcus aureus*) and Gram negative: (*Escherichia coli*, *Salmonella typhi*, *Klebsiella pneumoniae*, *Proteus mirabilis*, *Pseudomonas aeruginosa*) strains. Oils extracted by hydrodistillation have presented a yield of 01.66%, had a significant bacteriostatic activity against the microorganisms tested. This activity was more marked against the Gram- positive species.

**PP-197**

**CHEMICAL COMPOSITION, ANTIOXIDANT AND ANTIMICROBIAL ACTIVITIES OF ALGERIAN *ARTEMISIA HERBA ALBA* ASSO. ESSENTIAL OIL.**

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*Artemisia* genus is the most common genus in the *Asteraceae* family. Its species, located in our arid and semi arid zones, are very largely distributed toward the world (Europe, Asia, America and North Africa). The high amounts of essential oils in certain species of *Asteraceae* are responsible for their use as flavors in food and liquors. Furthermore, these metabolites give their medical importance to these plants, often used in folk medicine [1].

This work is devoted to the study of chemical composition and evaluation of antioxidant and antimicrobial activities of essential oil extracted from *Artemisia herba alba* Asso. collected in the area of Laghouat (South of Algeria).

The essential oil was obtained by hydrodistillation of the aerial part of the plant, after slight grinding. The chemical composition analysis was performed by GC and GC/MS. The essential oil yield was 1,46 % (m/m). The major chemical components characterizing our essential oil were: camphor (17,09 %), 1,8-cinéol (13,35%) and cis-davanone (12,21%).

Antioxidant activity was evaluated by two assays: DPPH method (1, 1-diphenyl-2-picrylhydrazyl free radical scavenging) [2] and phosphor-molybdenum method (antioxidant activity determined by molybdate VI reduction) [3]. Ascorbic acid was used as standard for both analyses. The EC<sub>50</sub> value of the essential oil in DPPH test was 11,45 ± 1,88 mg/ml. In the phospho-molybdenum test, results were expressed relative to the activity of ascorbic acid. The value obtained, for this assay, is 0,36 ± 0,01 mg/ml AAEC (Ascorbic acid Antioxidant Equivalent Capacity). This essential oil revealed different inhibitory activities, varying from strong to moderate ones, against the bacterial strains, except *Pseudomonas aeruginosa* which was resistant. A strong activity was showed against the mushroom *Fusarium oxysporum* f.sp. *albedinis*.

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**PP-198**

**ANTIBACTERIAL ACTIVITIES OF ESSENTIAL OILS AND EXTRACTS FROM FOUR ENDEMIC *SIDERITIS* SPECIES TO TURKEY**

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This research was carried out to cultivate four endemic *Sideritis* species (*S. hispida* P.H. DAVIS, *S. galatica* BORNEM, *S. germanicopolitana* BORNEM subsp. *germanicopolitana* BORNEM. and *S. dichotoma*) from natural area and investigate the antibacterial activities of plant extracts and essential oils, and chemical compositions of essential oils from these species both in the natural and culture area during 2009-2011 years. Essential oils extracted by hydrodistillation from natural and culture of herbage were analyzed by GC-MS. The essential oils and plant extracts with water and ethanol were evaluated for their antibacterial activity against ten bacteria (*Escherichia coli*, *Pseudomonas aeruginosa*, *Salmonella typhimurium*, *Serratia marcescens*, *Proteus vulgaris*, *Enterobacter cloacae*, *Klebsiella pneumoniae*, *Streptococcus pyogenes*, *Staphylococcus aureus* and *Staphylococcus epidermidis*) by the disc diffusion assay.

The essential oil contents varied from 0.02 (*S. dichotoma*) to 1.50 % (*S. hispida*) in natural area and from 0.01 (*S. germanicopolitana* subsp. *germanicopolitana*) to 0.16 % (*S. galatica*) in culture area.  $\alpha$ -pinene,  $\beta$ -pinene, *p*-cymene, camphor,  $\beta$ -caryophyllene, caryophyllene oxide,  $\alpha$ -bergamotene and naphthalene were determined as the main components of essential oils investigated. Our findings showed that the studied essential oils and plant extracts exhibited weak activity against the bacteria tested, and the antibacterial activities of the essential oils and extracts with ethanol were higher than extracts with water.



**PP-199**

**ANTIOXIDANT AND ANTIMICROBIAL ACTIVITY OF METHANOLIC EXTRACTS OF LEAVES AND STEMS OF *ATRIPLEX CANESCENS* FROM ALGERIA**

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Plants are an essential and integral part of complementary and alternative medicine due to their ability to generate secondary metabolites that are used to restore health and treat many diseases. The aim of the present study was to determine the antioxidant and antimicrobial activities of methanolic extract of stems and leaves of *Atriplex canescens* from Algeria. The amounts of total phenolics for the two parts of plant were determined spectrometrically. From the analyses, leaves extract had the highest total phenolic content ( $8.67 \pm 1.71$  mg GAE/g). However the methanolic leaves extract had the highest DPPH scavenging ability with the lowest IC<sub>50</sub> value ( $4.56 \pm 0.08$  mg/ml), the same tendency was observed with ferric reducing power. Concerning  $\beta$ -carotene bleaching assays results showed that the stems methanolic extract exhibited the highest antioxidant ability (IC<sub>50</sub> =  $11.13 \pm 0.8$  mg/ml). The antimicrobial activity was studied. All extracts were tested, five bacteria species including Gram-positive bacteria (*Staphylococcus aureus* and *Bacillus cereus*), Gram-negative bacteria (*Escherichia coli*, *Pseudomonas aeruginosa*, and *Klebsiella pneumoniae*) and one yeast species (*Candida albicans*) using agar disc-diffusion method.

**PP-200**

**CYTOTOXIC EFFECT OF *RUTA CHALEPENSIS*'S EXTRACT**

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*Ruta chalepensis* L. (Rutaceae) commonly known as rue, is used in the traditional medicine of many countries for the treatment of a variety of diseases (Stuart, 1979). In Algerian folk medicine, this plant is used as vermifuge, anti-venomous, anti-vomiting, malaria and neurosis (Merad., 1973), rheumatism, digestive, anti-parasitic (Baba aissa., 1999).

*Ruta Chalepensis* has pleiotropic pharmacological properties attributed to the high content of bioactive molecules. Phytochemical screening of *Ruta* species has characterized the presence of alkaloids, flavonoids, coumarins, tannins, volatile oil, glycosides, sterols and triterpenes as possible active constituents (Chen et al., 2001; Gray and Waterman, 1978; Grundon and Okely, 1979; Kostova et al., 1999; Mansour et al., 1990; Ulubelen et al., 1986). In fact, flavonoids, glycosides and tannins are considered potent inhibitors of pro-inflammatory signaling molecules.

The aim of the current work was to evaluate the cytotoxic activity of both essential oil and phenolic compounds of *R.chalepensis* collected from Bejaia (Northern east of Algeria) and authenticated at the Ethnobotany laboratory of A.Mira University Bejaia. A voucher specimen was deposited at the herbarium of the laboratory. Fourteen compounds were identified in the essential oil, by GC/MS analysis. The cytotoxic effect was determined by MTT assay on different types of cells (CEM, H9, SKW 6.4, Jurkat 77 and CEM-Irc) showed that the extract of *Ruta chalepensis* exhibited a strong cytotoxicity against these cells.

**Keywords:** *Ruta Chalepensis*, chemical composition, cytotoxicity, essential oil, Phenolic compounds.

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PP-201

**CHEMICAL COMPOSITION OF ESSENTIAL OILS OF WILD-GROWING *MENTHA PIPERITA* L AND *MENTHA SPICATA* L FROM THE MARIOVO REGION, REPUBLIC OF MACEDONIA**

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The genus *Mentha* (family Lamiaceae), comprising more than 25 species, grows widely throughout the temperate regions of the world. *Mentha arvensis*, *M. longifolia*, *M. piperita* and *M. spicata*, commonly known as menthol mint, wild mint, peppermint and spearmint, respectively, are frequently cultivated in many countries of Europe, East Asia, America and Australia for the production of essential oils. The essential oils and extracts from *Mentha* species have been in use since ancient times for the treatment of many digestive tract diseases, as well as, in cuisine.

*M. spicata* and *M. piperita* are the most abundant species of the genus *Mentha* which grow as wild crops mostly at the south parts of the Republic of Macedonia. The main goal of our study was evaluation of chemical composition of the essential oils obtained from the leaves of wild-growing *M. spicata* and *M. piperita* from the region of Mariovo, located at the farthest southern part of the Republic of Macedonia. The harvest of the plants was performed during July 2014. The essential oils obtained by hydro-distillation were analysed on ZB-5 MS column using a gas chromatograph with flame ionization detector (FID) and gas chromatograph with mass spectrometric detection (GC-MS). A total of 46 and 32 compounds in essential oils of *M. piperita* and *M. spicata*, respectively, were identified. The main constituents in the essential oils of *M. piperita* (>5%) were found to be oxygenated monoterpenes: menthol (34.3%), L-menthone (18.24%) and isomenthone (5.16%); followed by neoisomenthol (3.48%), pulegone (3.03%) and menthyl acetate (3.01%). The main constituents (>5%) in the essential oils of *M. spicata* were found to be oxygenated monoterpenes: carvone (61.4%) and 1, 8 - cineol (5.21%). Limonene (11.87%) was found to be the most abundant monoterpene hydrocarbon in *M. spicata* essential oil. In addition, the tested *Mentha* essential oils contained substantial amounts of various minor constituents, as sesquiterpene hydrocarbons ( $\beta$  - bourbonene and  $\beta$  - caryophyllene), as well, as oxygenated sesquiterpenes (caryophyllene oxide).

The obtained results for chemical composition of essential oils of *M. piperita* and *M. spicata* were in line with some data reported in literature [1].

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**PP-202**

**NEW TERPENOIDS FROM *EUPHORBIA BUPLEUROIDES***

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*Euphorbia bupleuroides* Desf. is an endemic species, and one known medicinal plant of the flora of Algeria, belonging to the spurge family of Euphorbiaceae. It was described in ancient treatises to extirpate thorns and warts. In Algeria, the decoction of roots is used as anti-inflammatory. *E. bupleuroides* is herbaceous plant with simple leaves that grows in sandy habitat. *Euphorbia* species are growing in all parts of the world, exceptions the Antarctic regions and the high mountains. The genus *Euphorbia* is the largest in this family, containing more than 10000 species. Isoprenic compounds such as diterpenoids and triterpenoids are their characteristic secondary metabolites. The phytochemical investigation of the dichloromethane extract of the roots of *Euphorbia bupleuroides* yielded three new compounds named 4,20-dideoxy (4 $\alpha$ )phorbol-12-benzoate-13-isobutyrate (**1**), 25-hydroperoxy-cycloart-3 $\beta$ -ol (**2**), and 3 $\beta$ , 7 $\beta$ -dihydroxy-4 $\alpha$ ,14 $\alpha$ -dimethyl-8 $\beta$ , 9 $\beta$ -epoxy-5 $\alpha$ -ergosta-24(28)-ene (**3**). The known compounds were identified as jolkinolide E (**4**), 25-hydroperoxycycloart-23E-en-3 $\beta$ -ol (**5**) and 3 $\beta$ -hydroxy cycloart-25-ene-24-hydroperoxide (**6**). The structures of all isolated compounds **1-6** were established from analysis of 1D (<sup>1</sup>H, <sup>13</sup>C and DEPT) and 2D NMR (COSY, HSQC, HMBC and NOESY) data, and of mass spectrometry (HRESIMS), and by comparison with literature data. The dichloromethane extract of this species has been submitted to antibacterial bioassay against several bacterial strains as *Pseudomonas aeruginosa*, *Escherichia coli* and *Staphylococcus aureus*, by the disc diffusion method on agar medium. This extract showed significant antibacterial activity with strong inhibition zones. Therefore, *E. bupleuroides* could be used as a source for antimicrobial drugs.

**PP-203**

**CHEMICAL COMPOSITION AND ANTIOXIDANT ACTIVITY OF ESSENTIAL OILS FROM ARTEMISIA CAMPESTRIS L**

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The use of medicinal plants by humans dates back thousands of years due to their medicinal and nutritional properties. Many natural compounds extracted from plants have important biological activities. Among these compounds, we highlight the essential oils, which are increasingly attracting the attention of various segments of industry due to their multiple functions, especially antioxidant activity. This study is designed to examine the chemical composition and the evaluation of the antioxidant activity of essential oils obtained from the aerial parts of *Artemisia campestris L*, a medicinal plant from traditional pharmacopoeia of Algeria.

The essential oil was isolated by hydrodistillation using a Clevenger modified apparatus, and the identification and quantification of constituents, through GC and GC/MS analysis, revealed the presence of many components, among which  $\beta$ -pinene, sabinene and  $\alpha$ -pinene. The antioxidant capacity of these essential oils was evaluated *in vitro* by four different tests: DPPH• free radical scavenging assay,  $\beta$ -carotene bleaching test, ABTS+ free radical-scavenging activity, Chelating metal ions and reducing power assay. The study of antioxidant power showed a great capacity antioxidant in comparison with antioxidant of reference.

In conclusion, The chemical variations of the essential oil from the aerial parts of *Artemisia campestris L*. have been studied. The antioxidant activity by these tests went up that it has a good antioxidant activity in comparison with antioxidant of reference.

**PP-204**

**PROTECTIVE EFFECT OF VITAMIN E AGAINST ALUMINUM TOXICITY IN RATS WISTAR**

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Aluminum is a toxic metal for all living beings, it is primarily neurotoxic able to play an important role in the onset and progression of some of the nervous system degenerative diseases. Therefore, this study was conducted to determine the efficacy of vitamin E (VE) in the reduction of the toxicity of aluminum chloride (AlCl<sub>3</sub>) on some biochemical parameters, antioxidant status and lipid peroxidation. Adult male rats (150-180 g) of Wistar strain were given intraperitoneal injections (IP) of aluminum chloride at a dose of 50 mg/kg body weight once a week for 6 weeks, the treatment of vitamin E (50 mg/kg/day orally) was administered simultaneously with AlCl<sub>3</sub>. 24 rats were divided into 4 groups: group (C) control group (Al) received 50 mg AlCl<sub>3</sub>/kg/bw group (VE) VE only administered 50 mg/kg/day group (Al+VE) which AlCl<sub>3</sub> was treated with vitamin E. The results showed that the AlCl<sub>3</sub> induced an increase in serum reactive substances thiobarbituric acid (TBARS) and the activities of alkaline phosphatase (ALP) and lactate dehydrogenase (LDH). While the catalase activity was reduced. The administration of vitamin E improved the catalase activity and decreased the rate of lipid peroxidation. The combination of VE with AlCl<sub>3</sub> reduces the toxic effects on the parameters studied. In conclusion, vitamin E is beneficial and could be a protection against aluminum toxicity.

**PP-205**

**CHANGES IN BIOACTIVE COMPOUNDS AND ANTIOXIDANT CAPACITY OF OLIVES AFTER PROCESSING**

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The consumption of olives provides a large amount of natural bioactive compounds which may contribute to the prevention of many diseases. However, the processing to which olive fruits are exposed impact significantly the phenolic contents<sup>1</sup>. Hence, the aim of the present study which focused on the changes in bioactive compounds and antioxidant capacity of olives occurring after processing with dry salt. The olive extracts were prepared using 50% acetone. The bioactive substances (total polyphenols, *ortho*-diphenols, proanthocyanidines and flavonoids) and the antioxidant activity (reducing power and antiradical activity) were determined with spectrophotometric methods. The results revealed that the dry salting affects significantly both the antioxidant contents and the antioxidant capacity of the final product; it induces a marked decrease with variable values depending on the analyzed parameters. However, the studied olives have significant levels of total polyphenols (1276 mg/100 g dw), *ortho*-diphenols (348 mg/100 g dw), proanthocyanidins (142 mg/100 g dw) and flavonoids (131 mg/100g dw). In the other hand, high correlation coefficient are obtained between the reducing power and total phenolic (0.80), *ortho*-diphenol (0.85), flavonoid (0.78) and proanthocyanidin (0.65) contents of olives. Despite of the decrease occurred during processing, the antioxidant activity of olives remains considerable.

Reference

<sup>1</sup>Bianchi, G. (2003). Lipids and phenols in table olives. *European Journal of Lipid Science Technology*, 105, 229-242.

**PP-206**

**POSITIVE EFFECTS OF GREEN TEA (CAMELLIA SINENSIS) ON TESTICULAR DYSFUNCTION INDUCED BY LEAD ACETATE IN MALE RAT WISTAR**

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Many xenobiotics (solvents, pesticides, heavy metals ...) are suspected of being responsible for the decline in male and female fertility observed during the last century. The addition of antioxidants in food seems to be a way to limit the various problems of infertility. The objective of this study is to highlight the impact of the consumption of green tea (*Camellia Sinensis*) rich in antioxidant on the infertility Wistar strain rats induced by heavy metal (lead acetate). For this, male rats were exposed for four weeks to lead acetate (3 g / L) in the presence or absence of green tea (6.6%). Our results show that rats exposed to lead acetate have severe abnormalities in sperm by raising the percentage of dead sperm, cytopathic effects of the germinal layer of the seminiferous tubules and decreased body weight. In the other hand , administration of green tea could significantly correct the negative effects of lead acetate on the parameters mentioned above during the four weeks. In conclusion, the use of green tea extract appears to be beneficial to a large extent by mitigation and repair of damage caused by lead exposure.



**PP-207**

**COMPARATIVE EVALUATION OF FRUITS OF *GARCINIA INDICA* FROM DIFFERENT REGIONS OF SOUTH INDIA BY HPLC**

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Comparative evaluation of fruits of *Garcinia indica* samples collected from four different regions was carried out by HPLC method. *Garcinia indica* commonly known as kokum is a popular Indian spice. The fruits are known to contain garcinol, hydroxycitric acid (HCA), citric acid, lactone and several polyphenolic compounds. Hydroxy citric acid (HCA) is the major constituent and is a popular component of the weight loss formulations, available as herbal supplements, which decrease adipose tissue weight after ingestion for a few weeks. There are wide variations in naturally distributed kokum. Methanolic extracts were prepared and subjected to preliminary phytochemical screening by applying different qualitative tests for phytoconstituents. The amount of phytoconstituents including HCA, lactone and citric acid were quantified using HPLC in all the samples. There was a significant variation in amount of HCA in all the four samples. Sample collected from Karnataka was found to contain maximum amount of HCA.

Shara M, Ohia SE, Schmidt RE. Physico-chemical properties of a novel (-)-hydroxycitric acid extract and its effect on body weight, selected organ weights, hepatic lipid peroxidation and DNA fragmentation, hematology and clinical chemistry, and histopathological changes over a period of 90 days. *Mol.Cellular Biochem.* 2004;260(1):171–186.

Deore BA, Sapkal DV, Naikwade SN. Antioxidant and Hepatoprotective activity of *Garcinia indica* Linn fruit rind. *Pharmacia Globale.* 2011; 2(6):1-5.

**PP-208**

**EFFECTS OF MARINE UNICELLULAR ALGA IN DIETS ON THE METABOLISM OF OBESE PREGNANT AND LACTING RATS AS A SOURCE OF  $\Omega$ 3 FATTY ACID.**

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The mechanisms by which maternal overfeeding influences fetal development are extremely complex and animal models are needed due to ethical and methodological limitations. Several authors have used animal models of cafeteria-diet-induced obesity.

The aim of the present study was to determine the time course of changes serum glucose, and lipid levels, liver adipose tissue and muscle lipid contents, in cafeteria-diet-fed and cafeteria diet supplemented green microalgae dams during gestation and lactation. Algae have the highest capacity to synthesize long chain PUFAs. It is indicating that micro alga naturally contain omega 3 which can be purified to provide a dietary supplement of high value. Among these compounds, omega 3 eicosapentaenoic acid (EPA), decosahexaenoic acid (DHA) and chlorophyll. Recently, microalgae have been reported for use as a powerful source for food additive, nutraceutical or pharmaceutical products. The study focuses on three groups of pregnant rats consuming the control diet or cafeteria diet supplemented or not by marine unicellular alga. Our results shown that the cafeteria plan provide an obese phenotype with alterations mainly causing an increase in body weight. The supplementation of 10% of marine microalgae reduced food intake regime causing weight loss and causes a decrease in blood glucose, and lipid parameters in obese pregnant rats-algae. In conclusion, maternal over nutrition has long term metabolic consequences. The supplementation of 10% marine microalgae can reduced this disorder by a significant increase LCPUFA n-3 and a lower lipid in the liver and the serum.

**PP-209**

**TOPICAL CITRULLUS COLOCYNTHIS IN PAINFUL DIABETIC NEUROPATHY, A RANDOMIZED CLINICAL TRIAL**

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Aim of this study to examine the safety and efficacy of Citrullus colocynthis (C. colocynthis) topical formulation in patients with painful diabetic neuropathy.

The study was designed as a two-arm, double-blind randomized placebo-controlled clinical trial using a parallel design. Sixty patients with painful diabetic polyneuropathy (PDPN) were randomly allocated to receive the topical formulation for C. colocynthis (1:1 allocation ratio) or placebo for three months. The patients were evaluated before and after the intervention in terms of Neuropathic Pain Scale, electrodiagnostic findings, World Health Organization BREF quality of life scores and reported adverse events.

The mean change in pain score was significantly higher in the C. colocynthis group (3.89, CI: 3.19-4.60) than in the placebo group (2.28, CI: 1.66- 2.90) (*P value* < 0.001). The mean changes in nerve conduction velocity of the tibial nerve, distal latency of the superficial proneal nerve and sural nerve, as well as sensory amplitude of the sural nerve in the intervention group were significantly higher than in the placebo group (*P value* < 0.001). No significant differences were observed between the mean changes in other nerve conduction values. In the different domains of WHOQOL-BREF, only the mean change in the score of physical domain showed significant improvement.

Application of topical formulation of C. colocynthis fruit extract can decrease the pain in patients with PDPN. It also may have some uncertain effects on the nerve function and physical domain of quality of life, which should be further investigated in studies with larger samples and of longer duration. (ClinicalTrials.gov ID: NCT02155361)

**PP-210**

**TANNINS FROM *CYNOGLOSSUM CHEIRIFOLIUM*.L WITH POTENT ANTIOXIDANT ACTIVITY**

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There is a keen interest in replacing synthetic antioxidants such as butylated hydroxyanisole (BHA), butylated hydroxytoluene (BHT), propyl gallate (PG), and tert-butylhydroquinone (TBHQ) with natural alternatives in food systems. Possible use of *Cynoglossum cheirifolium* (Boraginaceae) as a source of natural antioxidants was explored. Crude extracts of tannins isolated from the aerial part, leaves and stems of *C. cheirifolium* were tested and compared for their antioxidant activity by using different methods such as: Total antioxidants activity,  $\beta$ -carotene-linoleate, 1,1-diphenyl-2-picrylhydrazyl (DPPH) radical and reducing power assays. Total condensed tannins content in crude tannin extracts ranged between  $0.036 \pm 0.011$  and  $0.199 \pm 0.014$  mg of catechin equivalents per 1 g of dried weight. Crude tannins isolated from *C. cheirifolium* exerted very good antioxidant activities. The scavenging effect of all crude tannins, at a dose of 0.25 mg/ml, on the DPPH radical ranged from 82.353 to 93.487%. Stems extract showed the highest activity with an EC<sub>50</sub> of  $0.078 \pm 0.001$  mg/ml. Tannins present in *C. cheirifolium* extracts are good electron donors and could terminate the radical chain reaction by converting free radicals to more stable products. The effect of crude tannin extracts on the coupled oxidation of linoleic acid and  $\beta$ -carotene was compared to that of  $\alpha$ -tocopherol. Crude extracts exhibited the greatest antioxidant activity, but the values were lower than that of  $\alpha$ -tocopherol in the  $\beta$ -carotene-linoleate model system. The plant appears to have a potential use as antioxidative preservatives for industrial applications.

Tannin extraction: Zhang et al;2008

Determination of condensed tannin: Sun and al; 1998

Determination of flavonoids: Barros and al., 2011

Antioxidant activity DPPH: Barros and al., 2011

FRAP: Oyaizu.,1986.

TAA: Prieto and al., 1999.

B-carotene: Koleva and al., 2002

**PP-211**

**PHENOLIC COMPOSITION AND ANTIOXIDANT ACTIVITY OF THREE ZINGIBER OFFICINALIS EXTRACTS OBTAINED BY MICROWAVE**

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*Zingiber officinalis* (ginger), honey and olive oil, are very used food since antiquity to treat various diseases. This work concerns a comparative study of the phenolic composition and antioxidant activity of three mixtures: ginger-honey, ginger-water and ginger-olive oil. These mixtures are obtained by extraction in the microwave. According to the results obtained, the extract of ginger-honey is richer in total polyphenols, flavonoids and total tannins which contents respectively 29,93 mg of gallic acid equivalent/g of fresh weight, 0,7 µg of quercetin equivalent/g of fresh weight and 0,63 mg of tannic acid equivalent/g of fresh weight. The lowest contents of total polyphenols and flavonoids were recorded in the extract of ginger-olive oil with contents of 0,13 mg of gallic acid equivalent/g of fresh weight. While the lowest content of total tannins was recorded in the extract ginger-water 0,03 mg of tannic acid equivalent/g of fresh weight. The evaluation of the antioxidant properties<sup>(1,2)</sup> have shown that the ginger-honey extract has the most powerful reduction and the best capacity antiradical (DPPH).

1. Bougatef A., Hajji M., Balti R., Lassoued I., Triki-Ellouz Y. and Nasri M. (2009). Antioxidant and free radical-scavenging activities of smooth hound (*Mustelus mustelus*) muscle protein hydrolysates obtained by gastrointestinal proteases. *Food Chemistry*, 114(4): 1198-1205.
2. Wang H., Zhao M., Yang B., Jiang Y. and Rao G. (2008). Identification of polyphenols in tobacco leaf and their antioxidant and antimicrobial activities. *Food Chemistry*, 107:1399-1406.

**PP-212**

**PHYTOCHEMICAL SCREENING AND ANTIOXIDANT ASSESSMENT  
ACTIVITY OF EXTRACTS FROM SOUTH WEST ALGERIAN  
*HALOXYLON ARTICULATUM BOISS***

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This work tallies the valorization of the natural resources, of the extracts of a local plant *Haloxylon articulatum Boiss.* Called *Remth*, the study basing of the screening phytochimic and the evaluation the antioxydant activity of the fractions and selective extracts by method of DPPH. The phytochimic screening made it possible to know different the phytoconstituants present in this plant and to target the selective extraction of the three families among these metabolites, in particular the saponins, tannins and alkaloids. In addition to the successive extract methanolic crude and these fraction, acetate of ethyl, n-butanol and the fraction aqueous and this dernière gives the best yield (25.31%). The in vitro evaluation of the antioxydant activity shows that the extract methanolic crude and the fractions of the butanolic and aqueous type are the most antioxydant of the free radicals of the DPPH.

**PP-213**

**COMPOSITION AND ANTIMICROBIAL ACTIVITY OF THE ESSENTIAL OIL OF ROOT FROM ALGERIAN *PULICARIA MAURITANICA* COSS.**

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Root essential oil of *Pulicaria mauritanica* Coss. (Asteraceae) collected from western Algeria was analyzed using a combination of chromatographic (CC, GC/FID, GC(RI)) and spectroscopic [GC-MS, <sup>13</sup>C-NMR] techniques. Thirty-eight compounds accounting for 90.4% of the whole composition were identified. The oil composition was dominated by thymyl derivatives: 2,5-dimethoxy-*p*-cymene (37.2%), 6-methoxythymyl isobutyrate (14.2%), 10-isobutyryloxy-8,9-dehydrothymyl isobutyrate (4.8%) and thymyl isobutyrate (3.1%) as well as by neryl isobutyrate (11.1%). A new natural compound was isolated and the structure was elucidated as 1S,2S,5S,8S-modhephan-3-one.

The antimicrobial activity of the root essential oil of *Pulicaria mauritanica* was determined against eleven bacteria and one yeast using the agar disc diffusion method. The results showed a little or no antimicrobial activity against all strains tested, with inhibition zones between 6.0 and 13.5 mm. *Pseudomonas aeruginosa* and *Klebsiella pneumoniae* were the most sensitive, the diameter of growth inhibition is 13.5 mm. In contrast, the most resistant microbial strain is *Enterobacter cloacae* (diameter of inhibition zone= 6.0 mm).

**PP-214**

**CONTRIBUTION TO THE STUDY OF THE ANTIOXIDANT ACTIVITY OF THE ESSENTIAL OIL EXTRACTED FROM THE SEEDS OF FENNEL (*FOENICULUM VULGARE MILL*) FOR USE AS A PRESERVATIVE TUNA (*THUNNUS ALALUNGA*).**

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At the end of our study, we evaluated the in vitro antioxidant activity of the essential oil extracted from dry seeds of *Foeniculum vulgare* Mill on a food matrix (tuna, Albacore).

The extraction was performed by two methods: hydrodistillation and Soxhlet. Yields obtained are equivalent to 0.98% and 1.63% respectively. The evaluation of the anti-radical activity of the essential oil of fennel seeds was investigated by the test DPPH °. This powerful radical has been effectively reduced, compared to vitamin E. These results were confirmed by whitening of the test β-carotene.

EC50 (effective concentration) obtained is 0.63. This oil shows an interesting antioxidant activity of 0.56 mg / ml by the Iron reduction method.

These data show that H.Es constitute an alternative to synthetic preservatives in the food industry.



**PP-215**

**THE EVALUATION OF SYNERGIC ANTIOXYDANT AND ANTIFUNGAL ACTIVITY OF A COMBINATION OF ESSENTIAL OILS OF *ORIGANUM COMPACTUM* AND *THYMUS LEPTOBOTRYS* AGAINST *PENICILLIUM ITALICUM***

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In recent years there has been an increasing interest to the use of natural substances and some studies concerning the safety of the use of synthetic compounds have encouraged the look for their substitution by plant extracts like essential oils. The antimicrobial properties of essential oils have been known for many centuries and this study is a contribution in search of new natural substituent of synthetic compound as an antifungal and antioxidant. The essential oils of aerial parts of *Origanum compactum* (*Oc*) and *Thymus leptobotrys* (*Tl*) were obtained by hydro distillation, using clavenger apparatus, and tested for their antifungal activity alone and mixed (50%/50%), by the disc diffusion method, against *Penicillium italicum*. The results showed a synergic effect of the combination of the two essential oils against *Penicillium italicum* with total inhibition at 350 ppm when the Essential oil of (*Tl*) inhibited totally the mycelial growth at 500ppm and we obtained 88% of inhibition at 700ppm with The essential oil of (*Oc*).

**PP-216**

**CONTRIBUTIONS TO PHYTOCHEMICAL STUDY OF *INULA VISCOSA* HARVESTED IN BOUMERDES (ALGERIA)**

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Our work consists of a phytochemical study, followed by an evaluation of the antimicrobial activity of bioactive substances (total polyphenols) of the *Inula viscosa*. Dosages of recorded total polyphenols are respectively 13.3 mg EAG / 100g powder leaves EAG 8.15mg / 100g powder for stems. These results indicate that the polyphenol content in the leaves is high relative to the stems. It appears that the strains *Staphylococcus aureus* and *Enterobacter* sp are highly sensitive ( $25 \pm 1.00$ mm,  $1.00 \pm 22$ ) *Escherichia coli* ( $9.33 \pm 0.33$ mm), *Bacillus thuringiensis* ( $9.66 \pm 1.33$ ), *Pseudomonas aeruginosa* ( $9.66 \pm 1.20$ ), *Micrococcus* sp ( $10.66 \pm 0.33$ mm) *Aspergillus Niger* ( $9.33 \pm 0.33$ mm) are sensitive while *Candida albicans* is highly sensitive ( $15.66 \pm 1.76$  mm). It is found that the extract of these leaves antimicrobial effects on different strains tested except *Klebsiella pneumoniae* ( $0 \pm 0$  mm) and *Salmonella enterica* ( $0 \pm 0$  mm) or had not observed an inhibition zone on goshawk disks, which shows the resistance of these strains. According to the observed diameter, the antimicrobial activity of the polyphenols from the extract of stems of *Inula viscosa* depends on the strain tested. It turned out that this extract has means antimicrobial effect on *Staphylococcus aureus* ( $14.33 \pm 0.66$ mm), *Enterobacter* sp ( $12.33 \pm 1.45$ mm), *Bacillus thuringiensis* ( $10.66 \pm 1.45$ mm) *Micrococcus* sp ( $9.33 \pm 0.33$ mm), *Klebsiella pneumoniae* ( $9.33 \pm 0.88$ mm) and *Candida albicans* ( $8 \pm 1$ mm), which allowed us to infer that these bacteria are sensitive against strains of *Escherichia coli* ( $\pm 0$ ), *Pseudomonas aeruginosa* ( $0 \pm 0$ ) *Salmonella enterica* ( $0 \pm 0$ ) and *Aspergillus Niger* ( $0 \pm 0$ ) show no microbial activity. Crude extracts of plants are starting to have a lot of interest as a potential source of natural bioactive molecules. They are the subject of study for their possible use as an alternative for the treatment of infectious diseases and to protect food against oxidation

**PP-217**

**DETERMINATION OF BIOACTIVE COMPOUNDS OF *SALVADORA PERSICA* L. EXTRACTS**

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The species *Salvadora persica* L. (Salvadoraceae), commonly known as the siwak and aarak, is a small tree to 6-7 m. Its bark is scabrous and cracked, whitish with pendulous extremities. The tree is able to tolerate a very dry environment with mean annual rainfall of less than 200 mm. Highly salt tolerant, it can grow on coastal regions and inland saline soils.

*Salvadora persica* is a popular chewing stick throughout the Arabian Peninsula, as well as the wider Muslim world. It is commonly referred to as miswak, it is often mentioned that the Islamic Prophet Muhammad recommended its use. Miswak were used by the Babylonians some 7000 years ago; they were later used throughout the Greek and Roman empires and have been used by Egyptians and Islamic empires. This species was valued for its important biological and its utilization in oral hygiene. The experiment was carried out on natural siwak; treated by a conservative and flavored The phytochemical screening of the aqueous and ethanol stems extract of *Salvadora persica* and were investigated. Phytochemical screening revealed the presence of flavonoids sterol/triterpenes, glycosides and saponins in high concentrations. Coumarins and alkaloids were detected in moderate amounts while quinons were present in trace amounts. Tannins didn't detected in these extracts. In conclusion, the aqueous extract of *Salvadora persica* might be directed to further investigation for identification of potential antioxydant and antimicrobial activities towards aqueous and ethanol extracts.

**PP-218**

**EVALUATION OF *IN VITRO* ANTIMICROBIAL ACTIVITIES OF *KIGELIA AFRICANA* FRUIT EXTRACTS**

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This study aimed to evaluate the antibacterial and antifungal activities of the aqueous, methanol and petroleum ether extracts of *Kigelia africana* fruit at different concentrations under laboratory conditions. The activities of the extracts were assessed against *Staphylococcus aureus*, *Streptococcus* spp. (Gram-positive), *Escherichia coli* and *Salmonella* spp. (Gram-negative) by disc diffusion method; and the fungi: *Aspergillus flavus*, *Aspergillus niger*, *Candida albicans*, *Penicillium* spp., *Scopulariopsis brevicaulis*, *Trichophyton metagrophytes* (Animal strain), *Trichophyton mentagrophytes* (Human strain), *Trichophyton verrucosum*, *Trichophyton schoenleinii* were tested by using cup-plate agar diffusion method and agar incorporation technique. The water extract was prepared by freeze-dried method while organic solvents extracts were prepared by soxhelt extractor. The results showed varying levels of activities. The aqueous extract of *K.africana* fruit revealed activity against *C.albicans* at the highest concentration with diameter of inhibition zone of 15.33±4.16 mm and index activity of 85.17. Additionally, the aqueous extract was less potent than methanol extract against both strains of *T. mentagrophytes*. On the other hand; the petroleum ether extract had activities against *streptococcus* spp., *A.flavus*, *A.niger* and *Pen.* spp. at highest concentration with growth inhibition zones of 15.0, 20.0, 12.0, 20 mm, respectively. The index activity of the extract at the highest concentration against these organisms were 85, 73, 86 and 89, respectively. Moreover, the Petroleum ether extract reduced diameters of growth of *T.mentagrophytes* and *T. schoenleinii*. From this study it is concluded that *K.africana* fruit showed antibacterial and antifungal activities. Further *in vivo* studies to confirm these results are needed, and phytochemical analysis is recommended.

**PP-219**

**PHYTOCHEMICAL STUDY AND ANTIOXIDANT ACTIVITY OF ESSENTIAL OILS OF SOME PLANTS OF ASTERACEAE FAMILY**

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Recent studies have shown that essential oils and their constituents have significant potential as antioxidant agents and in many industrial and medical fields. Dried aerial parts of some plants of the Asteraceae family (*Cladanthus arabicus* and *Bubonium intricatum*) were distilled by stripping with water vapor. The plants were harvested in full bloom in region of Ourika and Essaouira. Firstly the phytochemical screening revealed that these plants contain sterols, polyterpenes, polyphenols, flavonoids, tanins and saponins.

Also polyphenols, flavonoids and tannins content was determined. The results showed that the plants studied are rich in polyphenols, flavonoids and tannins with different concentrations.

DPPH radical scavenging and ferric reducing power methods were used to assess the antioxidant activity of the essential oil obtained from the plants. The results showed the existence of an interesting antioxidant activity for essential oils of aerial parts of both plants.  $Ic_{50}$  of each individual HEs was determined: *Bubonium intricatum*  $Ic_{50(dpph)} = 0,23 \pm 0,01$  mg/ml,  $Ic_{50(RP)} = 0,1 \pm 0,01$  mg/ml and *Cladanthus arabicus*  $Ic_{50(dpph)} = 0,5 \pm 0,02$  mg/ml,  $Ic_{50(RP)} = 0,5 \pm 0,01$ .

**PP-220**

**ANTIBACTERIAL EFFECT OF LEAVES EXTRACTS FROM *Eucalyptus globulus* Labill.**

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The antimicrobial activities of *Eucalyptus globulus* Labill leaf extracts from were measured by the plate well diffusion method. Aqueou and ethanoliqye extrats significantly inhibited the growth of Gram-positive and Gram-negative bacteria (*Staphylococcus aureus*, *Enterococcus faecalis*, *Staphylococcus aureus*, *Pseudomonas aeroginosa*), but the aqueous extract show strong antibacterial effect than ethanol extract.

*Eucalyptus* species extracts are now entering into common herbal use for the treatment of cold, chest pain, or cough, hemolytique study about the aqueou extrat leaves demonstrate important hemolytique activity, so *Eucalyptus* leaves extrats are tolerated well both when inhaled and when applied onto the skin in topical formulations.

**PP-221**

**ANTIMICROBIAL ACTIVITY OF THE LEAVES ESSENTIAL OIL OF  
EUCALYPTUS CAMALDULENSIS DEHNH.**

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The present work is to evaluate the antimicrobial activity of *Eucalyptus camaldulensis*

The leaves essential oil of *Eucalyptus camaldulensis* (family Myrtaceae) which was obtained by hydro distillation technique using Clevenger's apparatus was tested against six standard bacteria: *Bacillus subtilis*, *Staphylococcus aureus*, *Escherichia coli*, *Klebsiella pneumoniae*, *Proteus vulgaris*, *Pseudomonas aeruginosa*, two standard fungi namely *Aspergillus niger* and *Candida albicans* in comparison to known antibacterial and antifungal drugs using the Agar plate diffusion method. (Kavanagh<sup>1</sup>). The oil of *Eucalyptus camaldulensis* inhibited the growth of all organisms tested and the clinical strains respectively and the minimum inhibition concentrations was 12.5µg/ml for all organisms tested.

In conclusion, the obtained result suggested that *E. camaldulensis* can be used in treating diseases caused by the test organisms.

1-Kavanagh, F. 1972. Analytical Microbiology, Vol II Academic press (Pub) New York and London, pp11.

PP-222

**ANTIMICROBIAL ACTIVITY OF THE LEAVES OF CYMBOPOGON NERVATUS .CHOIV.**

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**ABSTRACT:**

The aim of the study was to evaluate the antimicrobial activity of *Cymbopogon nervatus*.(Chiov.).

The antimicrobial activity of the Leaves essential oil of *Cymbopogon nervatus* (family: Poaceae) was tested against eight standard microorganisms: *Bacillus subtilis*, *Staphylococcus aureus*, *Escherichia coli*, *Klebsiella pneumoniae*, *Proteus vulgaris*, *Pseudomonas aeruginosa* ,*Aspergillus niger* , *Candida albicans* and sixty clinical isolates using the Cup plate agar diffusion method. The leaves essential oil of *Cymbopogon nervatus* showed high activity against all organisms tested. The minimum inhibitory concentrations (MICs) of the essential oil against all standard organisms was 12.5 µg/ml .The antimicrobial activity of the reference drugs were determined against the standard organisms and compared with the antimicrobial activity of the tested oil. The obtained results can justify its folkloric uses.

Kavanagh F. (1972). Analytical Microbiology, Vol.II, Academic press, (Pub) New York and London, pp11.



**PP-223**

**PHYTOCHEMICAL SCREENING OF GROWING WILD AND CULTIVATED *RUTA CHALEPENSIS* CRUDE EXTRACTS AND THEIR ANTIOXIDANT AND ANTIMICROBIAL ACTIVITIES**

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The aim of the present work is to perform a phytochemical screening of the cultivated and wild growing *Ruta chalepensis* L. crude extracts obtained by three solvents of different polarities (acetone, ethanol, and distilled water), and to study their antioxidant and antimicrobial activities. Phytochemical screening showed the presence of flavonoids, tannins, coumarins, saponins, alkaloids and sterols/triterpenes in the ethanol and acetone extracts. The last compounds were absent in the aqueous extracts which contain more saponins. The ethanol extracts had the highest total phenolics content ( $65,34 \pm 2,73$  and  $72,085 \pm 1,94$  mg GAE/g DW). The highest flavonoids content was recorded with the ethanol extract of the wild growing one ( $31,9 \pm 2,12$  mg QE/g DW) which is also the richest in flavonols ( $13,22 \pm 0,86$ mg QE/g DW). The extracts showed a remarkable antioxidant activity. Ethanol and acetone extracts were the most powerful (especially ethanol extract of the growing wild *R.chalepensis* with an  $IC_{50} = 51,18 \pm 1,14 \mu\text{g/ml}$  against DPPH• and an absorption =  $0,805 \pm 0,12$  at 700nm with a concentration of  $1000 \mu\text{g/ml}$ ) than aqueous extracts. Antioxidant activity correlated significantly with flavonoids and flavonols contents, but not with total phenolics. Ethanol and acetone extracts were the only active extracts against the strains tested. Acetone extract of the cultivated *Ruta chalepensis* L. gave the largest diameter inhibition (15mm) against *S.aureus*.

**PP-224**

**THE EFFECT OF THE HYPERICUM NEUROCALCYIUM ON ALZHEIMER'S DISEASE**

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Aluminum is a metal spread, between in the composition of the majority of the industrialized products and having the utilities remarkable and perceived but ca do prevents it presents dangers for human health.

It is known for many years that the aluminum is toxic to our brain and that it has a place as possible with Alzheimer's disease, which has been proven by numerous studies.

The diagnosis of the disease being carried out of the treatments are assigned to the sick but in the majority of these treatments is used that has decreased the suffering of patients gold alternative medicine has made many pats in the area of protection against the degeneration of neurons and Alzheimer's disease.

The Hypericum neurocalcyinum is a medicinal plant, known for these effects antioxidants and antidepressant, which has proven a certain effectiveness against the lesions of nerve cells, according to studies carried out in vitro.

The objective of this work is to determine the effect of the Hypericum neurocalcyinum on the nervous system more precisely against the development of Alzheimer's disease by an in vivo study in mice model Alzheimer's disease caused by the administration per-os AlCl<sub>3</sub> to a dose of 10mg/Kg and D-galactose by see IP has reason 120mg/kg).

References : BERIVAN TANDOGAM, Ayşegül Güvenç, İhsan Çahş3 and Nuriye Nuray Ulusu, 2011, In vitro effects of compounds isolated from Hypericum Nemocalyinum, 2007, springer Science+Business Media, LLC. Library of Congress Control Number: 2006938892.

EXLEY C. AMYLOID, aluminum and the aetiology of Alzheimer's disease [letter; comment]. Medical Journal of Australia 1996;164(4):252-3.

**PP-225**

**ACUTE AND CHRONIC EFFECT OF *ARTEMISIA HERBA- ALBA* FROM SOUTHERN TUNISIA ON BLOOD GLUCOSE, TRIGLYCERIDES AND CHOLESTEROL IN NORMAL AND DIABETIC SUBJECTS.**

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Dry or crude aerial parts of *Artemisia herba- alba* (Asteraceae) (*Aha*) is widely used in folk medicine for anti-diabetic and antihypertensive agents in many areas including Tunisia. However, it still unknown whatever essential oil or aqueous extract of *Aha* has the beneficial bioactive effect on these diseases. The objective of this study was to examine the acute and chronic effect of *Aha* decoction (AD), prepared by boiling *Aha* in water for a relatively long period of time on blood glucose, triglycerides and cholesterol in normal and diabetic subjects. The study was performed on 6 normal male adults (NA) and 6 type-2 diabetic adults (T2D) treated exclusively with diet. The acute effect was examined before and after 30, 60, 90, 120 and 180 min of *Aha* treatment, however chronic effect was examined after one week *Aha* treatment at a dose of 100 mL/person/day. The AD was freshly prepared throughout the treatment period as follow: 20 g of the aerial parts of *Aha* was soaked in hot water and boiled in 300 mL of water for 20 min and distributed daily to each subject after meals intake. AD did not significantly change the blood glucose, cholesterol or triglycerides after acute treatment, however, it significantly decreased blood glucose, cholesterol and triglycerides in NA and T2D after chronic treatment of one week. In comparison with the basal values, the blood glucose and cholesterol decreased by about 1 mmol /L in the two groups ( $p < 0.001$ ). However, the decrease of blood triglycerides was significantly only for T2D ( $p < 0.05$ ). In conclusion, after chronic treatment of 7 days, AD significantly decreased blood metabolic parameters in NA and especially in T2D. The decreasing effect of AD treatment on these metabolic parameters persists for at least one week after treatment discontinuation. Therefore, a chronic AD treatment could constitute a good adjuvant to combat hyperglycemia, hypercholesterolemia and hypertriglyceridemia in TD2.

PP-226

**COMPARATIVE LARVICIDAL ACTIVITY OF THREE OCIMUM SPECIES ON *CULEX QUINQUEFASCIATUS***

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Pest control has become a major problem in recent years. The plant world comprises a rich storehouse of biochemicals that could be tapped further for their insecticidal properties. Biopesticides, because of their natural derivations are biodegradable. In view of the disadvantages of synthetic pesticides, their continued and indiscriminate use will perhaps irrevocably mutilate the ecosystem and mankind. Our only hope of redemption from this situation is to promote new pest control agents from natural sources. Keeping this in mind, for this research we had chosen three ocimum species which are indigenous to India and evaluated them for insecticidal potential. Three species selected were *O. sanctum*, *O. basilicum* and *O. gratissimum*; they were evaluated for their larvicidal activity against the mosquito *Cx. quinquefasciatus*. Ocimum plants were successively extracted with non-polar solvents to polar solvents. Oils were extracted by hydrodistillation. All the extracts of *ocimum* were screened for larvicidal activity at different concentration ranging from 10 ppm to 10,000 ppm. The petroleum ether extract and oils have shown the better activity at 100 ppm and above. The chloroform extract showed moderate, alcohol very less and water has not shown any activity. Petroleum ether extract and oils were selected for further study. The order of activity based on the LD<sub>50</sub> values was found to be *O. basilicum* oil > *O. sanctum* oil > *O. gratissimum* oil > *O. basilicum* petroleum ether extract > *O. sanctum* petroleum ether extract > *O. gratissimum* petroleum ether extract.

**PP-227**

**ANTIOXIDANT ACTIVITIES AND TOTAL PHENOLICS OF WALNUT KERNELS AND OILS FROM KOREA**

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While there are some data on the constituents and biological activities of *Juglans regia* (Persian walnut), there are no studies of antioxidant potential and the amount of total phenolics of *J. sinensis* (*J. regia* × *J. mandushurica*) which cultivated in Korea. The aims of this study were twofold : (a) to extract the phenolic fraction from walnut kernels and oils, and to examine its antioxidant potentials and (b) to determine the total phenolics for evaluating the correlation between antioxidant potential and total phenolics of the walnut kernels and oils. Total phenolic content in walnut ethanolic extracts (WE), dichloromethane fraction (WD), ethyl acetate fraction (WEA) and butanol fraction (WBU) were 83.9±4.44, 43.6±14.33, 360.4±8.83, and 189.3±19.91 mg/g, respectively. The free-radical scavenging activities of WE, WD, WEA, and WBU were 70.5±7.30, 31.0±6.38, 90.1±0.50, and 90.0±1.34% at 100 mg/mL, respectively. It was also found that a linear correlation was shown between free-radical scavenging activity and total phenolic content. Free-radical scavenging activity of walnut oil at 1 mL/mL and 0.5 mL/mL were 88.0 and 51.9 %, respectively. To assess antioxidant potential of walnut cultivated in Korea which is different cultivated in Persian, we measured total phenolic content, free radical scavenging activity and reducing power in walnut kernels and oils.

PP-228

**METABOLITE CHARACTERISTICS AND ACORN COMPONENTS IN THE HIGHLY YIELD VARIETY OF *QUERCUS ACUTISSIMA***

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*Quercus acutissima* is an economically important tree species, which provides foods to both human beings and animals. In Korea, acorn has been traditionally used as an emergency foods and also currently plays an important role as a resource for various health functional foods. Korea Forest Research Institute developed a variety, *Q. acutissima* var. Keumsura 1, which has been verified to have best acorn productivity by successive clinal selection of plus trees. In this study, we analyzed acorn productivity of Keumsura 1, metabolite constituents of acorn. Finally we also compared the contents of metabolites in stems of both high- and low-yield variety to know whether there was any metabolite that is related to fruit setting. The grafted Keumsura 1 at age 8 years produced 2.4-fold higher number of acorns per tree compared to common oak variety, although the contents of general constituents such as ash, total amino acids, total dietary fiber, ascorbic acid, beta-carotin and acorn starch were not significantly different from those of common variety. Among 79 metabolites identified by GC/MS analysis, the contents of phosphoric acid, fructose and sucrose in stem, and phosphoric acid, malic acid and fructose in leaf were significantly higher in high-yield variety. In contrast, the contents of catechine and galactose in leaves were higher in low-yield variety. Therefore, these results suggested that high-yield oak variety with higher levels of phosphoric acid, malic acid and sugar might grow more actively compared to low-yield oak variety.

**PP-229**

**ANTI-OXIDANT AND ANTI-LIPIDEMIC ACTIVITIES OF ETHANOLIC LEAF EXTRACT OF THEVETIA NERIFOLIA (YELLOW OLEANDAR).**

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The species *Thevetia nerifolia* juss ex. Steud (Apocynaceae), has been known to be used as Febrifuge, the leaves and stem is applied on wasp bites in tradition medicine. The study is to investigate the ethanolic leaf extract of *Thevetia nerifolia* and to examine whether it could be used to treat or prevent cardiovascular, inflammations, cancer etc. The leaf was harvested, air dried for 6-7days, milled into fine powdered. Ethanol served as extraction solvent and after extraction, it was weighed and preserved under anti-microbial condition. DPPH radical scavenging activity, anti-lipid peroxidation activity and nitric oxide scavenging activity served as marker for determination of antioxidant capacity. The ethanolic leaf extract at various concentrations were used with ascorbic acid(vitamin c) as a standard control. The results showed that, there was no significant differences on Total Cholesterol(TC) & High density lipoprotein(HDL). But there was significant difference on LDL & Triglycerides at high concentration. The leaf extract, at high conc. shows a high scavenging level on both lipid peroxidation and nitric oxide which decreases as the concentration decreases. Conclusively, the results obtained implies, that the ethanol extracts of *Thevetia nerifolia* possesses a high antioxidant and antilipidemic properties and could be useful in the treatment of infections and for scavenging free radicals and its effectiveness increases with increasing concentration.

**PP-230**

**CHEMICAL COMPOSITON AND CHOLINESTERASE INHIBITORY ACTIVITY OF *DAUCUS ARISTIDIS* COSS. ESSENTIAL OIL FROM TWO STATIONS OF ALGERIA.**

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The chemical composition of the essential oil obtained by hydrodistillation from the aerial part of *Daucus aristidis* (Apiaceae) cultivated from two stations from Algeria (Ghofi and Djelfa) at the flowering stage, was investigated for the first time, by GC and GC-MS and evaluated for *in vitro* acetylcholinesterase (AChE) and butyrylcholinesterase (BChE) inhibitory activities, the enzymes linked to Alzheimer's disease, by a spectrophotometric method of Ellman using ELISA microplate-reader at 100 µg/ml concentration. The Main components of *D. aristidis* oil from Ghofi and Djelfa were α-pinene (74.1%- 49%) and β-pinène (11.9% - 19.2%) respectively. The oils exhibited a moderate inhibitory activity (over 50%) against both enzymes.



**PP-231**

**ANTIFUNGAL ACTIVITY OF ISOLATED LACTIC STRAIN FROM  
WHEAT AGAINST SOME *FUSARIUM GRAMINEARUM* STRAINS**

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In agriculture, Fusariosis is a disease that causes big losses in industry. It affects not only the yield but also the sanitary quality of crops by the presence of toxins in grains. Biocontrol shows a promising solution to this problem. In the present work, we have tried to demonstrate the repressor activity of lactic acid bacteria against *Fusarium graminearum* strains. The lactic strains were isolated by enrichment isolation technique, followed by qualitative and quantitative tests, and then, they were tested for their antifungal effect on the selected fungus using radial growth method. This method is a variant of that described by (Florianowicz, 2001)<sup>1</sup>. The results obtained showed a remarkable antifungal activity of the bacterial strains, in which the inhibition percentages were estimated between 40% to 54%. Thus, the exploitation of this bio-preservation in the field of agriculture carries many perspectives.

<sup>1</sup>Florianowicz, T. (2001). Antifungal activity of some microorganisms against *Penicillium expansum*. *European Food Research and Technology* 212, 282-286.

**PP-232**

***ESSENTIAL OIL OF AMMOÏDES VERTICILLATA AND HOSPITAL STRAINS***

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*Ammoïdes verticillata* is an aromatic plant belonging to the family of *Apiaceae*, commonly called by locals Nounkha or Noukha, its name comes from the Persian Nankhah (Nan=bread and khah=flavour) name comes from its use as a flavoring in the bread. It is spontaneous, largely spread in North Africa, Ethiopia and Turkey (1).

The plant show several therapeutic effects and it's used as: diuretic, analgesic, carminative, anti-diarrheal, anti-histamine, febrifuge, anthelmintic and anti-asthmatic.

In Algeria, dry aerial part of the plant is recommended as decoction against flu and fever, and as fresh infusion with lemon slices -in hot season- to avoid infections (2).

Our work focuses on the activity of the essential oil of *Ammoïdes verticillata* on hospital strains, for that the extraction was done by hydrodistillation, and the plant revealed an important yield (2.58% w/w).

The antimicrobial activity was evaluated against a sample of 130 strains: 102 enterobacterium, 16 staphylococci and 12 streptococci.

The essential oil is active against 90.76% of the strains:

- 92.15% among Enterobacteriaceae are sensitive, given that 7.85% that are resistant represent *Pseudomonas aeruginosa*;

- 81.25% of *Staphylococcus aureus* are sensitive;

- 91.66% of Streptococci are sensitive.

The essential oil of *Ammoïdes verticillata* is highly active against most bacteria strains that may causes infections.

(1) Baytop T. and Sütülpinar N. (1986). Characteristics of « Nanahan» cultivated in Anatolia and its volatile oil. J. Fac. Pharm. Istanbul, 22: 73 - 76.

(2) Grosjean N. (2004). Huiles essentielles: Se soigner par l'aromathérapie. Ed. Eyrolles, pp 98.

PP-233

**IN VITRO ANTIFUNGAL EFFECT OF SOME *COTULA CINEREA* EXTRACTS AGAINST THE CAUSATIVE AGENT OF BAYOUD DISEASE AND SOIL POPULATION ASSAY**

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This study was conducted to evaluate the antifungal effect of the cell-wall polysaccharide extracts (cellulose, hemicellulose and highly methylated pectins (HMP)) of *Cotula cinerea* on the in vitro development of *Fusarium oxysporum* f. sp. *albedinis* (*Foa*), the causal agent of vascular wilt of date palm, and their effect on the density of this pathogen population in the soil. Germination, mycelial growth and sporulation were studied on two media: cellulose-based agar 0.25% (w/v) extracted from the leaves and flowers of *Cotula cinerea*, and Potato dextrose agar acidified (PDAA) incorporated by hemicelluloses and HMP at different concentrations. The results obtained show that these extracts have presented an inhibitory effect both on the germination and sporulation neatly superior to that on the mycelial growth. For germination, the best inhibitory effect was exercised under the effect of foliar hemicelluloses, with a rate up to 84.45% at 1 mg/ml. Concerning the mycelial growth, cellulose-based media have developed a weakly dense mycelium compared to PDAA. By contrast a stimulatory effect was recorded in the presence of HMP at all concentrations. Sporulation was strongly inhibited on cellulose-based media, whose inhibition rate exceeded 97%. The hemicelluloses and HMP proved to be less active than the cellulose. *Foa* infested soils were treated with cellulose, hemicellulose and HMP separately. After 21 days, the 5% and 10% cellulose doses, in addition to 1% HMP had an average inhibitory effect, while the other treatments had no inhibitory effect.

Results obtained highlight the importance of this approach, as it can offer the possibility of using plant extracts in crop protection against this soilborne pathogen.

**PP-234**

**ANTIBACTERIAL ACTIVITY OF ESSENTIAL AND CRUDE EXTRACTS OF *SANTOLINA AFRICANA***

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Aromatic and medicinal plants have been known to possess biological activity. The aim of this work is to test the antibacterial activity of essential oil and crude extracts of the aerial part of *Santolina africana* against five strains (*Escherichia coli*, *Staphylococcus aureus*, *Salmonella Paratyphi*, *Bacillus Subtilis* and *Pseudomonas aeruginosa*) by using disc diffusion method and micro-broth dilution.

Phytochemical screening of the crude extracts revealed the presence of polyphenols, flavonoids, tannins, quinones, sterols and polyterpenes.

The essential oil exhibited a good antibacterial effect and the diameter of zones of inhibition were ranged between (10, 66± 0, 57% and 5,5± 0,5%) against *P.aeruginosa* and *B.Subtilis*, respectively. For the two tested bacteria (*P.aeruginosa* and *B.Subtilis*), the minimal inhibitory (MIC) were respectively 1.25 mg/ml. and 2.52 mg/mL. The bactericidal concentrations (MBC) was 0.75 mg/ml for *P.aeruginosa*.

The methanol extract was more active than the aqueous extract but it presents a very low activity.

In conclusion, essential oils of *Santolina africana* can be used in medicinal and pharmaceutical purposes.

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**WOUND HEALING PROMOTING EFFECT OF ETHANOL EXTRACT OF *POLYGONUM EQUISETIFORME*: BIOPHYSICAL, BIOCHEMICAL AND HISTOLOGICAL EVALUATION**

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Medicinal plants constitute a considerable percentage of the flora, which provide raw materials for pharmaceutical, cosmetic and fragrance industries<sup>1</sup>. Recently synthesized drugs started to replace natural products, but man began to test such products due to some harmful symptoms caused by some synthesized drugs. The presence of various life sustaining constituents in plants has urged scientists to examine these plants with a view to determine potential wound healing properties<sup>2</sup>. This study aims to evaluate the efficacy of the ethanol extract of *Polygonum equisetiforme* in promoting wound healing. A 10% (w/w) ointment was made up from the extract in a petroleum jelly base. Studies were performed using excision wound model.

The test ointment, untreated and vehicle controls, and standard therapy were used to assess the healing potential by measuring different biophysical (period of epithelialization) and biochemical parameters (protein content). In addition to a histological evaluation of full thickness excision wounds on the 4<sup>th</sup>, 8<sup>th</sup>, 12<sup>th</sup>, 16<sup>th</sup> and 20<sup>th</sup> post wounding days by light microscopy.

The test ointment-treated wounds healed significantly faster, which was indicated by a decrease period of epithelialization (21±1.00 days) in comparison to vehicle-treated group (28.33±1.03 days). Moreover biochemical analysis revealed a significant increase in total protein content of the granulation tissue of the ointment-treated group in comparison to vehicle control group. The results obtained from the histological assessments as compared to vehicle treated control groups indicated that ointment treatment of wounds promotes the process of wound healing by influencing fibroblasts proliferation and collagen synthesis and deposition.

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**PP-236**

**EVALUATION OF ANTI-INFLAMMATORY EFFECT OF HYDROALCOLIC EXTRACTS FROM *Cytisus triflorus* L'Hérit.**

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The plants from the genus *Cytisus* are known to produce essentially flavonoids [1] and alkaloids [2]. These substances have been previously evaluated for their bioactivities in some *Cytisus* species.

This work aimed to investigate and evaluate the anti-inflammatory activities of the hydroalcolic extract (HAE) from aerial parts (stems and leaves separately) of algerian medicinal plant *Cytisus triflorus* L'Hérit. The anti-inflammatory activity is evaluated by the carrageenan induced mice hind paw edema model. Oral administration of HAEs tested at the dose of 200 and 400 mg/kg body weight produced significant decrease of the paw edema, in a dose dependant manner. HAEs of leaves and stems showed the maximum inhibitory effect (80,26% and 36,92 %, respectively) at the 4<sup>th</sup> hours for the 400 mg/kg dose. The total amount of phenolic compounds and flavonoids accounted for 240 mg/g and 52.13 mg/g of the HAE from leaves and 166.5 mg/g and 16.82 mg/g of the HAE from stems, respectively, which were evaluated using the Follin-Ciocalteau and aluminium chloride methods, respectively. The results suggest that the hydroalcolic extract from leaves of *Cytisus triflorus* may be considered as a good source of natural anti-inflammatories.

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**PP-237**

**COMPARISON OF THE ESSENTIAL COMPONENT IN THE FLOWER BUDS FROM THE NON-INDIGENOUS *EUGENIA CARYOPHYLLATA* (CLOVE) SOLD BY HERBALISTS WITH THE NATIVE *ORTHURUS HETEROCARPUS* JUZ. (ROOT CLOVE) PLANT.**

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In this study, organized fieldwork was conducted in two locations (İbradı-Toka plateau and Alanya-Gevne valley) in the province of Antalya, to collect native *Orthurus heterocarpus* (**Rosaceae**) plants specimens. The *O. heterocarpus* plant is known as the 'root of clove.' The essential oil content from the *O. heterocarpus* plant specimens was compared to that in the flower buds of the non-indigenous *Eugenia caryophyllata* (**Myrtaceae**) plant, sold by herbalists. The essential oil concentration in each of the plants was analysed by GC/GC-MS (gas chromatography; Agilent 7890A, gas chromatography-mass detector; Agilent 5975C) devices with capillary column (HP innowaxcapillary; 60.0 mx 0,25 mm × 0.25 µm). The results of this study show that the essential oil content from the *O. heterocarpus* plant specimens was 0.25% for the İbradı-Toka plateau and 0.19% for the Alanya -Gevne valley plant specimens, compared to 8.7% for the *E.caryophyllata* flower buds.

In conclusion, Eugenol a major component of essential oils was found at the highest purity in the *O. heterocarpus* specimens from the İbradı-Toka plateau (94.13%), compared to that in the Alanya–Gevne valley specimens (84.56%) and the 90.0% in the non-indigenous *E.caryophyllata* flower bud specimens.

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**THE ROOT EXTRACT OF ELECAMPANE (*INULA HELENIUM* L.)  
INHIBITS THE PROLIFERATION OF URINARY TRACT CANCER  
CELLS**

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The genus *Inula* (Asteraceae) comprises more than 100 species found in Asia, Europe etc. *Inula helenium* L. is a perennial composite plant which medicinal properties are attributed to the presence of sesquiterpene lactones, flavonoids, triterpenes, phenolic acids, polysaccharide inulin in the extract.<sup>i</sup>

Our study is aimed at the identification of new antiproliferative activities of different plant extracts in urinary tract cancer cells. We studied the extracts of more than 20 plant species that belong to different families: Lamiaceae, Asteraceae, Solanaceae, Rutaceae etc.<sup>ii</sup> The antiproliferative plant extracts were identified after treatment of human urothelial bladder carcinoma cells (647-V) using the MTT-dye reduction assay. We determined that *Inula helenium* root extract (IC<sub>50</sub>=8,93±0,93 µg/mL) and *Inula helenium* leaves extract (IC<sub>50</sub>=31,63±9,96 µg/mL) exerted the best antiproliferative properties among several other plant species: *Achillea collina* aerial parts (IC<sub>50</sub>=□245,9±28,37 µg/mL), *Physalis alkekengi* flowers (IC<sub>50</sub>=91,36±26,08 µg/mL), *Ruta graveolens* leaves (IC<sub>50</sub>=249,9±55,33 µg/mL) extracts. The selected plant species showed less cytotoxicity in mouse embryonic fibroblast cells (BALB/3T3 clone A31).

Our results suggest that it is worthwhile to subject *Inula helenium* root extract to further toxicity studies as a potential natural antiproliferative agent for prevention of bladder cancer.

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<sup>1</sup>This work is developed under an Erasmus contract 2014/2015 between the Pamukkale University, Turkey, and the Bulgarian Academy of Sciences.



PP-239

**CHEMICAL VARIABILITY OF THE ESSENTIAL OIL OF *JUNIPERUS PHOENICEA* VAR. *TURBINATA* FROM ALGERIA**

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*Juniperus phoenicea* L. is a small tree growing wild around the Mediterranean basin from Portugal to Israel as well as in North Africa (Algeria and Morocco), the Canary Islands, and Madeira Island <sup>[1]</sup>. *J. phoenicea* was clearly divided into var. *phoenicea* and var. *turbinata*. Only *J. phoenicea* var. *turbinata*, commonly known as “arar”, grows wild in Algeria, near the seaboard and in mountainous zones <sup>[2]</sup>.

The chemical composition of 50 samples of leaf oil isolated from Algerian *Juniperus phoenicea* var. *turbinata* L. harvested in eight locations (littoral zone and highlands) was investigated by GC-FID (in combination with retention indices), GC/MS, and <sup>13</sup>C-NMR analyses. The composition of the *J. phoenicea* var. *turbinata* leaf oils was dominated by monoterpenes. Hierarchical cluster and principal component analyses confirmed the chemical variability of the leaf oil of this species. Indeed, three clusters were distinguished on the basis of the  $\alpha$ -pinene,  $\alpha$ -terpinyl acetate,  $\beta$ -phellandrene, and germacrene D contents. It should be noted that most of the oil samples isolated from plants harvested in the littoral zone belong to Subgroup IB and Group III, and they are characterized by a lower content of  $\alpha$ -pinene (15.8%–47.0%). Conversely, all the oil samples isolated from plants collected in the highlands belong to Subgroup IA and Group II, and they are characterized by a higher content of  $\alpha$ -pinene (39.7–76.7%). However, five out of the 50 samples exhibited an atypical composition characterized by the predominance of germacrene D (16.7–22.7%),  $\alpha$ -pinene (15.8–20.4%), and  $\alpha$ -terpinyl acetate (6.1–22.6%).

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**PP-240**

**QUANTIFICATION OF THE CONTENTS OF TANNINS IN THE EXTRACTS METHANOLIC AND AQUEOUS OF *PITURANTHOS CHLORANTHUS* (COSS. AND DUR.)**

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Most of the interest of current research relates to the antioxydant study of molecules of natural origin. In this work, we were interested in the quantification of the contents of tannins of the extracts methanolic and aqueous by the method of vanillin, obtained starting from the air part of the endemic plant of the Sahara Algerian: *Pituranthos chloranthus*. The results obtained showed outputs considerable of about 8.45 and 10.07% for the extracts methanolic and aqueous, respectively. The proportioning of tannins revealed contents of  $9.01 \pm 0.60$  and  $1.66 \pm 0.10$  Mg equivalents of dry matter catéchine/g, respectively for the extracts methanolic and aqueous.

**PP-241**

**ESSENTIAL OILS OF *THYMUS SERPYLLUM* ANALYTICAL AND BACTERIOLOGICAL STUDY**

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Folk remedies intended to fight against multiple diseases takes a large place around the world, it is impossible to eliminate the traditional use of medicinal plants despite the development of synthetic chemistry. Advances in chemistry have allowed the isolation of the active ingredients in plants which are now the basis for many pharmaceutical specialities. Among the active ingredients from herbs, essential oils can be very effective in the treatment of physical and psychological ailments and occupy a very important place in the new life of health called - Aromatherapy -. The Lamiaceae family occupies an important place in the plant kingdom and finds wide use in aromatherapy for its richness in essential oils. Among the plants used in herbal medicine were: the Wild thyme (*Lamiaceae* family) whose study was done in order to obtain botanical, analytical and biological informations of this species and their richness in active ingredients that are essential oils .

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**PP-242**

**INHIBITION OF CRYSTALLIZATION LITHIASIS PHOSPHATE (STRUVITE) BY EXTRACTS *ARTEMISIA CAMPESTRIS L***

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Many plants species, described in pharmacopoeias of several countries is used as a remedy for urinary stones, the latter is a disease resulting from the presence of stones in the kidneys or urinary tract [1].

Following our work on urolithiasis / natural products. We have studied the effect of extracts of *Artemisia campestris L* (ASTERACEAE), on phosphate stones especially Ammonium-Magnesium Phosphate Hexahydrate (Struvite). This medicinal plant used for the cure of urinary tract diseases in the region of Algeria south west, locally named as "Allal, dgfouft".

The organic and aqueous extracts of it has an effect on the crystal size and aggregates of struvite. The results, compared to crystallization without inhibitor [2] give a very significant reduction in the size of the crystals of struvite in the presence of hexane extract (12 to 4-6  $\mu\text{m}$ ), for the same: aqueous and methanol extract (12 to 6-7 $\mu\text{m}$ ). Size increasing was observed in the presence of the ethanol extract.

We've observed a decrease in the size of the aggregates in the presence of all the extracts. This reduction is important for the aqueous extract (45 to 9 $\mu\text{m}$ ).

In conclusion the effective extract of *Artemisia campestris L* might be directed to deep study for determine the influence of inhibitory phytochemical compounds.

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PP-243

**ANTI-OXIDANT ACTIVITY, BRINE SHRIMP LETHALITY TEST AND PHYTOCHEMICAL SCREENING OF *BLEPHARIS LINARIIFOLIA* ETHANOLIC EXTRACT**

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*Blepharis linariifolia* (Family: Acanthaceae) a native plant in Western Sudan is used traditionally for the treatment of renal disorders. However, little is known about this plant. This study is an attempt to reveal its biological activities. In this study, the ethanolic extract of *Blepharis linariifolia* was studied for its lethality and/ or safety, its anti-oxidant activity and phytochemical screening. The extract contains alkaloids, tannins, flavonoids, saponins, sterols and triterpenes. The cytotoxic activity of the extract was conducted by using the brine shrimp assay. It was found that this plant extract has a wide safety effect ( $> 1000 \mu\text{g}/\text{ml}$ ) which considered significant at  $P \leq 0.05$ . Study of the anti-oxidant activity of *Blepharis linariifolia* extract was conducted by using the radical scavenging method (DPPH). The extract showed the presence of a remarkable anti-oxidant activity measured as 86 %. In conclusion, *Blepharis linariifolia* is considered as a safe bio-active plant and further studies to be conducted to elucidate its bio active constituents.

**PP-244**

**ANTIMICROBIAL ACTIVITIES OF PLANT EXTRACTS FROM  
KARAMAN PROVINCE**

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Plant have been used as main food sources and remedy for diseases since ancient times along the human history. The aim of this study was to investigate antimicrobial activities of *Myosotis ramosissima*, *Delphinium peregrinum*, *Cruciata taurica* plant extracts in different solvents, water and hexane. Totally 6 different extracts were obtained and tested against *Bacillus licheniformis*, *Escherichia coli*, *Agrobacterium tumefaciens*, *Staphylococcus aureus*, *Enterococcus faecalis*, *Proteus vulgaris*, *Klebsiella pneumoniae* ve *Bacillus subtilis* by using disk diffusion method.

In conclusion, *D. Peregrinum* water extract showed highest and widest antimicrobial activity against tested pathogen microorganisms.

This study was supported by KMU-BAP 01-YL-14 project.

**PP-245**

**DETERMINATION OF COPPER AND ZINC IN PHLOMIS BOVEI BY FLAME ATOMIC ABSORPTION SPECTROMETRY**

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Wound healing comprises many biochemical processes, and their performance, in some cases, depends on the presence of some metallic ions or silicon, which is known to be related to collagen and elastin structures and to stimulate the activity of enzymes related to collagen crosslinkage.

Copper and zinc, are components or activators of enzymes important in several steps of the healing process, such as the synthesis of extracellular substances (collagen, elastin, glycoproteins, and glycosamine glycanes) in cellular division, digestion of necrotic tissues. In Algeria, lot of medicinal plants are used in traditional medicine for their healing activity such as *phlomis bovei*

The aims of the present work is to determinate Copper and Zinc in *phlomis bovei* by flame atomic absorption spectrometry. We followed a protocol previously defined by Pinta. M(1973) Cu =35,8mg/l Zn=78mg/l *Phlomis bovei* can be a source of copper and zinc. The concentrations of copper and zinc may justify its use in traditional medicine

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**PP-246**

**MINERAL CONTENT OF GREWIA TENAX EXTRACT USED FOR THE TREATMENT OF IRON-DEFICIENCY ANEMIA**

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Anemia is a hematopoietic disorder affect people of all ages, races, and ethnicities. Some types of anemia are very mild, and others are severe or even life-threatening if not treated. A healthy diet ensures to get enough nutrients to make healthy blood cells. These nutrients include iron, vitamin B<sub>12</sub>, folate and vitamin C which are found in a variety of foods. *Grewia tenax* is a Sudanese medicinal plant used traditionally for the treatment iron-deficiency anemia. In this Study we have aimed to determine the concentration of Ascorbic acid by using HPLC method and analyze the concentrations of Fe, Cu and Zn via atomic absorption for aqueous and ethanolic extracts of this plant. These elements are important for hemoglobin synthesis. Iron was with higher concentration in ethanolic extract than in the aqueous extract. Both aqueous and ethanolic extracts contain high concentrations of Ascorbic acid.

In conclusion, mineral and Ascorbic acid analysis revealed the potential possibility of *G. tenax* as anti-anemic agent.



**PP-247**

**ANTIMICROBIAL ACTIVITY OF PLANT VOLATILE OILS AND COMPONENTS**

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Volatile oils have been recognized for their antimicrobial properties. Since middle age, volatile oils extracted from plants have been used for bactericidal, fungicidal, insecticidal and medicinal applications. Nowadays, volatile oils and their components are used in pharmaceutical, cosmetic, agriculture and food industries. Focusing on pervious researches, has revealed the antimicrobial activity of this volatile oils on bacteria and fungus such as; *Bacillus cereus*, *Clavibacter michiganense*, *Clostridium sporogenes*, *Pseudomonas fluorescens*, *Staphylococcus aureus*, *Candida albicans*, *Fusarium solanium*, *Alternaria citrii* and *Aspergillus fumigates*. Medicinal plants contain a variety of volatile molecules such as terpenes, terpenoids, phenol-derived aromatic components and aliphatic components. Depending on type and concentration of volatile oils, they exhibit different cytotoxic effects on living cells.

Antimicrobial activities of medicinal plants are being increased as it is reported from different parts of the world so the aim of this study is to review the pervious study and provide an overview on the antimicrobial activity of essential oils and their components.

**PP-248**

**ANTICANCER ACTIVITY OF *CINNAMOMUM INERS* Reinw. AGAINST DALTON'S ASCITIC LYMPHOMA**

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The present investigation was designed to screen the anticancer activity of an indigenous plant *Cinnamomum iners* Reinw. against Dalton's ascitic lymphoma (DAL) cells.

The barks of *Cinnamomum iners* Reinw. (Lauraceae) were collected and extracted by continuous hot percolation method. Swiss albino mice (20-25 g) were used throughout the study and they were inoculated with Dalton's ascitic lymphoma cells by intraperitoneal transplantation of  $10^6$  cells/mouse. The animals were divided into various groups and comprised as tumor bearing mice, tumor bearing mice treated with ethanolic extract of *Cinnamomum iners* (EECI) (200 mg/kg/d, i.p.) for 9 days, tumor bearing mice treated with 5-Fluorouracil C (20 mg/kg/d, i.p.) for 9 days, tumour bearing mice treated with 0.9% NaCl and normal mice. The effect of extract on mean survival time, tumour cell growth, Normal peritoneal cells and haematological parameters were studied and compared with the standard drug.

A significant enhancement of mean survival time of tumor bearing mice and peritoneal cell count in normal mice was observed with respect to the control group. When this EECI treated animals underwent i.p. inoculation with DAL cells, tumor cell growth was found to be inhibited. After 14 d of inoculation with DAL cells, EECI is able to reverse the changes in the haematological parameters, protein and packed cellular volume.

The reliable criterion for judging the value of any anticancer drug is the prolongation of life span of the animal and reduction of WBC from blood. The above results demonstrated the antitumor effect of *Cinnamomum iners* against Dalton's ascitic lymphoma in Swiss albino mice.

**PP-249**

**ANALYSIS OF THE ESSENTIAL OIL OF LEMON BALM (*MELISSA OFFICINALIS* L.)**

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Lemon balm (*Melissa officinalis* L.), belongs to the Lamiaceae family, is one of the important medicinal and aromatic plant species. *M. officinalis* is commonly used in folk medicine for different medical purposes as tonic, antispasmodic, carminative, diaphoretic, a mild sedative. Nowadays, it is used in different branches of industry (such as medicine, perfume, cosmetic, and food etc.) in many countries of the world. In addition, modern pharmacology has shown that essential oil of lemon balm can be used in the treatment of Alzheimer's disease. In this study, the essential oil was obtained by hydrodistillation in a Clevenger apparatus and analysed by gas chromatography–mass spectrometry (GC-MS). Forty compounds were identified in the essential oil, representing 98 % of the total oil and the essential oil was 0.06 %. The main components of the essential oil were caryophyllene acetate (35.8%), cedrene-13-ol, 8- (7.6%),  $\alpha$ -cadinol (6.6%). The essential oil contained oxygenated sesquiterpenes (61.9%), sesquiterpenes (13.9%), monoterpenes (13.5%), oxygenated monoterpenes (8.6%).

**PP-250**

**ARGANIA SPINOSA LEAVES EXTRACT INDUCED PIGMENTATION IN B16 MELANOMA CELLS**

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Melanocytes, through their ability to produce melanin, not only provides a wide range of cosmetic coloration to the skin, hair and eyes, but also provides the protection of the skin from the damaging effects of ultraviolet-radiation. In human skin, ultraviolet radiation is undoubtedly one of the most important stimulators of melanogenesis. However, an excessive or reduced production of melanin in skin accounts for pigment-related diseases such as melanoma, vitiligo ... etc. In recent years, more attention has been paid to this due to the relationship between increased pigmentation and cosmetic study. The aim of this work was to investigate the activity of *Argania spinosa* leaves and its mechanism on melanogenesis in murine B16 melanoma cells. Cells treated with argan leaves extract showed a significant stimulation of melanogenesis in a dose-dependent manner without cytotoxicity. To determine whether the stimulation activity of argan leaves was related to the expression levels of melanogenesis related proteins, including tyrosinase, tyrosinase related protein 1 and dopa-chrome tautomerase, we used western blot assay. Our results showed that *Argania spinosa* leaves up-regulated the expressions of these proteins level in B16 cells.

These results indicate that *Argania spinosa* leaves may be effective in topical application for treating hypopigmentation disorders.

**PP-251**

**THE ESSENTIAL OIL COMPOSITION AND MINERAL CONTENT OF  
*SIDERITIS BILGERANA* P. H. DAVIS**

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The genus *Sideritis* (Lamiaceae) is represented mainly in the Mediterranean area by more than 150 species of shrubs and annual or perennial herbs. In our country the total number of species reached 47 and the number of taxa reached 54. Approximately 80% of the species are endemic. Turkey is the 2nd country in the world which has the maximum species of the genus *Sideritis* and one of the most important gene centers<sup>1</sup>. *Sideritis* species have been used in folk medicine for their anti-inflammatory, antirheumatic, digestive and antimicrobial activities in Turkey and Europe<sup>2</sup>. Therefore, it is important to determine the chemical composition of these plants.

In the present study, we have aimed to report the essential oil composition and mineral content of *Sideritis bilgerana* P. H. Davis endemic for Turkey. The essential oil was investigated by GC/MS, the mineral contents were determined using ICP-OES.  $\alpha$ -Cadinol and  $\alpha$ -cadinene were determined main components of the oil. The amount of calcium, magnesium and iron were found to be higher than other minerals. It is apparent that the tea of *S. bilgerana* is good sources of the minerals.

<sup>1</sup>A. Güvenç, H. Duman: Morphological and anatomical studies of annual taxa of *Sideritis* L. (Lamiaceae), with notes on chorology in Turkey, *Turkish Journal of Botany*, 34 (2), 83-104, 2010.

<sup>2</sup>S. Çarıkçı, T. Kılıç, A. Azizoğlu and G. Topçu: Chemical Constituents of Two Endemic *Sideritis* Species from Turkey with Antioxidant Activity, *Records of Natural Products*, 6:2, 101–109, 2012.

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PP-252

**THE ESSENTIAL OIL COMPOSITION AND MINERAL CONTENT OF  
*SIDERITIS HISPIDA* P. H. DAVIS**

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Several aromatic plants are used as herbal tea in Turkey and one of the most commonly used plants for herbal tea is the genus *Sideritis*, which is widely available particularly in Aegean and Mediterranean areas, and represented by 47 species with high endemism ( $\cong 80\%$ )<sup>1</sup>. For their anti-inflammatory, antirheumatic, digestive and antimicrobial activities, *Sideritis* species have been used in folk medicine especially in Turkey and Europe <sup>2</sup>.

In the present study, we report the essential oil composition and mineral content of the endemic species *Sideritis hispida* P. H. Davis. The essential oil was investigated by GC/MS, the mineral contents were determined using ICP-OES. Totally 36 compounds were determined in the oil of *S. hispida* and  $\alpha$ -cadinol and  $\alpha$ -cadinene were main components of the oil. The amount of calcium, magnesium and iron were found to be higher than other minerals.

<sup>1</sup>A. Güvenç, H. Duman: Morphological and anatomical studies of annual taxa of *Sideritis* L. (Lamiaceae), with notes on chorology in Turkey, *Turkish Journal of Botany*, 34 (2), 83-104, 2010.

<sup>2</sup> S. Çarıkçı, T. Kılıç, A. Azizoğlu and G. Topçu: Chemical Constituents of Two Endemic *Sideritis* Species from Turkey with Antioxidant Activity, *Records of Natural Products*, 6:2, 101–109, 2012.

**Acknowledgements**

The authors thanks to TÜBİTAK for supporting this study as a part of the project 113Z710.

**PP-253**

**FUNCTIONAL PROPERTIES AND NUTRIENT COMPONENT OF  
OPIUM POPPY SEED (PAPAVR SOMNIFERUM L.) WITH HIGH  
ECONOMIC VALUE**

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Opium Poppy due to possess some alkaloids such as morphine, codeine, thebaine, and etc, has medicinal and commercial importance. Moreover, the plant which is traditional product for farmers of Turkey, is a strategic crop. Everyone in Turkey knows the importance of Opium Poppy seed oil and its nutritional value. Recently interest to alternative medicine increased in Turkey as well as all over the world and this industry become major. Lecithin, phytosterols / stanols and omega fatty acids as tablets have an important place in markets. Poppy oil in compared with sesame oil appears to be better in terms of poly unsaturated fatty acids; sesame oil keeps high linolenic acid. Protein content of the seeds varies between 18-27%, so it can be a very good source of amino acids. In terms of mineral and dietary fiber content, the seeds are extremely important.

**PP-254**

**ANTIOXIDANT PROPERTIES OF *LOTUS CORNICULATUS* L. EXTRACTS**

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In this study, the effect of extraction conditions on antiradical and chelating activity of *Lotus corniculatus* L. extracts was investigated. The optimum conditions for the extraction were determined using response surface methodology (RSM). Box Behnken design was used to investigate the effects of three variables: ethanol concentration (%), temperature (°C) and pH. Selected variables were coded at three levels and their actual values selected on the basis of preliminary experimental results. Spectrophotometric methods were used for determination of antiradical and chelating activity in extracts. Data was analysed using Design Expert software. The optimal conditions for extraction of compounds with high antioxidant activity were 62% ethanol, 60°C and pH value of 7.3. Extraction was repeated under optimum conditions to check the validity of the model. The experimental EC<sub>50</sub> values for antiradical and chelating activity were 87.41 and 109.12 µg /ml while predicted values were 85.1 and 102.6 µg /ml respectively.

Experimental values agreed with those predicted within 2,7% and 6,4%, thus indicating suitability of the model employed and the success of RSM in optimizing the extraction conditions. Data from the presented results revealed that *Lotus corniculatus* L. act as an antioxidant agent due to its free radical scavenging and chelating activity.



**PP-255**

**INVESTIGATION OF SOME PLANT EXTRACTS' EFFECTS ON ACTIVITY OF HUMAN ERYTHROCYTE ACETYLCHOLINESTERASE ENZYME**

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The acetylcholinesterase enzyme (Acetylcholine acetylhydrolase, AChE, EC3.1.1.7) hydrolysis acetylcholine, a neurotransmitter in the cholinergic synapses (Grisaru et al. 1999). Acetylcholine is a major neurotransmitter in the central nervous system and peripheral nervous system (Perry et al. 1999). In addition, it regulates the production of sensor-related thoughts and selective attention (Mesulam et al. 2004; Sarter et al. 2005). There is a deep relationship with learning and memory and acetylcholine so that acetylcholine containing neurons is present in the brain (Akman 2007). Acetylcholinesterase inhibitors are highly significant in the treatment of diseases such as Myasthenia Gravis, Glaucoma and Alzheimer's disease (Porcelli *et al.* 1999, Alaşehirli 2005). Herbal treatments have been used for many years. Among the people, it has been thought that clove (*Eugenia aromatica*), linden (*Tilia cordata*), carob (*Ceratonia siliqua*) tea reduce anxiety and stress and provide relief.

In our experiment AChE enzyme was partially purified by the DE-52 anion exchange chromatography from human erythrocytes. Then, plant extracts were prepared with ethanol extraction and effects of them were examined on the enzyme activity.

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**PP-256**

**INVESTIGATION OF THE EFFECTS OF EXTRACTS FROM SOME DIURETICS PLANTS ON THE ACTIVITY OF HUMAN ERYTHROCYTES CARBONIC ANHYDRASE II**

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Carbonic anhydrase (E.C.4.2.1.1 hydrolyase carbonate (CA)) is an important metalloenzyme containing Zn<sup>2+</sup> ion at active site. The enzyme is important in both CO<sub>2</sub> removal and protection of acid-base balance by forming HCO<sub>3</sub><sup>-</sup> and H<sup>+</sup> (Supuran, 2008). CO<sub>2</sub>+H<sub>2</sub>O⇌H<sup>+</sup>+HCO<sub>3</sub><sup>-</sup>-CA

While H<sup>+</sup> which was formed from the reaction catalysed by CA, releases to the renal tubule lumen, Na<sup>+</sup> is reabsorbed in the tubule lumen. HCO<sub>3</sub><sup>-</sup> is transferred to the peritubular capillaries from the cell. By inhibition of the CA enzyme, Na<sup>+</sup> reabsorption decreases accordingly decreased H<sup>+</sup> formation and consequent water reabsorption reduces and urine formation increases (Smith *et al.*, 2007).

Among the people, due to their diuretic property avocado (*Persea gratissima*) leaf, linden (*Tilia cordata*) and parsley (*Petroselinum crispum*) teas are widely used in kidney disorders.

In our study CA II enzyme was purified from human erythrocyte by Sepharose-4B-L-tyrosine-sulfanilamid affinity chromatography with 9481.7 EU /mg protein specific activity, yield of 12.33%, and 145.92 purification fold. Inhibitory effects of extracts prepared by ethanol extraction from at issue plants were investigated on the purified enzyme activity.

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**PP-257**

**PHYTOCHEMICAL SCREENING, ANTICANCER AND ANTIOXIDANT ACTIVITIES OF *CHROZOPHORA TINCTORIA* (L.) RAFIN.**

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In this study, extracts of *Chrozophora tinctoria* (L.) Rafin in different solvents were prepared. Both polar and nonpolar parts of the extracts were fractionated by flash chromatography. Phenolic contents of the extracts and the sub-fractions from ethyl acetate extract were determined qualitatively and quantitatively by HPLC/TOF-MS. The ethlyacetate extract and its sub-fractions were investigated for their antiproliferative activities against HeLa cell line (by using real time cell analyzer and BrdU ELISA assay) and antioxidant activities (by using 2,2-diphenylpicrylhydrazyl and metal chelating assays). CT-F6 had the most effective antiproliferative activity. CT/E-F2 displayed relatively higher radical scavenging activity ( $IC_{50} = 0.014 \pm 0.001$  mg/mL) compared to synthetic antioxidant BHT ( $IC_{50} = 0.023 \pm 0.001$  mg/mL). A significant relationship between antioxidant activity and total phenolic content of the fractions was observed. The most biologically active subfraction (CT/E-F6) may be considered a potential source of a natural antioxidant or anticancer agent.

**PP-258**

**IN VITRO ANTIPROLIFERATIVE AND ANTIOXIDANT ACTIVITIES OF THE BIO-ACTIVE SUB-FRACTIONS OF *KICKXIA SPURIA* SUBSP. *INTEGRIFOLIA* AND THEIR PHENOLIC COMPOSITION**

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In this study, the ability of the sub-fractions of ethylacetate extract to induce cell death of HeLa cell line was determined by using real time cell analyzer and BrdU ELISA assay. Also, antioxidant activities of these fractions were investigated by using DPPH radical scavenging and metal chelating assays. Phenolic contents of the sub-fractions were determined qualitatively and quantitatively by HPLC/TOF-MS. KS/E-F12 showed the highest antiproliferative effect on HeLa cell line. KS/E-F10, KS/E-F18 and KS/F21 showed remarkable scavenging abilities. A significant relationship between antioxidant activity and total phenolic content of the fractions was observed. This study provides first results on the antiproliferative, antioxidant properties and detailed phytochemical screening of *K. spuria* subsp. *integrifolia*.

PP-259

**BIOLOGICAL PROPERTIES OF FIVE DITERPENES FROM *CROTON OLIGANDRUM* STEM BARK**

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The aim of this study was to investigate the antiproliferative, antimicrobial, and antioxidant activities of five diterpenes isolated from the methanolic extract of the stem bark of *Croton oligandrum* Pierre ex Hutch. namely crotonoligaketone, crotonadiol, imbricatadiol, crotonzambefuran B and 7-acetoxytrachiloban-18-oic acid. The chemical structures of pure compounds were elucidated with different chemical and spectroscopic methods (IR, <sup>1</sup>H NMR, <sup>13</sup>C NMR, HETCOR, COSY, HR-MS). The antiproliferative activities of the compounds against HeLa cell line were determined by using the xCELLigence system (Real Time Cell Analyzer). The results showed that crotonzambefuran B had the highest antiproliferative activity at the concentration of 100 and 50 mg/mL. The isolated diterpenes from *C. oligandrum* exhibited low antimicrobial activity against the tested gram positive bacteria. Among the compounds; 7-acetoxytrachiloban-18-oic acid showed the highest radical scavenging (IC<sub>50</sub> = 7.75 ± 0.88 mg/mL) and metal chelating activity (26.5 ± 0.5 % at 2 mg/mL).

**PP-260**

**HEPATOPROTECTIVE ACTIVITY OF *ABUTILON INDICUM* (LINN) SWEET. AGAINST CCL<sub>4</sub> INDUCED HEPATOTOXICITY IN RATS**

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The present investigation was designed to screen the hepatoprotective activity of *Abutilon indicum* (Linn) Sweet. against carbon tetra chloride (CCl<sub>4</sub>) induced hepatotoxicity in rats.

The leaves of *Abutilon indicum* (Linn) Sweet. (Malvaceae) was collected and extracted. Wister rats of either sex and of approximately the same age, weighing about 150-175 g were used for the study. The animals were divided into various groups. Group I and II served as normal and positive control, received propylene glycol and CCl<sub>4</sub> respectively. Group III and IV were treated with ethanolic extract of *A. indicum* (500 mg/kg, p.o.) and reference compound Silymarin (200 mg/kg, p.o.), respectively for 7 consecutive days. On the seventh day 2 ml/kg, p.o. of CCl<sub>4</sub> was administered 30 min of the last dose to all the rats except group I. After 36 h, blood samples were withdrawn and the biochemical parameters such as AST, ALT, ALP, GGTP and total bilirubin were estimated.

The extract exhibited significant hepatoprotective activity at 500 mg/kg, p.o., which was comparable to the control and the standard Silymarin in CCl<sub>4</sub> induced hepatotoxicity model.

The result of present investigation indicates that the ethanolic extract of *Abutilon indicum* possess good hepatoprotective activity.

**PP-261**

**INVESTIGATION OF THE ANTIOXIDANT, ANTI RADICAL AND ANTIBACTERIAL ACTIVITIES OF OLIVE LEAF EXTRACT**

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This study presents an investigation on some biological properties of olive tree leaves (*Olea europaea* L.). The antioxidant activity of methanolic extracts of olive leaves was evaluated by using the emulsion model  $\beta$ -carotene-linoleate. The extracts have inhibited discoloration of  $\beta$ -carotene linoleate and neutralized free radicals formed in the mixture. The antioxidant activity of olive leaf extract is important (92.5- 95%) even for relatively low extract concentrations and it is comparable to that of BHA (88- 98.26%). In addition, olive leaf extracts have the capacity to give electrons to reactive free radicals and convert them into more stable and non-reactive products. However, they exhibit a lower reducing power than that of vitamin C.

DPPH test is used to determine the ability of the extracts to reduce the DPPH radical. The radical scavenging activity of olive leaf extracts depends on the extract concentration. The effective concentration (EC<sub>50</sub>) of olive leaf extracts ranges from 39.40 to 39.95 ug/ml. These values are comparable to that of BHA (EC<sub>50</sub> = 30.4). Seven phenolic compounds were identified in olive tree leaves: oleuropein, verbascoside, hydroxytyrosol, apigenin-7-glucoside, luteolin-7-glucoside, tyrosol and vanillic acid. Due to these important antioxidants, olive leaf extracts can be used as pharmaceutical and dietary supplements.

Antibacterial potential of olive leaf extracts was evaluated by disk diffusion method against Gram-positive and Gram-negative germs. The *Escherichia coli* germ showed sensibility to olive leaf extracts; the inhibition diameters of this germ vary from 15.66 to 16.33 mm. However, olive leaf extracts showed no antibacterial activity against *Staphylococcus aureus*, *Salmonella typhimurium*, *Enterobacter cloacae*, *Pseudomonas aeruginosa* and *Micrococcus luteus* since their zones of inhibition are less than 8 mm.

**PP-262**

**PHENOLIC PROFILE AND ANTIOXIDANT CAPACITY OF EXTRACTS DERIVED FROM *ULVA RIGIDA***

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The phenolic profile of the marine alga *Ulva rigida* was investigated by high-performance liquid chromatography-electrospray ionisation mass spectrometry (HPLC-ESI-MS). For this purpose, ethyl acetate, water, hydrolysed water and methanol *U. rigida* extracts were used. Phloroglucinol, fucodiphloroethol, fucophlorethol, fucophlorethol derivatives, phloroeckol, dioxinodehydroeckol, eckol, dieckol and diphloroethohydroxycarmalol were identified as phlorotannins. Other phenolic compounds including phenylethanol and benzoic acid derivatives, were also characterised. A correlation between the antioxidant extract capacity and total phenol content was established. The highest free radical scavenging activity and phenolic content were detected in ethyl acetate extract (phenolic content= 782.93 mg GAE g<sup>-1</sup> dry matter; IC<sub>50</sub> = 0.18 µgmL<sup>-1</sup>). Furthermore, our biological investigation revealed that *U. rigida* water extract was not cytotoxic and protected cells from death induced by H<sub>2</sub>O<sub>2</sub>-toxicity.



**PP-263**

**INHIBITORY EFFECTS OF *ONONIS ANGUSTISSIMA* EXTRACTS ON  $\alpha$ -AMYLASE ACTIVITY**

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*Ononis angustissima* (*Fabaceae*) is a sub-Saharan plant, widely used in traditional medicine as a remedy for various diseases including diabetes. Inhibition of intestinal glucose absorption related to amylases inhibition, is a therapeutic approach applied for diabetes Mellitus. The aim of this study was to investigate *in vitro* the effect of *Ononis angustissima* aerial parts extracts on  $\alpha$ -amylase activity. Therefore, aqueous (EA) and organic extracts water-methanol (EM) and ethyl acetate (EAc) were prepared, followed by determination of total polyphenols content and  $\alpha$ -amylase inhibition assay.

Obtained results show that the amount of total polyphenols was similar in EM, EAC and EA extracts 78.11, 72.21, and 65.29 ( $\mu\text{g GAE/mg}$ ) respectively; as well flavonoids content in these extracts 34.14, 32.01 and 12.6 ( $\mu\text{g CEq /mg}$ ). Concerning  $\alpha$ -amylase activity, results are expressed as inhibition percentage which changes depending on extract concentration ranging from 0.5 to 2.5mg/ ml (reaction medium). At high concentration of 2.5 mg/ml EAC extract has the highest percentage 64.88%, EM, EA extracts provides an inhibition of 50.49% and 35.10% respectively. At low concentrations 0.5 mg/ml of extracts, only EAC extract showed an important percentage of inhibition 30.28%.

In conclusion, These results indicate the capacity of *Ononis angustissima* organic extracts concentration-dependent  $\alpha$ -amylase activity this effect is probably related to phytoconstituants specially polyphenols and flavonoids, wichmay have an inhibitory effect on intestinal glucose absorption.

**PP-264**

**RESEARCH OF CORRELATION BETWEEN ANTIOXIDANT ACTIVITIES AND ENERGETIC AND STRUCTURE PARAMETERS OF ROSMARINIC ACID AS A MAIN COMPONENT OF SALVIA OFFICINALIS LEAVES**

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Salvia officinalis leaves (*Salvia officinalis* L.) are used as a tincture to gargle, during mouth cataracts in the upper respiratory tract and stomatitis. These leaves are part of *Species pectorales N23 species "Elecasol"*, they are used to produce essential oils, salvin, phytolizyn, salviathymol, salvisat. Previous studies found that the leaves of *Salvia officinalis* contain large amount of rosmarinic acid. Due to the structure of rosmarinic acid it was interesting to investigate of the antioxidant properties of extracts of *Salvia officinalis* leaves. Also, the authors conducted a quantum- mechanical calculations of structural and energy parameters of rosmarinic acid to establish the correlation of the "structure - antioxidant action."

Extraction was performed with ethyl alcohol of different concentrations (96%, 90%, 70%, 50%, 40%, 20%) by maceration with raw-extractant ratio of 1:5. Antiradical activity was studied by spectrophotometric method. Determination of antioxidant activity was done using the biochemiluminescence method (BCL) in the model system of egg yolk lipoproteins (LPEY).

It is shown that Extracts were obtained from the leaves of *Salvia officinalis* in 70% ethanol containing maximum rosmarinic acid. The studied tinctures reduce the intensity of luminescence by 17% and 23% and of light sum area by 42% and 36% compared with controls, indicating very high antioxidant properties. Tinctures of 40% and 50% ethanol were shown to have the most powerful antiradical properties, which are significantly higher than the activity of standard, walnut tincture. The energy and structural parameters of the rosmarinic acid molecule were calculated. Highest occupied molecular orbital (HOMO) of rosmarinic acid molecule is localized mainly on the hydroxyl groups of the molecule. Thus, its hydroxyl fragment will be responsible for the antioxidant properties.

**PP-265**

**PRESERVATIVE EFFECT OF *THYMUS CAPITATUS*'S ESSENTIAL OIL ON RAW MILK**

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Essential oil has multiple uses in human life due to their important biological activities (Senhaji, 2006). This work aims to characterize *Thymus capitatus* essential oil, to investigate its antimicrobial properties and the effect of its incorporation on milk quality. Essential oil characterization was made by GC-MS and the measurement of the antimicrobial activity was assessed by disc diffusion method (Graham et al., 1985). To study its preservative effect, increasing concentrations of *Thymus capitatus*'s essential oil were added to raw milk. The evaluation of milk's quality was made by consulting, throughout six days, the acidity and the total microbial count. Main result showed that carvacrol (76.1 %) is the main chemotype of this oil. The evaluation of antimicrobial activity depicted a very good efficacy particularly against *Salmonella typhi* and *Escherichia coli* (38 and 40 mm, respectively). Moreover, controlling titratable acidity of milk samples and the evaluation of their microbial loads suggested that this essential oil present a detectable preservative effect from the fourth day at a concentration of 1 µg/ml. In conclusion, our results suggested that *Thymus capitatus* essential oil presents an interesting potency to act as milk preservative.

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**PP-266**

**FUNGAL CONTAMINATION OF SOME SAMPLES OF MEDICINAL HERBS**

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Biological effects of vegetal extracts depend by the chemical composition of these, and could be influenced by the microbiological quality of raw material used to prepare the extracts. The aim of our study was to evaluate the microbiological quality of some medicinal herbs and to establish the degree of fungal contamination. 70 samples of different medicinal herbs have been analysed according the protocol established by the VII<sup>th</sup> Edition of European Pharmacopoeia (EP). For each sample the total number of fungi expressed in CFU/g (colony forming units/g sample) has been determinate. The total number of CFU for fungi was under the limits ( $10^5$  CFU/g) for all samples. The most contaminated samples were *Urticae herba* – S3 ( $1.5 \cdot 10^4$  CFU/g) and S5 ( $4 \cdot 10^4$  CFU/g), *Calendulae flos* – S7 ( $2.2 \cdot 10^4$  CFU/g), *Theae folium* – S1 ( $1.2 \cdot 10^4$  CFU/g) and S5 ( $2.4 \cdot 10^4$  CFU/g), *Cerasi stipes* – S1 ( $1.5 \cdot 10^4$  CFU/g). The next fungal strains have been identified in the samples: *Rhizopus nigricans*, *Aspergillus sp.*, *Penicillium sp.*, *Cladosporium sp.* and *Mucor sp.* By treating the samples with boiling water (the method used to prepare infusions) the level of fungal contamination is reduced by up to 90%.

**PP-267**

***CORIANDRUM SATIVUM* L. SEED (CORIANDER) ESSENTIAL OIL :  
EXTRACTION, ANALYSIS AND ANTIOXIDANT ACTIVITIES.**

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*Coriandrum sativum* (L.) seeds from ALGERIA were used to extract essential oil, this plant was commonly used as spice in the culinary art (1). Extraction of essential oils from *Coriandrum sativum* (L.) seeds was carried out by hydro distillation extraction using Clevenger apparatus with conventional and non-conventional heating (microwave heating). In addition of the extraction time which was reduced from 3hrs to few minutes for the microwaves heating the yield was also improved. The components of the essential oil were identified through GC, and GC-MS. Linalool has the highest percentage composition in the *Coriandrum sativum* seed essential oil (73.17% for conventional heating and 78.11% for microwaves heating). The antioxidant activity by DPPH and ABTS assays was also performed (2).

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**PP-268**

**KINETIC EXTRACTION AND CHEMICAL COMPOSITION OF  
ESSENTIAL OIL OF CURCUMA LONGA**

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Turmeric (the common name of *Curcuma Longa*) is an exceptional plant with respect to its many uses: spice, food conservative, coloring agent, cosmetic and medical. If it has been widely known throughout South-East Asia since antiquity, today *Curcuma* is also the subject of many scientific studies worldwide. In order to determine its food and medical properties, we interest ourselves in turmeric originating from Brazil by determining its chemical composition by GC, GC-MS through kinetic and several other extraction techniques. This study's final objective is the determination of the appropriate extraction process for improving yielded essential oil quality. The processes of extraction selected for obtaining essential oil are: traditional hydrodistillation (HD), hydrodistillation assisted by microwaves (HD-MO), and steam distillation assisted by microwaves, SDAMO, using cryogrinding with liquid nitrogen at (-196°C).

**PP-269**

**VALUABLE PHENOLIC DERIVATIVES FROM KNOTWOOD OF VARIOUS TREE SPECIES**

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Knot of different softwood species, available as by-products of pulp and paper industry, have been intensively studied and identified to contain high amounts of lignans in concentrations up to several hundred times higher than heartwood<sup>1</sup>. Such phenolic compounds constitute a valuable pool of bio-sourced molecules with potential applications as antioxidants in cosmetic and pharmaceutical sectors<sup>2</sup>. However, relatively few studies exist on the characterization of knot extractives of other wood species.

This study focused on the quantification and characterization of phenolic compounds such as lignans, stilbenes and flavonoids present in knotwood of twenty six tree species. Knotwood and heartwood sawdusts were Soxhlet-extracted using successively dichloromethane, acetone, toluene/ethanol and water. GC-MS allowed the identification and quantification of extractives present in the acetone fraction expected to contain higher amounts of phenols.

Total extract concentrations in knotwood ranged from 6.3 % to 45.3 % of the sawdust according to the species while the range is from 3.9 % to 21.6 % in heartwood. The main compounds were lignans (hydroxymatairesinol, nortrachelogenin), flavonoids (catechin, taxifolin, robinetin) and stilbenes. Indisputably, knots are a new provider of high amounts of antioxidant polyphenols with a lot of expected applications.

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<sup>2</sup>S. Pietarinen, S. Willför, M. Ahotupa, J. Hemming, B. Holmbom. Knotwood and bark extracts: strong antioxidants from waste materials, 2006 *Journal of wood science*, 52: 436-444

**PP-270**

**VOLATILE OIL COMPAUNDS (VOC)S OF ENDEMIC ORNAMENTAL AND AROMATIC SPECİES-*MUSCARI MUSCARIMI* MEDİK. (LİLİACEAE)**

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There are 28 *Muscari* species in Turkey and *Muscari muscarimi* Medik. is also important species with their attractive flowers and pleasant smell among these species. The species which belongs to the family Liliaceae, is a geophyte endemic to Turkey and the distribution areas of the species are Antalya and Denizli provinces in Turkey. Extensive habitat destruction in these provinces threatened the existence of the species. Irregular collection and exportation of the species from their natural habitats are prohibited in Turkey. The species has white flowers with their intense musky fragrance. Because of volatile oil compounds (VOC)s of the species in its flowers is too low or in trace amounts, the flowers were harvested April 2104 and kept immediately in hexane in this study. After the hexane was evaporated, GC-MS analysis revealed six major (VOC)s. M-cymene (24,33 %), Terpinene (21 %) and Eucalyptol (14,38 %) were identified as a basic VOC in this valuable plant and the species may be considered in perfume and pharmaceutical industry.



**PP-271**

**ANTIMICROBIAL AND PHYTOCHEMICAL SCREENING OF *CORDIA AFRICANA* IN SUDAN**

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The present study was conducted to investigate the antimicrobial activity and phytochemical screening for different parts (leaves, stem, park and fruit) of *Cordia africana*. The extracts of *C. africana* were screened for their antimicrobial activity against four standard bacteria, two Gram-positive bacterial strains (*Bacillus subtilis* and *Staphylococcus aureus*), two Gram-negative bacterial strains (*Escherichia coli* and *Pseudomonas aeruginosa*) and two standard fungal strains (*Apergillus niger* and *Candida albicans*) using the cup plate agar diffusion method. The methanol extract of *C. Africana* extracts exhibited inhibitory effects against most of the tested organisms with zone of inhibition ranging from (11-30 mm). Phytochemical investigations for the methanolic extracts showed the presences of cumarins, saponins, sterols and triterpens, while anthraquienones glycosides, alkaloids and cyanogenic glycosides were absent.

In conclusion: The extracts of *C. africana* can be used for the treatment of bacterial and fungal infections.

**PP-272**

**HISTOLOGICAL AND PHYTOCHEMICAL STUDY OF TWO SPECIES OF THE HYPERICACÉES FAMILY: *Hypericum androsaemum* L. AND *Hypericum montanum* L., From THE EDOUGH PENINSULA (N.E. ALGERIA).**

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St. John's Wort *Hypericum androsaemum* L. is a plant that was used long ago in Herbal Medicine. As for mountain St. John's wort *Hypericum montanum* L., it has never been used in medicine but rather as an ornamental. That's why we are interested in these two plants based on the following:

1. A study of bioclimatic zone sampling to identify and control the data that may influence climate on plant communities (vegetation cover), allowed us to characterize the type of Seraïdi's climate: "Climate wet" as the two plants require [3] et [4].
2. A histological study of the leaves and stems of both species was made in order to determine their different anatomical structures, and we showed the presence of prominent wings on the stems of *Hypericum androsaemum* L. absent in *Hypericum montanum* L. [2].
3. A chemical screening of secondary metabolites (leaf) was made in order to make a comparison in terms of their chemical composition, and revealed the common presence in both species the following active ingredients: flavonoids, catechin tannins, anthocyanins, and Terpenes Sterols [2]. The chemical screening has also revealed the presence of cardenolides in *Hypericum androsaemum* L. and Leuco-Anthocyanins in *Hypericum montanum* L.
4. Extraction of essential oils by steam distillation was performed on leaves of both species. Performance in *Hypericum montanum* L. essential oils was 0.30% while for *Hypericum androsaemum* L., it was lower with 0.08%.

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4. Quézel P. et Santa S. 1963. Nouvelle flore de l'Algérie et des régions désertiques méridionales- tome 2 Ed. Centre National de la Recherche Scientifique p521.

**PP-273**

**SEASONAL VARIATION OF PHENOLICS AND FLAVONOID CONTENT  
IN *THYMUS CILIATUS* SSP *COLORATUS* FROM ALGERIA**

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The genus of thymus belonging to the lamiaceae family, several species grow wild in Algeria, among which *Thymus ciliatus ssp coloratus*, which is an endemic species from North Africa, and commonly used in folk medicine.

The seasonal variation of total phenolic and flavonoid content was studied in aerial party of *Thymus ciliatus* from Ain barber Annaba and histological study was investigated.

Total phenolic and flavonoid was determined by colorimetric assay, and the total phenolic increase over a month of june  $47,74 \pm 1,72$  GAEmg/g and total flavonoid increase over a month of May  $26,45 \pm 0,41$ CEA mg/g

in conclusion they aren't negative correlation between total flavonoid and phenolic and seasonal variation, we herein report the first investigation on phytochemical study of *Thymus ciliatus ssp coloratus*

**PP-274**

**ANTIPROLIFERATIVE, GENOTOXIC AND OXIDANT ACTIVITIES OF PHYSODIC ACID FROM LICHEN SECONDARY METABOLITES AGAINST HUMAN GLIOBLASTOMA MULTIFORME CELLS**

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Glioblastoma multiforme (GBM), the most dangerous form of astrocytomas, is the highest grade (grade IV) glioma tumor. Since GBM always grows rapidly and shows highly malignant property, it is known as grade IV tumor. Since surgery, radiotherapy and chemotherapy methods utilized in treatment process with GBM, usage of herbal products in the treatment process come into prominence. Lichens are symbiotic organisms used medicinal purposes for many years. It was reported that antitumorigenic activities of secondary metabolites from lichens on different cancer cells. In this study, it was determined cytotoxic, genotoxic, antioxidant and pro-oxidant activities of physodic acid (PA) isolated from *Pseudevernia furfuracea* (L.) Zopf against U87MG, GBM cell line. In addition, comparative effects of PA on healthy and cancerous brain cells were revealed performing the researches on primary mouse cerebral cortex (PMCC) cells. Cytotoxic effects of metabolite were determined via 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) and lactate dehydrogenase (LDH) analyses. Total antioxidant capacity (TAC) and total oxidant status (TOS) parameters were used for evaluation of oxidative effects in the cell cultures. At the same time, oxidative deoxyribonucleic acid (DNA) damage levels of lichen secondary metabolites on healthy and cancerous brain cells were investigated by 8-hydroxy-2'-deoxyguanosine (8-OH-dG) activity. After 72 h median inhibitory concentration (IC<sub>50</sub>) values were 410.72 and 698.19 for U87MG and PMCC cells, respectively. LDH and 8-OH-dG activities increased in a concentration-dependent manner for both cells. While there was a positive correlation between TAC activity and concentration for PMCC cells, concentrations of 2.5 and 10 mg/L of PA had higher TAC activity for U87MG cells. It was assessed that on PMCC cells maximum concentration (40 mg/L) of PA and on U87MG cells minimum concentration (2.5 mg/L) of PA showed higher TOS activity. It can be hypothesised from the current study that the antioxidant and anticancer potential of *P. furfuracea* lichen may reside in PA secondary metabolite present in it and therefore, PA may be used as a possible source of natural antioxidant that may be developed to an anticancer agent.

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**PP-275**

**ANTIOXIDANT EXTRACTS OF AN EDIBLE MUSHROOM, *Lactarius deliciosus*, INHIBITS CELL PROLIFERATION IN LIVER HEPATOCELLULAR CARCINOMA CELL LINE HEPG2 AND BACTERIAL GROWTH**

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In this study, it was determined cell growth inhibitory potential of an edible mushrooms; *Lactarius deliciosus* (L.) Gray on HepG2 cells together with their antioxidant and antibacterial power. Antioxidant activities methanolic and aqueous extracts of *Lactarius deliciosus* were assayed by using 2,2-diphenyl-1-picrylhydrazyl (DPPH) scavenging activity, reducing power and iron chelating. Furthermore, total phenol, flavonoid,  $\beta$ -carotene and lycopene contents of these mushroom extracts were also determined. All extracts exhibited potent and concentration dependent free radical scavenging activity in all the assays tested. For DPPH scavenging activity, IC<sub>50</sub> values of methanol and water extract were 55.318 and 9.664 mg/ml, respectively. Reductive abilities of these extracts were also found an increasing in a concentration-dependent manner. For reducing power, EC<sub>50</sub> values of methanol and water extract were 15.697 and 4.329 mg/ml, respectively. IC<sub>50</sub> values for chelating on ferrous ions were 4.849 (for methanol extract) and 4.583 (for water extract) mg/ml. Total phenol, flavonoid,  $\beta$ -carotene and lycopene content determination showed that all the extracts are rich in antioxidant compounds. The highest quantity was determined in total phenol content (9.1  $\mu$ g/mg) for methanol extract. When cytotoxic effects of two extracts were investigated after 48 and 72 h, it was determined that cell viability decreased depending on passing of time. When compared the IC<sub>50</sub> values, the highest cytotoxicity capacities were determined after 72 h. While 72 h IC<sub>50</sub> value of methanol extract of *L. deliciosus* was 7.894 mg/ml, 72 h IC<sub>50</sub> value of water extract was 3.575 mg/ml. At the same time, IC<sub>50</sub> values of two extracts after 48 and 72 h were statistically ( $p < 0.05$ ) different from each other. In the antimicrobial treatment, methanol extract showed 6 and 9 mm inhibition zone against *Staphylococcus aureus* and *Agrobacterium tumefaciens*, respectively. Water extract formed 8 and 7 mm inhibition zone against *Bacillus subtilis* and *A. tumefaciens*. The present study shows that tested extracts demonstrated a strong antioxidant, antimicrobial and anticancer effects. The results suggest that *L. deliciosus* may be used as natural antioxidant, antimicrobial and anticancer agents to control various human, animal and plant diseases.

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**PP-276**

**COMPARATIVE STUDIES OF ANTIBACTERIAL EFFECT OF SOME PLANT EXTRACTS AND SOME ANTIBIOTICS ON FOUR PATHOGENIC BACTERIA**

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In this study, the comparative microbial effects of chili, dill, field horse tail and thyme extracts on four pathogenic bacteria such as *Escherichia coli*, *Klebsiella pneumoniae*, *Staphylococcus aureus* and *Pseudomonas aerogenosa* were investigated. The extracts were prepared from leaves and fruits for each plant by using conventional water extraction method. Some antibiotics, e.g. Rifamcin, Clindamycin, Vancomycin, Erythromycin, Ciprofloxacin, Tobromycin, Crftazidime and Imipenem, were used as controls.

The results showed that the water extract of thyme and chili leaves had the highest antibacterial activity compared to the other plant extracts mentioned above. However, synthetic antibiotics just mentioned above were found to be more effective on bacteria in comparison with tyh eextract of thyme and chili leaves. This findings indicated that the water extracts of these plants could be used alone or together with conventional antibiotics to fight the against bacterial infection.

**PP-277**

**THE EXTRACTION OF *SALIX AEGYPTIACA* L. ROOT AND ITS DPPH SCAVENGING ACTIVITY**

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*Salix aegyptiaca* L. is known as Musk Willow. It has been used in traditional medicines for the relief of anemia and vertigo, as a cardiogenic agent as well as a fragrance additive in the preparation of local candies. *S. aegyptiaca* has recently been shown to have antioxidant, anxiolytic activity and hypocholesterolemic effects. High amounts of phenols and flavonoids such as gallic acid, caffeic acid, myricetin, catechin, quercetin as well as salicin, are reported from the leaves of this plant. The purpose of this study was to find the antioxidant activity and the extract yield percentage of the root of *Salix aegyptiaca* L. For the extraction of the roots, water, ethanol and methanol were used as solvents by using various extraction methods, e.g. accelerated solvent extraction (ASE), conventional extraction (CE) and microwave extraction (ME) methods. The antioxidant activities of extracts were measured by UV-vis spectrophotometer at 517 nm. Butylated hydroxytoluene (BHT) and 1,1-diphenyl-2-picrylhydrazyl (DPPH) were employed as reference and free radical, respectively.

In conclusion, the highest DPPH scavenging activity (98,8%) was determined by methanol extract obtained with ASE method while the lowest DPPH scavenging activity value (97,5%) was for the ethanol extract by using ME method. The DPPH scavenging power of the whole extracts studied here is higher than that of BHT. Furthermore, the highest extraction yield (17,3 %) was found by ASE technique.

PP-278

**AN ANTIOXIDANT STUDY ON EXTRACTS OF IRAQIAN *TRIBULUS TERRISTERIS* L. ROOT**

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The plant used in present study is *Tribulus terrestris* L. known as Puncture Vine, Caltrop, Yellow Vine and Goathead. It is a flowering plant of the Zygophyllaceae family, native to warm temperature and tropical regions of the old world in Southern Europe, Southern Asia, Africa and Northern Australia. It could thrive even in desert climates and poor soil. In Iraq, *T. terrestris* has been used in folk medicine as tonic, aphrodisiac, analgesic, astringent, stomachic, anti-hypertensive, diuretic, lithon-triptic and urinary anti-infective. The aim of present study was to find the antioxidant activity and the yield percentage of the root extracts of *Tribulus terrestris* L. For the extraction of the roots, ethanol, methanol and water were used as solvents by using different extraction methods, e.g. conventional, microwave and accelerated solvent extraction (ASE) methods. The total antioxidant activities of extracts were evaluated by Uv-vis spectrophotometer. 1,1-diphenyl-2-picrylhydrazyl (DPPH) and butylated hydroxytoluene (BHT) were used as a free radical and reference, respectively.

The highest DPPH scavenging power (85.2%) was determined for methanol extract obtained by means of ASE method whereas the lowest DPPH scavenging power (76.0 %) was observed for ethanol extract from conventional extraction method. The DPPH scavenging power of the ethanol extract was higher than that of BHT. However, DPPH scavenging power of methanol extracts was lower than that of BHT. Moreover, the highest extraction yield (12 %) was also determined by ASE method.



**PP-279**

**ANTIOXIDANT AND METAL CHELATING PROPERTIES OF ONION VARIETIES**

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Onion (*Allium cepa* L.) is a bulbous geophyte belongs to the Liliaceae family. Onion which is indispensable of Turkish cuisine and also international cuisine has a very high nutritional value. Onion, has been had a wide usage area as food and medicine since ancient times. In scientific researches, it has been identified that onion is one of the powerful antioxidants and plays an effective role in removal of heavy metals from the body. In this study, some antioxidant activities of onion varieties (white, yellow, red colored onions), famed as Adapazarı onion, in our country, was determined, comparatively. The species belonging to this genus, were studied in terms of their antioxidant activities, while research in comparative antioxidant activities of different colored varieties of the same species is quite limited. In this research, antioxidant properties and contents of phenolic compounds were analyzed in white, yellow and red onion samples obtained from Adapazarı. Free radical removal capacity of each 3 samples was determined by DPPH (1, 1-diphenyl-2-picrylhydrazyl) method. According to the obtained results, highest antioxidant activity was observed in red onion with 86.2% inhibition value, 75.4% in yellow onion, and 67.8% in white onion respectively. These extracts also been detected to have effective reducing power and metal chelating activities.

As a result, onion bulbs especially red onion showed strong antioxidant and antiradical scavenging and metal chelating activities which may contribute to the interpretation of the pharmacological and medicinal effects of *A. cepa*. In this investigation, role of onion in Turkish cuisine due to its flavor to our food as well as the floor and its protective properties was emphasized and the data obtained from this research is intended to clarify the deficiencies in this area, and to be a ground work for new researches.

**PP-280**

**THE INVESTIGATION OF DNA PROTECTIVE ACTIVITY OF THE EXTRACTS OF *HYPERICUM CAPITATUM* VAR. *CAPITATUM***

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*Hypericum* species locally known as “binbirdelik otu, kan otu, kılıç otu and koyunkıran” are of important plant species in Turkey. Those plants and their parts used for treating various human ailments. They are represented with ninety-four different taxa in Turkey and some of them are endemic. Of those species, *Hypericum capitatum* CHOISY var. *capitatum* CHOISY with red-coloured flowers, an endemic, where distributes especially in south eastern regions of Turkey. A huge number of studies concerned with *Hypericum* spp. in relation to their phytochemical content and their biological efficacies in comparison but there are few published data about *Hypericum capitatum* CHOISY var. *capitatum* CHOISY. In this context, the present study was designed to investigate of DNA protective effects of *Hypericum capitatum* var. *capitatum* against to the DNA damage generated by H<sub>2</sub>O<sub>2</sub> and UV. For this purpose stem, leaves and flowers of *Hypericum capitatum* var. *capitatum* were collected at the flowering stage from natural habitats in Kilis and dried in laboratory conditions. Air dried powdered specimens were exhaustively extracted with water and ethanol by Soxhlet. pBR322 plasmid DNA (vivantis) was used for evaluation the DNA protective activity of the extracts against to H<sub>2</sub>O<sub>2</sub> and UV and different groups were used including untreated pBR322 plasmid DNA, treated with H<sub>2</sub>O<sub>2</sub> and UV pBR322 plasmid DNA, treated with only H<sub>2</sub>O<sub>2</sub> pBR322 plasmid DNA and treated with only UV pBR322 plasmid DNA. Each treatment group was analyzed on a 1.5% agarose gel using ethidium bromide staining and photographed in Gel Doc. and finally DNA fragmentation patterns were separated by agarose gel electrophoresis. According to the results of DNA fragmentation patterns, the water extracts of *Hypericum capitatum* var. *capitatum* were found high protective activity when compared with the ethanol extracts. In conclusion, we can say that this study has clearly demonstrated all of the *Hypericum capitatum* var. *capitatum* plant extracts have DNA protection potentials. This result indicates that *Hypericum capitatum* var. *capitatum* is significant as medicinal plants.

**PP-281**

**ETHYL ACETATE EXTRACT OF *ARTEMISIA HERBA-ALBA* AFFECTS MOTORIC FUNCTION IN RATS**

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*Artemisia herba-alba* Asso (AHA) is traditionally used for treatment of neurological disorders in Mediterranean countries. Recent *in vitro* studies have demonstrated that specific flavonoids from ethyl acetate extract of AHA show affinity for GABA<sub>A</sub> receptors, that play important role in functioning of central nervous system. This discovery, at least to some extent, offered justification for AHA usage in the treatment of certain neurological diseases, and also revealed possible effect on mammalian behavior that has never been investigated so far. The aim of our study was to investigate the effect of ethyl acetate extract of AHA on motor behavior. We performed experiments in adult male Wistar rats that were exposed to open field test after intraperitoneal application of three increasing doses (10, 30 i 100 mg/kg) of ethyl acetate extract of AHA. Saline containing Tween 80 was used in control group of animals. Our results show significant decrease in vertical activity (supported and nonsupported rears), decreased numbers of squares crossed and increased tighmotaxis after application of highest dose of ethyl acetate extract compared to controls. These results unfold the possibilities for further investigations in this field.

**PP-282**

**ANTIOXIDANT ACTIVITY OF LEAF EXTRACT AND INFUSIONS OF  
*AMPHORICARPOS AUTARIATUS***

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*Amphoricarpos autariatus* Blečić & Mayer perennial chasmophytic plant, growing on mountain rock in Montenegro and Bosnia, belongs to the Asteraceae family, Cardueae tribe. Cytotoxic and antimicrobial activity of *Amphoricarpos* species, is known. Also, *Xeranthemum annuum* L., related species, is used in traditional medicine in cancer treatment. In the present study, antioxidative activity of methanolic extract, methanolic and water infusions of leaves from *A. autariatus* were investigated. The antioxidative capacity was assessed using DPPH assay. Total phenolic and flavonoid content was also determined. Methanolic extract showed the highest antioxidative activity (DPPH IC<sub>50</sub> = 170 ± 1.58 µg/ml), comparing to methanolic and water infusions (DPPH IC<sub>50</sub> = 565.02 ± 1.45 µg/ml and DPPH IC<sub>50</sub> = 676.18 ± 1.84 µg/ml, respectively). The total flavonoid content were 13.14 ± 0.12 mg/g (water infusion), 21.14 ± 0.22 mg/g (methanolic infusion) and 88.96 ± 1.33 mg/g (methanolic extract), while the total phenolic content were 19.71 ± 0.46 mg/g (water infusion), 25.10 ± 0.50 mg/g (methanolic infusion) and 67.23 ± 0.70 mg/g (methanolic extract). Present results demonstrate that the antioxidative activity is in the correlation with the concentrations of the phenolic and the flavonoid compounds.

These results indicate that *A. autariatus* has good antioxidative capacity and could be considered as natural source of antioxidant agents.

**PP-283**

**ANTIOXIDANT ACTIVITY OF *N*-HEXANE, ETHYL ACETATE AND METHANOL LEAF EXTRACTS OF SOME *CENTAUREA* SPECIES**

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*Centaurea* species have long been used as medicinal plants against diabetes, diarrhea, rheumatism, high-temperature, headache etc. In this work the antioxidative capacity of crude leaf extracts of eight *Centaurea* species (*C. atropurpurea* Waldst. & Kit., *C. chrysolepis* Vis., *C. gjurasinii* Bošnjak, *C. kotschyana* Heuffel ex Koch, *C. orientalis* L., *C. immanuellis-loewi* Degen, *C. murbeckii* Hayek and *C. grbavacensis* (Rohlena) Stoj. Acht.) from the Balkans were investigated. The antioxidative capacity was evaluated using DPPH and ABTS assays. Total phenolic and flavonoid content was also determined. The leaf extracts were obtained using Soxhlet type apparatus, with three different solvents (*n*-hexane, ethyl-acetate, methanol). The highest activity was detected with methanol extracts of *C. atropurpurea* (DPPH IC<sub>50</sub>=0.120mg/ml; ABTS AAEC=0.313mg/ml), *C. orientalis* (DPPH IC<sub>50</sub>=0.160mg/ml; ABTS AAEC=0.260mg/ml) and *C. immanuelis-loewi* (DPPH IC<sub>50</sub>=0.187 mg/ml; ABTS AAEC=0.161mg/ml). The total flavonoid concentrations varied from 6.8 to 212.1 µg/ml, while the total phenolic concentrations were in range from 3.0 to 268.2 µg/ml. Obtained results showed that the antioxidative activity is in the correlation with the concentrations of the phenolic compounds. No correlation was found with the total flavonoid concentrations.

This finding suggests that *Centuarea* species may be considered as natural source of antioxidant agents.

**PP-284**

**COLLAGEN HYDROLYSATE-ZEOLITE-ESSENTIAL OIL  
ANTIMICROBIAL SYSTEMS**

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Natural medical, pharmaceutical and cosmetic products and their ingredients have attracted increasing attention during the last decades. Due to their properties, natural ingredients with functional and biological activity are continuously researched. In the recent years the interest in using essential oils in pharmaceuticals and medicine increased. Due to their biologically active compounds essential oils have been shown to have antibacterial, antifungal, antiviral and antioxidant properties. In this study natural systems based on three types of ingredients: essential oils (*Myrtus communis* L., *Origanum syriacum* L. var *bevanii*, *Salvia officinalis* L. and *Thymbra spicata* L.), zeolite and collagen hydrolysate were obtained and characterized by GC-MS, zeta sizer potential, thermal stability and stability at centrifugation. The antimicrobial activities of collagen hydrolysate-zeolite-essential oil systems were test against *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Escherichia coli* and *Candida albicans*. The best antimicrobial system was proved to be based on collagen, sage essential oil and zeolite. This system can be use as coating for medical implants, active ingredient and cosmetic and cosmeceutics and antimicrobial in pharmaceuticals for treatment of different kind of infections.

**Acknowledgement**

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**PP-285**

**FATTY ACID PROFILES IN THE AERIAL PARTS AND ROOTS OF WILD BEET (*Beta maritima* L. var. *pilosa* Del**

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Chenopodiaceae family contains about 103 genera and 1400 species worldwide. In Turkey there are about 129 species from 33 genera. The members of the family are annual or perennial herbaceous plants that are spreaded out in many places all over the world but especially on dry regions, gravel soil, sea coasts, sides of the roads, sides and insides of fields and soils that are rich in nitrogen and potassium nitrate. The spread zone of this variety in Turkey is the coastal and inner parts of Western and Northern Anatolia. In the present study, the fatty acid composition in the aerial parts and roots of Wild Beet (*Beta maritima* L. var. *pilosa* Del.) were examined. After the aerial parts and roots of Wild Beet were dried and ground, methyl ester of hexane extract of Wild Beet was analysed by Gas Chromatography-Mass Spectroscopy (GC-MS). In the methylated hexane extract of the aerial parts 9-octadecenoic acid (33.31%), 8,11-octadecanoic acid (27.84%) and hexadecanoic acid (16.95%) were the major fatty acids elucidated. In the methylated hexane extract of the roots hexadecanoic acid (25.16%), 9,12-octadecanoic acid (24.05%), 9-octadecenoic acid (20.40%) were the major fatty acids elucidated

**PP-286**

**CHEMICAL PROFILE RELATION BETWEEN *Cuscuta arvensis* Beyr. AND ITS HOSTS**

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*Cuscuta* species are chlorophyll-free parasitic herbs, which belong to Cuscutaceae family. They can not produce their own sources instead they utilize the hosts and what they provides. We aimed to analyze selected *Cuscuta* spp. and their host plants (olive, grape, licorice, pepper and pomegranate) in terms of their phytochemical contents and antioxidant activities. First of all a methanolic extract was prepared from each cuscuta sp. and their host plants. These extracts initially were analyzed by thin layer chromatography in order to determine and to compare the chemical profile of compound/compounds both in *Cuscuta* sp. and their hosts. Later on all the extracts were analyzed for their total phenolics by Folin-Ciocalteu, total flavonoids and *in vitro* antioxidant activities by using 2,2-diphenyl picrylhydrazyl (DPPH). The compared results will be discussed.



**PP-287**

**PRE-PHYTOCHEMICAL ANALYSIS AND RADICAL  
SCAVENGING ACTIVITY OF *Cuscuta arvensis* Beyr. METHANOLIC  
EXTRACT**

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*Cuscuta arvensis* Beyr. known as IKSUT in Turkish Folk medicine, mostly applied to prevent or heal liver disturbances, and physiological hepatitis, which occur in newborns and their others. Therefore, the effect of *C. arvensis* extracts were explored for their pharmacological activities. Hepatoprotective activity of the polar, methanolic and aqueous extracts were determined by in vivo experiments using rats. In this study, we decided to reseach methanolic extract in detail. To determine the chemical profile for possible valuable compounds of the plant were analyzed by chromatographic methods in order to determine the responsible compound/compounds. Firstly, poliamid column chromatography (CC) was used and phenolic compounds were separated from other compounds. Then, fractions of CC were analyzed by means of preparative thin layer chromatography. The results will be discussed.

**PP-288**

**RAW RESOURCES AND COMPOSITION ESSENTIAL OIL PEROVSKIA  
ABROTANOIDES KAREL IN CONDITIONS OF KYRGYZSTAN**

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Carried out a study on the feedstock and the component composition of essential oil of plant Perovskaya wormwood. In researched geobotanically region in 9 sections were found natural thickets Perovskaya abrotanoides on a total area of 38.5 hectares, with an average productivity of 344 kg / ha of air-dry raw material. Summary biological stock is 13.75 ton for operational reserves 9.1 ton annual harvesting volume should not exceed 4.5-5 ton. In the study were established the presence 51 components in the essential oil, of which 39 were identified. In the percentage correlation dominated  $\alpha$ -pinene (5,795), camphene (4,223),  $\Delta$  cubed – Karen (12,696). Oxygen-containing components of the percentage correlation: 1,8-Cineole (6,965), camphor (33,766). In the over ground mass were found 0.47-0.94 % essential oil, which contained up to 26 % camphor, also flavonoids, coumarin, lactones and traces of alkaloids. When comparing the data presented in the literature revealed that essential oils of PEROVSKIA ABROTANOIDES which grows in different ecological areas Central Asia similar in physicochemical constants.

PP-289

**CHEMICAL COMPOSITION AND ANTIMICROBIAL ACTIVITY OF THE ESSENTIAL OIL OF *CONYZA CANADENSIS* (L.) CRONQUIST FROM TURKEY**

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The genus *Conyza* Less. (Asteraceae) consists of about fifty species from all over the world. In Turkey, the genus *Conyza* is represented by three species, namely *Conyza canadensis* (L.) Cronquist, *C. bonariensis* (L.) Cronquist and *C. albida* Willd. ex. Sprengel. *C. canadensis* (syn. *Erigeron canadensis* L.) is an annual plant, erect with one to several sparse hairy stems reaching 10 to 180 cm high<sup>1,2</sup>. In traditional medicines, *C. canadensis* is used for the treatment of gastrointestinal disorders such as diarrhea, dysentery and as diuretic agent as well as against rheumatic symptoms<sup>3</sup>. The essential oil of the plant was applied against bronchitis and cystitis in Indian<sup>4</sup>.

In our study, the essential oils of the aerial parts and roots of *C. canadensis* collected from Manavgat, Antalya in the flowering stage in August 2014 were obtained using a Clevenger-type apparatus. The chemical composition of the essential oils was analyzed by GC-FID and GC-MS, simultaneously. Major components of the essential oil of the aerial parts were found as limonene (28.1%), spathulenol (16.3%) and  $\beta$ -pinene (9.7%). The root essential oil mainly contained *cis*-lachnophyllum ester (86.5%), (2Z,8Z)-matricaria ester (3.9%) and  $\beta$ -pinene (2.3%). In addition, antimicrobial activity of the essential oils was screened against Gram-positive and Gram-negative bacteria, and fungi by Broth microdilution method. Both of the essential oils exhibited antifungal activity against *Candida albicans* ATCC 10231 with 0.078  $\mu$ g/ml MIC values. The highest antibacterial activity was observed by aerial parts oil against *Escherichia coli* RSKK 234 (MIC: 0.039  $\mu$ g/ml). This is the first study of composition of the essential oil and antimicrobial activity obtained from the aerial parts and roots of *C. canadensis* growing in Turkey.

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**PP-290**

**DETERMINATION of TOTAL PHENOLIC and TOTAL FLAVONOID CONTENT OF *Phlomis lycia***

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The genus *Phlomis* (*Labiatae*) consists of about 100 species, few species of them are used as tonics and stimulants in Anatolian folk medicine. *Phlomis* contains iridoids, flavonoids, phenylpropanoids, phenylethanoids, lignans, neolignans, diterpenoids, alkaloids and essential oils. In this study, *Phlomis lycia* was collected from Kemer-Beycik district of Antalya at 459 m altitude in flowering period. Total phenolic content and total flavonoid content analyses were done with UV-Vis spectrophotometric method. Methanol and ethanol were used respectively in the extraction. In methanol extraction, total phenolic content were determined as 32.53 mg GAE/g plant and in ethanol extraction total phenolic content were determined as 34.10 mg GAE/g plant. In total flavonoid analysis, total flavonoid content were determined as 14.35 mg CE/g plant in methanol extraction and total flavonoid content were determined as 15.73 mg CE/g plant in ethanol extraction. As a result, it was seen that ethanol extraction gives better results than methanol extraction both in total phenolic content and total flavonoid analyses.

**PP-291**

**DETERMINATION of ESSENTIAL OIL COMPONENTS of *Phlomis lycia***

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The genus *Phlomis* L. has more than 100 species deployed in Euro-Asia and North Africa. A number of *Phlomis* species have medicinal characteristics. They are used for herbal teas as stimulants, tonics and diuretics, and they are also claimed to exhibit interesting biological properties for the treatment of ulcers and haemorrhoids. In this study, *Phlomis lycia* was collected from Kemer-Beycik district of Antalya at 459 m altitude in flowering period. Essential oil rate was determined by hydrodistillation method and essential oil component analyses were done by GC and GC/MS. The percentage contents of the components was determined by FID dedector. The essential oil rate was determined as 0.15%. The main essential oil components were determined as Germacrene D (28.66%),  $\beta$ -caryophyllene (21.40%),  $\gamma$ -elemene (17.69%) and caryophyllene oxide (4.93%).

**PP-292**

**ESSENTIAL OIL CONTENT AND COMPOSITION OF MOUNTAIN TEA  
(*Sideritis brevibracteata*<sup>e</sup>) SPECIES GROWN IN NATIVE**

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The objectives of this study were to determine quality traits of *Sideritis* (*Sideritis brevibracteata*<sup>e</sup> (**endemic**) species collected from the flora of Antalya, Turkey. Essential oil components were determined before inflorescences (BF), during inflorescences (F) and after inflorescences (AF) of species grown in wild. The essential oil components of aerial parts from *Sideritis brevibracteata*<sup>e</sup> were investigated by GC and GC–MS.

The highest essential oil rate was obtained from before inflorescences stage (0.05%) and followed by after inflorescences stage of 0.04% from *Sideritis brevibracteata*<sup>e</sup>.

The average constituents *Sideritis brevibracteata*<sup>e</sup> was found to be 47 compnents. *Sideritis brevibracteata*<sup>e</sup> was contained mainly beta-Caryophyllene (39,37%) inflorescences and (**30,37%**) after inflorescences stage. The other major constituents of *Sideritis congesta* was found to be germacrene-D (15,89%) before inflorescences and (14,89%) after inflorescences satage.

**PP-293**

**DETERMINATION OF ANTIBACTERIAL AND ANTIOXIDANT ACTIVITY OF *Phlomis lycia* EXTRACT**

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*Phlomis lycia*, is a commonly find species of *Phlomis* genus in South-West of Turkey. It has a long-standing use in Turkish traditional medicine.

*Phlomis lycia* was collected from Kemer-Beycik district of Antalya at 459 m altitude in flowering period and dried in shade. The ethanol and methanol extract were obtained by using aerial part of plant. The antioxidant activity and antibacterial effect of extracts were performed by DPPH free radical method and Disc Diffusion Method (CLSI 2006), respectively.

The IC<sub>50</sub> antioxidant value of the ethanolic extract and the methanolic extract were 5,46 mg sample/mg DPPH and 6,19 mg sample/mg DPPH, respectively. The ethanol extract had higher values of antioxidant capacity than methanol extract.

It was observed that the ethanolic extract was more efficient than methanolic extract on *Salmonella typhimurum* and *Staphylococcus epidermidis* ATCC 12228, and *Proteus hauseri* strains. Similar to the antioxidant capacity, the antibacterial activity of ethanol extract was higher than the methanolic extract. The study reveals that the antibacterial activity of these extracts would exert beneficial effects by virtue of their antioxidant activity.

**PP-294**

**DETERMINATION THE ANTIBACTERIAL ACTIVITY OF *Stevia rebaudiana* ESSENTIAL OIL**

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*Stevia rebaudiana* Bertoni is a subtropical perennial shrub of the Asteraceae family found in Paraguay and Brasil that produces sweet steviol glycosides in the leaves. In our previous study we reported that the essential oil of *Stevia rebaudiana* mainly contain 17 compounds and 13-epi manool oxide was the main component with %60.71.

In the present study the aerial parts of *Stevia rebaudiana* was harvested from the plot cultivation area of stevia in the boundaries of BATEM in september, and plant were dried in oven at 40°C for 24 hours. The essential oil of *Stevia rebaudiana* was obtained by hydrodistillation method. To determine the inhibition zone of essential oil on some bacterial and fungal strains the Disc Diffusion Method (CLSI 2006) was performed.

According to our results, *Stevia rebaudiana* essential oil was efficient against to *S. aureus* ATCC 43300, *S. aureus* ATCC 29213, *S. epidermidis* ATCC 12228, *E. faecalis* ATCC 29212 strains, with the inhibition zones 8mm, 8mm, 7mm, 7mm respectively.



**PP-295**

**DETERMINE STABILITY OF CHLOROPHYLL AND CONJUGATED DIENE IN VIRGIN OLIVE OIL**

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The objective of this work was study to determine the change in the chlorophyll content and also to identify pure of chlorophyll amount in olive oil and the K232 specific extinction coefficient values in Olive oil (VOO) subjected to high temperatures for 24 h. VOO, and subjected to 150, 160, 170, and 180. 190 and 200°C for 2, 4, 6, 8, 10, 12 and 24 h, and the chlorophyll content and the K232 specific extinction coefficient values were determined. The chlorophyll content of VOO decreased significantly as the treatment temperature and the extent of heat treatment increased ( $P<0.05$ ) Especially, the temperature above 180°C, the chlorophyll content decreased below 4% after 24 h. The Conjugated diene values of VOO increased significantly with increasing the treatment of temperature and time ( $P<0.05$ ). The K232 reached to 9.12 and 5.25, respectively, at 200°C after 24 however, the rates of the increase in these values did not change with respect to different temperature and time. A significant reverse relationship was found between the chlorophyll content and the K232 specific extinction coefficient values ( $P<0.05$ ). This study showed that chlorophyll, when increase temperature can causes to decrease the absorption chlorophyll amount and lose the value of concentration because as one of the major quality criteria for olive oils, also is heat-liable, and decomposes at high temperatures and long treatment times. In addition, increases in the conjugated diene contents of Virgin Olive Oil indicate the accelerated oxidation reactions at high temperatures; therefore it is no longer according to the official standards.

**PP-296**

**COMPOSITION AND ANTIBACTERIAL ACTIVITY OF ESSENTIAL OIL FROM *ECHINOPHORA TENUIFOLIA* L. GROWN IN TURKEY**

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*Echinophora tenuifolia* L., a member of the Umbelliferae family, is a typical aromatic plant of Mediterranean region. *Echinophora* species grow naturally in low rainfall areas of Anatolia. *E. tenuifolia* L. plants are biennial and 20-50 cm tall, with yellow petals and have brush growing habitus. Fresh or dried herb is used in folk medicine for wound healing and gastric ulcers [1]. This particular herb not only adds flavour for soup, meat, and dairy products but also aids the fermentation process of the *tarhana* dough and improves its keeping qualities [2,3].

Aerial parts of *E. tenuifolia* L. were collected during the flowering period in September, 2014 from Selçuk, İzmir and was deposited in the Medicinal and Aromatic Plants Laboratory of Batı Akdeniz Agricultural Research Institute. Dried plant material was subjected to hydrodistillation and the essential oil obtained was analyzed by GC/GC-MS. The essential oil was dominated by the presence of hydrocarbon monoterpenes with  $\alpha$ -phellandrene (41.0%) being the major component. Another important component was a phenylpropanoid derivative methyl eugenol (37.9%), an aromatic compound.  $\delta$ -3-carene (10.6%) and  $\beta$ -phellandrene (5.1%) were other dominant components, while sesquiterpenes were not detected.

The Disc Diffusion Method (CLSI 2006) was performed and it was seen that *Echinophora tenuifolia* essential oil rather efficient against to *Salmonella typhimurum* and *Staphylococcus epidermidis* ATCC 12228, the inhibition zone diameter was 12 mm and 11 mm, respectively.

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**PP-297**

**ASSESSMENT OF CHOLINESTERASE INHIBITORY POTENTIAL OF SEVERAL CITRUS SPECIES**

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Alzheimer's disease (AD) is a progressive, neurodegenerative disease which especially effects elderly population. AD is characterized by a progressive decline in the brain, which leads to memory loss, speech difficulties, behavioral disturbances, and, finally, to death. Pathogenesis of AD has not been elucidated yet but it is known that it is a degenerative neurological disorder characterized by senile plaques containing amyloid  $\beta$  protein and loss of cholinergic neuromediators in the brain. Cholinergic hypothesis has been the most accepted theory for AD in which a marked deficit in level of acetylcholine (ACh) has been defined in the AD patients. Therefore, inhibition of acetylcholinesterase (AChE) and butyrylcholinesterase (BChE), the enzymes responsible for hydrolysis of ACh at the cholinergic synapse, is the most established approach to treatment of AD. For this purpose, cholinesterase inhibitory activity of the ethanol extracts prepared from the peels of mandarin orange (*Citrus deliciosa*, *Citrus reticulata*-Lee, *Citrus reticulata*-Nova), lemon (*Citrus limon* cv. Interdonato, *Citrus limon* cv. Kara limon, *Citrus limon* cv. Kibris), grapefruit (*Citrus paradisi* var. Handerson, *Citrus paradisi* var. Red blush, *Citrus paradisi* var. Star rugby), and orange varieties (*Citrus sinensis* cv. Navelina, *Citrus sinensis* cv. Shamouti, *Citrus sinensis* cv. Valencia late, *Citrus sinensis* cv. Washington navel), minneola tangelo (*Citrus reticulata* Blanco  $\times$  *Citrus paradisi*), nagami kumquat (*Citrus japonica*), peels and leaves of bitter orange (*Citrus aurantium*), peels and seeds of pomelo (*Citrus maxima*) which are used as fruits in Turkey were tested using ELISA microtiter assay with Ellman's method. Our results revealed that all of the extracts were inactive against AChE, while some of them had a notable level of BChE inhibition. Among the tested extracts, *Citrus limon* cv. Kibris flavedo extract ( $70.28 \pm 1.12\%$ ) and *Citrus maxima* seed extract ( $69.86 \pm 1.87\%$ ) exhibited the highest inhibition value against BChE and emerged as the sources of possible BChE inhibitors for future studies.

**PP-298**

**PROFILING MEMORY-VITALIZING POTENTIAL OF SELECTED MALEAE (ROSACEAE) TRIBE TAXA FROM TURKEY**

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Among the neurodegenerative disorders, Alzheimer's disease (AD) has become one of the deadly type of dementia due to its progressive nature and partly-solved pathology. Since it mostly affects the elder population, it has constituted a serious health problem especially in developed countries with high population of elderly. According to "cholinergic hypothesis" proposed for AD pathology, cholinergic transmission slows down due to rapid break-down of acetylcholine hydrolyzed by acetylcholinesterase (AChE, EC 3.1.1.7). Additionally, another relevant enzyme, butyrylcholinesterase (BChE, EC 3.1.1.8), has been also shown in the plaques in excessive amount in the brains of AD patients. Consequently, inhibition of cholinesterases establishes an important target for new drug discovery towards AD. Since oxidative damage is one of the strong triggering factors for AD, antioxidant effect of these drugs could be an additional value for the treatment of this disease.

On the other hand, plants are well-known for their vital role in drug development and in this regards, we herein aim to screen some selected taxa from Maleae tribe from Rosaceae for their memory-vitalizing potential. In this study, the ethanol extracts of thirty-seven taxa belonging to the genera *Cotoneaster* Medik., *Pyrus* L., *Sorbus* L., and *Amelanchier* Medik. from the same tribe have been screened against AChE and BChE using ELISA microtiter assays. Furthermore, the extracts were subjected to the antioxidant assays *via* DMPD radical scavenging, metal-chelation and ferric-reducing power (FRAP) methods in ELISA-adapted manner. Total phenol contents of all extracts were determined spectrophotometrically. In this presentation, the detailed results of our screening on aforementioned plant species will be presented.

**PP-299**

**IN VITRO NEUROBIOLOGICAL EVALUATION OF RANDOMLY SELECTED FOURTEEN MEDICINAL AND EDIBLE PLANTS USING HIGH-THROUGHPUT SCREENING ASSAYS**

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Various polarity extracts from fourteen plant species randomly selected were subjected to high-throughput screening against acetylcholinesterase (AChE), butyrylcholinesterase (BChE), and tyrosinase (TYRO), the key enzymes related to Alzheimer's and Parkinson's diseases, using microtiter assays at 100 µg/ml.<sup>1,2</sup> Antioxidant effect of the extracts was also tested for their scavenging activity against DPPH, DMPD, and NO radicals as well as their ferric- (FRAP) and phosphomolibdenum-reducing power (PRAP) and metal-chelation capacity. Total phenol and flavonoid quantities in the extracts were determined spectrophotometrically. The most active extracts inhibiting AChE over 50% were *Centaurium erythraea* ssp. *rhodense* and *Posidonia oceanica*, while BChE was inhibited most effectively by *Posidonia oceanica* root extract (82.55 ± 2.14%), followed by *Origanum haussknechtii* (66.88 ± 0.17%), which also had the highest TYRO inhibition (35.28 ± 1.90%). *Zostera noltii*, *Posidonia oceanica*, and *Ricotia carnosulo* extracts possessed the best scavenging activity against DPPH, whereas the highest NO scavenging (70.19±0.43%) and FRAP (1.326±0.065) was caused by *Zostera noltii*. *Atriplex lasiantha* and *Ecballium elaterium* were the most active plants in PRAP and metal-chelation assays, respectively. Besides, *Atriplex lasiantha* was found to be a rich source of rutin by HPLC for the first time. Our data showed that the marine plants, especially *Zostera noltii* and *Posidonia oceanica* contain cholinesterase-inhibiting and antioxidant substances.

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plants and identification of potent inhibitors from *Garcinia subelliptica*. *Biosci. Biotechnol. Biochem.* **69**, 197-201.

**PP-300**

**IMMUNOMODULATORY EFFECT OF EXTRA VIRGIN OLIVE OIL FROM SIDI BEL ABBES REGION IN WISTAR RATS**

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The extra virgin olive oil is characterized in the local plan physicochemical and organoleptic. The results of sensory analysis show that it has a pale green color does not taste or smell revealing tampering with a clear appearance at 20 ° C for 24 hours. It has a bitter and pungent character detected by a taste panel which gave the note to 3.10 each. It also noted an intense fruity 4.8/10. The physicochemical parameters, namely acidity (0.1% oleic acid), density (0.916), the peroxide (04), the refractive index (01.4685), and saponification (184) are up to standard. Analysis of the fatty acid spectrum obtained by gas chromatography shows a wealth equivalent to 80% oleic acid, in addition to essential fatty acids. The in vivo study of the immunomodulatory activity of this oil is performed in male and female Wistar rats aged 8 weeks. A subcutaneous injection of extra virgin olive oil in the presence of ovalbumin as immunogen with Freund's adjuvant is performed as part of an immunization protocol of 35 days. A dose of 300 microliters of extra virgin olive oil is fed to male and female experimental groups simultaneously with an injection of 300 microliters of antigen solution of ovalbumin in the presence of Freund's adjuvant. Using the inverse radial immunodiffusion method show that the diameter of the settling (5.56 mm ± 0.74) corresponding to the IgG anti-OVA levels in the serum in control females is higher than that of control males (3.9 mm ± 0.45) thus showing a difference of more intense stimulation in control females (p <0.001). Among the experimental groups there is also a very highly significant difference (p = 0.0006). The injection of extra virgin olive oil has an immunomodulatory effect on the immune system of Wistar rats especially in females, resulting in a reduction of immunoglobulin G. in serum.

**PP-301**

**THE PRODUCTION OF PHENOLIC COMPOUNDS BY CALLUS CULTURE OF *Hypericum retusum* AUCHER**

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In this study the seeds of *H. retusum* were germinated in plant growth regulators(PGRs) free MS (Murashige and Skoog) medium. Callus was induced from leaf explants of shoots were proliferated in MS medium containing 0.5 mgL<sup>-1</sup> BAP(Benzilaminopürin). The effect of different PGRs such as BAP, KİN(Kinetin, 6-furfurilaminopürin) and 2,4-D (2,4-Diklorofenoksi asetic acid) were examined for the callus induction. The effect of different concentrations (15, 30 and 50 gL<sup>-1</sup>) of sucrose and glucose, initial medium pH (4.5, 5.8 and 6.5) and different light applications (constant light, constant dark and control) were investigated on the callus formation and the production of phenolic contents(hypericin, pseudohypericin, hiperoside, quercetin and chlorogenic acid) by LC-MS/MS.

The best percentage of callus formation (%70) was obtained from MS medium supplemented with 0.5 mgL<sup>-1</sup> KİN + 1.0 mgL<sup>-1</sup> 2,4-D. It was determined that the MS medium containing a 30 gL<sup>-1</sup> sucrose, pH 5.8 and under control light conditions have a positive effect on the callus growth. The highest phenolic compounds was found on the control group of the light applications(16 h light and 8 h darkness) and phenolic contents of callus grown in MS medium with different pH value and sugars varied among the treatments.

**TOPIC – III: Ethnobotany & Biodiversity**



**PP-302**

**CONTRIBUTION TO THE ECOLOGICAL STUDY OF TERFEZ OF SOUTH OF ALGERIA**

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Our work is about the ecological study of the harvest of terfez in two places in Lahmar: Oumchagag and Ouriah in the state of Béchar. The identification of terfez indicates that the studied region is rich with *Tirmania* which is represented by two kinds: *Tirmania pinoyi* and *Tirmania nivea*. The soil of the regions is sandy, calcareous and its phis somehow alkaline (8,22-8,53) with organic mater which is poor of assimilable phosphore and azote which is favorable for the development of terfez.

The climatic parameters of Lahmar show that the region of sowth west is charaterized by desertic continental climate .It is hot in summer (+45 °C) and cold in winter(2à3°C).The hasturess is 40mm /year and its repartition has sufficiant quantity (more than 90mm) is good for the development of terfez. For the two places the *Hélianthemum Lipii* is the host endemic for all sorts of terfez. The floristic report of the places of the studied terfez indicates that the floristic procession is some how varied and less dense because of the climatic paramiters. The accompanying plants which are dominated by astéracées and chénopodiacées are represented by 8 families and 12 kinds. The examination of roots of the host plant show that the endomycorhized form in the only natural form of the roots found during the harvest. The account of mycorhization varied between 65 and 70% .This evaluation reflects the richness of the fructifers bodies in each place of the terfez during favorable years of the development of terfez.

**PP-303**

**INVENTORY AND IDENTIFICATION OF BIODIVERSITY IN THE MOUNTAINS OF TESSALA (SIDI BEL ABBES, ALGERIA)**

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The forest ecosystem at the common Tessala suffers severe damage. The dynamics of land use and land cover change have direct implications on the habitat of plant communities, local biodiversity and endemic plant taxa in a particular way. We studied the biological diversity in the mountains of Tessala applying an ecological study which is to inventory all species present at these mountains represented by 124 species, hence the presence of six endemic species (*Phlomis crinita*, *Helianthemum polianthum*, *Juniperus oxycedrus*, *Pistacia atlantica*, *Thymus ciliatus*, *Quercus ilex*) which are considered strict endemics and the presence of other Mediterranean species considered endemic in the broadest sense.

The ecological study also focused on 10 stations selected on an elevational gradient and depending on the presence of endemic species. The inventory carried out on all the stations has established a list of plants represented by 94 species, dominated by the family of Liliaceae. The biological spectrum reveals the dominance of therophytes and physiognomic terms, there are training tree, shrub, herbaceous and shrubby. All this vegetation is distributed on different types of vegetation and different habitats (more or less degraded). Regression of vegetation cover, vegetation degradation and fragmentation of habitus affect directly on biodiversity, hence the need for conservation actions and conservation must always be made to safeguard the biological material.

**PP-304**

**VALUATION OF ECOLOGICAL POTENTIAL, ECOTOURISM, AND SOCIO-ECONOMIC TALASSEM-TANE NATIONAL PARK (PROVINCE OF CHEFCHAOUEN, MOROCCO)**

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The valuation of ecological potential can be achieved through a study ethnobotaniquedu Talassem-tane National Park in Chefchaouen province level in Morocco, one of the areas using the Park's forest resources. This study describes the different uses of medicinal plants by the local population, and their impact on the degradation of plant biodiversity. The area is subjected to intense pressures anthropiquestrès, the illiteracy rate covers the majority of the local population, which influences the exploitation of forest resources, especially medicinal plants. Our survey beginning of March until the end of August (2014), five field missions (April, May, June, July, August) test on five consecutive day for each census mission with a sample of 182 plant harvested in the park, which has identified 53 families and 106 species identified, including 36 species of medicinal plants used in the study area and the most exploited are *Cistus varius* Pourret, *Marrubium vulgare* and *Mentha pulegium* L. the results of the study showed that the foliage is the most used part. The majority of medicines is prepared as maceration and infusion. The almost exclusive reliance of the local population to medicinal plant species in the daily care and the unorganized commercial exploitation of certain commercial, will only increase the pressure on these medicinal resources may lead to the disappearance of the majority of medicinal plants .It is an urgent need to adopt a sustainable management approach for the safeguarding and preservation of medicinal plants of Talassem-tane National Park.

**PP-305**

**INVENTORY, ANALYSIS AND PRESERVATION OF PLANT  
BIODIVERSITY IN THE SOUTHERN SLOPE OF MOUNT TESSALA  
WILAYA OF SIDI BEL ABBES (WESTERN ALGERIA).**

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Our work consists in inventorying the vegetation of the southern slope of the mount of Tessala according to an altitudinal gradient. For this purpose, we chose seven stations, inside each one of them floristic statements were realized. The inventory carried out on the whole of the stations made it possible to draw up a floristic list represented by 103 species, distributed on 39 botanical families dominated by *Asteraceae*, *Poaceae*, *Lamiaceae* and *Brassicaceae*. The biological spectrum of these species reveals the predominance of the hemicryptophytes and the therophytes, and on the physiognomical level, the vegetation of our stations allows distinguishing from the formations arborescent, shrubby, scrubby and herbaceous. The processing data obtained by the factorial analysis of correspondences (AFC) and by ascending hierarchical classification (CHA) emphasized the existence of two groups of stations. A first group of stations located in altitude, less degraded, more diversified and where in particular the phanerophytes dominate. A second group of stations located in low altitude, little diversified and where the degradation of vegetable cover is important, resulting in the installation of the hemicryptophytes and the therophytes.

**PP-306**

**DEVELOPING AND PRESERVING POPULAR KNOWLEDGE IN SOME REGIONS OF ALGERIA**

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Algeria benefits of a rich and diverse vegetation, in coastal, mountainous and Saharan regions, thus promoting the use of medicinal plants by local people. As part of the appreciation of traditional medicine, ethnobotanical surveys were conducted in several regions of Algeria and were carried on the traditional uses and medicinal virtues of five plants belonging to different families, *Juglans regia* L. (Juglandaceae) *Cotula Del cinerea* (Asteraceae), *Quercus suber* L. (Fagaceae) *Marrubium vulgare* L. (Lamiaceae) and *Aristolochia longa* L. (Aristolochiaceae).

Surveys conducted nearby herbalists, healers, and populations of these regions allowed us to collect information on the patterns of use of these medicinal plants, treated diseases, used organs etc. It was found that these plants are potential truly natural remedies that can be used in pharmacology.

**PP-307**

**ECOLOGY OF *PHLOMIS CRINITA* CAV. RARE SPECIES IN THE MOUNTAINS OF TESSALA (WESTERN ALGERIA)**

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Algerian flora is a part of the Mediterranean botanical richness, large hot spot of the global plant diversity. *Phlomis crinita* Cav. is part of the rare flora of western Algeria. *Phlomis crinita* Cav. is Lamiaceae used in traditional medicine and pharmacopeia. This plant is used in bindings and plasters to treat burns, lesions and the infections of the skin like for various allergies. From the floristic procession of the species *Phlomis crinita* which exists on the level of the mountains of Tessala, 30 species are distributed out of 14 botanical families were listed.

On the level of these studied species, the herbaceous annual ones (53,33%) dominate the morphological spectrum, the therophytes dominate the biological types with a presence of 40% and the Mediterranean element (26,67%) dominate the biogeographic types. The characters of the ground show a balanced texture, a ground rich in organic matter and a neutral pH.

**PP-308**

**BIODIVERSITY OF MEDICINAL PLANTS AROMATIC IN THE EL KALA NATIONAL PARK (NORTH-EASTERN OF ALGERIA): ETHNOBOTANICAL STUDY**

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The Algeria by its special geographical position has a rich bioclimate with diverse vegetation that included more than 600 species of medicinal and aromatic plants. The National Park of El Kala located in the extreme north - eastern of Algeria is contain too many lakes and ecosystems with a rich flora in the Mediterranean basin. Knowledge and use of medicinal aromatic plants in the field of public health are important and they provide cures are considerable; they have pharmacological properties that confer medicinal interest.

Our floristic study on the region of El Kala National Park was conducted in order to make an inventory of medicinal aromatic plants, generally gather information about therapeutic uses practiced in the region. The study of the flora has allowed us to inventory 219 plant species distributed in 61 families, the majority of which are medicinal and aromatic plants: 14 families with essential oils, which include 85 species. Based on the analysis of the data collected can be distinguished as almost all medicinal and aromatic species in the study area showed that the aerial part (leaves, flowers and seeds) is the most used part in treatments various diseases affecting the circulatory respiratory, digestive...etc.

Finally, the results are a source of valuable information for the study area and can serve as a starting point for the establishment of national medicinal and aromatic plants. The latter can be of great help for further research to know the phytochemistry, pharmacology... etc., in order to seek new natural substances.

**PP-309**

***IN VITRO* SYNERGISTIC ANTIOXIDANT ACTIVITY OF HONEY  
*MENTHA SPICATA* COMBINATION**

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The beneficial health effects including antioxidant properties of mint (*mentha spicata*) (1) and honey bees (*Apis mellifera*) (2) have been extensively studied. However, there is no data about the effects of their associated use. In this study the total phenolic and flavonoid contents for individual extracts of mint and honey and their combination were determined. The antioxidant activity was investigated by using reducing power, 1,1-diphenyl-2-picrylhydrazyl (DPPH), 2,2'-azinobis-(3-ethylbenzothiazoline-6-sulphonic acid diamonium salt (ABTS), and chelating power methods. The results showed that individual extracts contained important quantity of phenolics and flavonoids and their combination was found to produce best antioxidant activity. A significant linear correlation between the phenolic/flavonoid contents and antioxidant activity, especially with reducing power and free radical scavenging abilities, was observed.

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**PP-310**

**THE FLORA OF DIKME UPLAND AND SURROUNDINGS, BINGOL (CENTER)\***

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This research was carried out to determine the flora of Dikme upland and surroundings, Bingol (Center). 1255 plant specimens were collected from the research area. 337 genera and total 707 taxa belong to the 75 families were determined. From these, 3 taxa belong to Pteridophyta, 704 taxa belong to Spermatophyta division. Coniferophyta and Magnoliophyta subdivisions in Spermatophyta include 4 and 700 taxa, respectively. In Magnoliophyta subdivision, 595 taxa were determined in Magnoliopsida and 105 taxa were determined in Liliopsida class. In the research area, 75 endemic taxa were determined and endemism ratio is 10.6%. The distribution of phytogeographic elements is: Irano-Turanian 252 (35.6%), Mediterranean 30 (4.2%), Euro-Siberian 46 (6.5%), Euxine 4 (0.5%) and multiregional or unknown phytogeographic elements 372 (52.6%). In addition, in our study the distribution of 38 plant taxa which are unknown in B8 square to this day were detected to have distribution in this square; habitat characteristics, variations and interesting distribution of some taxa also revealed with this study. Threatened categories are also proposed for the 23 endemic taxa according to IUCN categories.

The distribution of the endemic and rare 23 taxa according to the red data as follows; 1 taxa in endangered “**EN**”, 3 taxa in vulnerable “**VU**”, 15 taxa in least concern “**LC**”, 3 taxa in near threatened “**NT**” and 1 taxa in data deficient “**DD**”. The largest ten families in the studied area were found as following: Asteraceae (99), Lamiaceae (64), Fabaceae (59), Poaceae (52), Brassicaceae (49), Boraginaceae (35), Caryophyllaceae (34), Apiaceae (31), Liliaceae (27), Scrophulariaceae (22). The largest ten genera in the flora region were: *Astragalus* L. (19), *Silene* L. (12), *Centaurea* L. (11), *Salvia* L. (10), *Euphorbia* L. (10), *Vicia* L. (9), *Trifolium* L. (9), *Scrophularia* L. (7), *Stachys* L. (7), *Anthemis* L. (7).

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**PP-311**

**CONTRIBUTION TO *EX SITU* CONSERVATION OF WILD LAVANDULA POPULATIONS IN PORTUGAL**

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The genus *Lavandula* L. (Lamiaceae family) belongs to the subfamily Nepetoideae. The tribe Lavanduleae (Endl.) Boiss contain just the single genus *Lavandula*. The *Lavandula* species occur in Portugal, either spontaneously or grown for their ornamental and aromatic value. These species also are used in traditional medicine in the form of infusions, for internal and external uses. The wild populations of this genus are represented by five species and several subspecies in the Portuguese flora. This genus shows a complex taxonomy with some taxa known under different scientific names, although under the same common name. In Portugal, there are significant research on these species, with significant results, in ethnobotany, essential oils, biological activities and *in vitro* research. The present assessment aims to present the Banco Português de Germoplasma Vegetal contribution to the *ex situ* conservation of of *Lavandula* species genetic resources: *ex situ* collection structure, the main taxonomy assess results, the main morphological evaluation results, the need to plan new collecting missions and, the prospects for the use of genetic variability preserved in this collection.

**PP-312**

**MEDICINAL PLANT DIVERSITY OF THE BORDER REGION  
OF HADDADA (NORTHEASTERN ALGERIA)**

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Today, despite the development of synthetic chemistry, the use of medicinal plants has retained a large place due to their effectiveness in various therapeutic procedures. Currently, their use occupies an important place in human life. Indeed, traditional knowledge is transmitted from generation to generation, allowing the preservation of this knowledge. The objective of the work was conducted to identify existing medicinal plants in the Haddada region, located on the Algerian-Tunisian border, identify those known and used by the locals and other available but ignored by residents.

Thus, we conducted a floristic inventory in the region by the method of the minimum area<sup>1</sup>, identify existing medicinal plants<sup>2</sup> and conducted ethnobotanical surveys. This study recorded 105 plant species representing 51 families and 88 genera, including 43 medicinal species plants: 26 of them are wild and 17 cultivated in home gardens as ornamentals or food plants. Among the wild plants inventoried, 17 are known by local people. This study allowed us to find plants used and therefore known by the residents and medicinal plants unknown but which have biological and pharmacological properties, these ones will later be studied to extract their oils and determined their active ingredients for possible recovery and conservation.

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**PP-313**

**ETHNOBOTANY STUDY ON CARTHAME « *Carthamus caeruleus L.* »  
IN Draa El Mizan REGION IN ALGERIA**

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Much of the world population still has no access to conventional medicine. In this case, preservation and promotion of traditional knowledge and medicinal plants is a health priority. Ethnobotany is an important step to establish a scientific research from arising new concepts, and this by taking into account the richness of local culture on plants. An ethnobotanical survey was conducted using questionnaires addressing ordinary users, traditional healers and herbalists in Draa El Mizan region in Tizi-Ouzou Department, Algeria.

In conclusion, the results of the survey show a remarkable diversity of medicinal plants used by local people of this region of Kabylie, and indicate the importance of *Carthamus caeruleus L* as an excellent healing plant in case of burns at different degrees.

**PP-314**

**IMPACT OF CLIMATE AND HUMAN DYNAMICS OF SOME  
MEDICINAL PLANTS OF FOREST ECOSYSTEM IN THE REGION OF  
ORAN; CASE DJEBEL Murdjadjo**

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In this study, we investigated the climatic variability of the period from 1980 to 2011, and the physicochemical properties of the soil and their impact on vegetation in a Mediterranean forest ecosystem in southern Murdjadjo (forest M'sila to Boutelilis). The methodology is to first recognize and inventory of medicinal and aromatic plants in the ecosystem, as well as the influence of climate and the share of men in the disappearance and regression of the main plants used for therapeutic and commercial use. Physicochemical study of 16 soil samples according to altitude, depth and exposure, and climate summary completed by achieving the floristic surveys of the study area. The results showed that this region is characterized by a slightly alkaline soil, unsalted and semi-arid mediterranean climate, promoting the development of different species xerophytes characteristics of the study area.

Also adding impact anthropozoic responsible for this regressive dynamic over existing vegetation sets in other similar places, the factor responsible for their disappearance is overgrazing, grazing and uprooting by herbalists by accelerating reduction of an involuntary way, hence the need to know to protect, conserve and enhance this wealth of plant resources.

**PP-315**

**ETHNOBOTANICAL SURVEY IN THE BIOSPHERE RESERVE OF DJURDJURA, ALGERIA. THE CASE OF MEDICINAL AND AROMATIC PLANTS AND THEIR USES**

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This study aims to assess ethnobotanical knowledge in the Djurdjura biosphere reserve, focusing on the traditional uses of medicinal plants. The ethnomedicinal information was gathered on the field, through a questionnaire and direct interviews, with 31 inhabitants of three villages, situated inside the biosphere reserve. Illiterate women, 51-60 years old, have the most know-how about the traditional medicinal practice.

Overall, 106 vascular plants have been identified; they belong to 52 families and 98 genera. The *Lamiaceae* is the most represented family with 12 different species. A majority of them (80.19 %) is spontaneous in natural habitats (forest ecosystems, especially). They are used in the preparation of 239 therapeutic recipes that can handle 70 diseases. The pathologies most treated are those of the digestive system (47 plants used). The part of the plant most used is the aerial part with 81.48 %, because of its availability. Infusion of fresh leaves is the most common preparation (24.26 %). The toxicity of some herbs (10.38 %), used with caution, is well known. Finally, medicinal plants are often multipurpose plants. Furthermore, 41 of these wild plants yet still have an interest in food for rural populations.

**PP-316**

**IP PROVISIONS FOR MEDICINAL PLANTS AND PRODUCTS: A COMPARATIVE STUDY OF THE LAWS IN U.S., EUROPE, CHINA AND INDIA**

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India possess rich heritage of valuable medicinal and aromatic plant species. Medicinal plants in whole or as a part of traditional knowledge are not patentable in India<sup>1</sup> however, new plant varieties can be protected under The Protection of Plant Varieties and Farmers' Rights Act. Further, the Biodiversity Act in India puts restrictions on acquiring any intellectual property rights (IPRs) by the foreign individuals or any institution/ company based on the biological resources such as the medicinal plants of the country<sup>2</sup>. The IP law in India relating to biodiversity and traditional knowledge has been under constant criticism at the internal front. To find out areas of improvement in the current IP regulations for medicinal plants and products in India, the related provisions in U.S., Europe, China and India were studied. Further, the Indian provisions were compared with the provisions of U.S., Europe, and China. A gap analysis was performed and measures to strengthen the provisions in India were proposed.

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<sup>1</sup> The Patents Act, 1970, 2. The Biological Diversity Act, 2002

PP-317

**RESTORING THE ECOLOGICAL BALANCE IN SAOURA OASES (ALGERIA) THROUGH THE USE OF BOTANICAL INSECTICIDES EXTRACTED FROM *CITRULLUS COLOCYNTHIS* (L.) AGAINST WHITE SCALE *PARLATORIA BLANCHARDI* (TARGIONI TOZZETTI, 1892)**

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Saoura region is situated in the south west of Algeria characterized by a height density of date palm trees (*Phoenix dactylifera* L.), where we note several oases (Igli, Béni Abbes, Taghit, among others). Despite this high density, the production of dates is still insufficient even for the local consumption, this is due to: Increasing water salinity, the spread of many fungal diseases, where the most serious is the Bayoud (*Fusarium oxysporum*), and finally insect pests, three of them remain the most serious: white scale locally named Semm (*Parlatoria blanchardi*), Boufaroua (*Oligonychus afrasiaticus*), and Doud called dates worm (*Ectomyelois ceratoniae*). The random use of insecticides during the last invasions of locusts caused an ecological imbalance, where virtually the majority of the enemies of white scale are disappeared, as consequence the population of white scale expanded increasingly. The solution requires the use of alternative methods to control pests. Colocynth (*Citrullus colocynthis*) is a desert plant, pariah by insects due to its toxicity, Malathion effectiveness 82.85% is more considered than aquatic extracts of colocynth 65.99 % however the side effects of this last one on the ecosystem is negligible comparing with Malathion where over 301 insects non-target dead among which, 68% are useful insects such as bees, butterflies and some auxiliary enemies of cochineal and even vertebrate such as insectivorous birds. The aim of this study is to find an eventual alternative to fight against white scale pest (*Parlatoria blanchardi*) using botanical insecticides taking into consideration the ecological balance and the side effects on the useful insects.



**PP-318**

**ETHNOBOTANICAL SURVEY OF MEDICINAL PLANTS USED FOR THE TREATMENT OF DIABETES**

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Diabetes mellitus is one of the most common chronic global diseases affecting children and adolescents in both the developed and developing nations. The major types of diabetes mellitus are type 1 and type 2, the former arising from inadequate production of insulin due to pancreatic  $\beta$ -cell dysfunction, and the latter from reduced sensitivity to insulin in the target tissues and/or inadequate insulin secretion. Sustained hyperglycaemia is a common result of uncontrolled diabetes and, over time, can damage the heart, eyes, kidneys and nerves, mainly through deteriorating blood vessels supplying the organs. The diabetic patients will be referred to a medical treatment, but some patients are fully convinced that Phytotherapy has more beneficial effects than conventional drugs.

This survey was carried out in the Kidney clinic of Constantine, Algeria , in order to inventory plants commonly used by Diabetic patients with kidney failure for the management of their diabetes . The inventory contains scientific, vernacular, common names of the plants used, the useful parts and method of preparation. Future research directed at the identification of active components is the only viable option for supporting the efficacy claims for all herbs and establishing their anti-diabetic mechanism .

**PP-319**

**ETHNO BOTANICAL SURVEY OF MEDICINAL PLANTS USED IN THE FIGHT AGAINST CANCER**

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Medicinal plants plays a critical role in treatment of chronic debilitating and life threatening conditions and diseases. They even help against those cannot be cured like the most cancers, so many herbal remedies are used by patients to prevent and manage their disease.

An ethno botanical survey of plants used for the treatment of cancer was carried out in Algerian center Anti-Cancer “Pierre et Marie Curie», that determines the abundance and availability of medicinal plants used by local communities. Information on the names of plants, parts used and methods of preparation were collected through a questionnaire which was administered to the patients.

**PP-320**

**TRADITIONAL KNOWLEDGE OF *PYRUS* L. (ROSACEAE) WITH SPECIAL EMPHASIS TO GRAFTING IN TURKEY**

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The genus *Pyrus* L. is the one of members of woody *Rosaceae*. It is known as an economically important plant in the world. The genus is represented by native and cultivated taxa, and these are assigned to different names by local people in Turkey. This study reports about folk use and vernacular names of *P. communis* L., *P. elaeagnifolia* Pall., *P. spinosa* Forsk. and *P. cordata* subsp. *boissieriana* Uğurlu & Dönmez, which are most popularly used in Turkey. These plants are generally named as 'armut' in Turkish. Beside this, 'çördük, panda, ahlat, boz armut, çalı armut, söbe armut and taş armut' are applied to these taxa in different regions. Most of the local names are firstly mentioned in this study and figures, distribution range and habitat information of mentioned *Pyrus* species are given. According to this research, these pear types are considered only as a food among local people. Moreover, we gathered information about grafting of pears and different preparation method to eat fruits. This report is the first extensive document about traditional knowledge of *Pyrus* in Turkey.

**PP-321**

**STUDY OF MEDICINAL PROPERTIES OF INTRODUCED VARIETIES  
JERUSALEM ARTICHOKE (*HELIANTHUS TUBEROSUS* L.) IN  
KYRGYZSTAN**

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We in conditions of extreme continental climate of Kyrgyzstan studied 6 varieties *Helianthus tuberosus* L., introduced in the Chuy valley in Kyrgyzstan. At the same time experiment proved that the Jerusalem artichoke for a long time can tolerate prolonged drought not perish without watering, even in arid and semiarid ecotopes. These properties and other qualities of the culture is supposed to apply in arid, semi-arid lands and technogenic-polluted regions of Kyrgyzstan, where it is impossible to grow other crops. Tubers due to its high content of carbohydrates, good winter and allow cultivation in the same place for several years. Jerusalem artichoke can be obtained inulin, alcohol, biogas and other products of the food, medical and technical purposes.

Range of ecological use of Jerusalem artichoke continues to grow, which brings considerable economic and environmental benefits. A studied variety of Jerusalem artichoke contains a sufficiently large amount of dry substances (up to 20%), of which up to 80% fructose containing polymeric homologue - inulin and contains fiber and rich mineral elements, including (mg% on dry substance): iron - 10.1; manganese - 44.0; calcium - 78.8; magnesium - 31.7; potassium - 1382.5; sodium - 17.2. Jerusalem artichoke actively accumulates also silicon from the soil and the tubers of the element content is 8% based on dry substance. The tuber composition also includes proteins, pectin, amino acids, organic acids and fatty acids. Pectins contained in Jerusalem artichoke to 1 1% by weight of dry matter. We worked out a complex processing technology to produce a variety of J. artichoke products for medical, veterinary and food production. So, obtained and are licensed: "A process for producing inulin from the roots of Jerusalem artichoke", "A method for producing fructose syrup", "A method for producing D-fructose." At the stages of completion are working to obtain different feed additives from the stems of Jerusalem artichoke.

**PP-322**

**DECONTAMINATION AND CONSERVATION OF *STEVIA REBAUDIANA BERTONI* (REVIEW)**

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*Stevia rebaudiana*Bertoni is a perennial herb that belongs to the Asteraceae family. It is known as a high-intensity sweetener, which is at least 200 times sweeter than sucrose. Today this plant is attractive to a many actors (industrials and researchers) because of its various therapeutic and medicinal benefits to human health, especially for diabetics and obese. Strong global demand for non-caloric natural sweeteners is the result of changing consumer eating habits, due to obesity and diabetes problems and controversy surrounding artificial sweeteners.

The history of its cultivation began in Paraguay. Currently, stevia is cultivated in countries around the world. However, the major problem (like all medicinal and aromatics plants) that is mainly related to the contamination of stevia by microorganisms. In order to meet the sanitary and hygienic quality requirements, the use of industrial decontamination processes are tools promising solutions to prevent the one hand the growth of the other microorganisms facilitate storage and transportation ensure pure production of a natural sweetener of high quality.

**PP-323**

**EVALUATION OF OLIVE POMACE AS A SOURCE OF POTENT BIOACTIVE COMPOUNDS**

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Increased popularity of Mediterranean diet and use of olive oil, result with large amounts of by-products remaining after the process of obtaining olive oil. In Croatia, the most common method of olive oil production is two-phase extraction which significantly reduces olive mill waste. However, the remaining waste represents a serious environmental problem due to management difficulties. At the same time, it contains a range of phenolic compounds with antioxidant activity. Thus, the aim of this study was to optimize the extraction conditions of phenols from olive pomace obtained from two-phase olive oil extraction using the classic solvent extraction. Total phenols were determined by the Folin-Ciocalteu method<sup>1</sup>, antioxidant capacity by the TEAC method<sup>2</sup>, while examined parameters were concentration and pH of extraction solvent, and duration of extraction. Tyrosol, hydroxytyrosol and oleuropein were determined by HPLC. Obtained results indicate that the optimal extraction conditions are 60% ethanol solvent at 70 °C and pH of 8.5, while the extraction time did not significantly affect the extraction efficiency. This investigation provides a valuable basis for further research to be applied in the food and pharmaceutical industries and technology.

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PP-324

**SPECIES OF THE GENUS *NEPETA* L. IN THE FLORA OF AZERBAIJAN,  
THEIR INTRODUCTION AND ECOPROTECTIVE SIGNIFICANCE**

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The present study was carried out in route location fields, stationary and laboratory conditions in. More than 200 herbarium materials have been collected and about 150 geobotanical descriptions made according to the results 27 species belonging to the *Nepeta* Genus have been registered. One of them has been ascertained by us in the Minor Caucasus Area for the first time in the Azerbaijan Flora. Location of the all species in the flora has been floragenetically defined. Their bioecological and morphological characteristics have been studied and anatomic description of the essential oils localities of some species as well as their floristic concepts developed. New areals of: *N. somkhetica*, *N. amoena*, *N. buhsei*, *N. grandiflora* vø *N. trautvetteri* species have been revealed. Specific status of the *N. grandiflora* and *N. grossheimii* species have been regenerated through anatomic investigations; and spread of *N. schischkinii* species in the Azerbaijan flora has been approved. Taxonomic spectrum of the *Nepeta* species and dotted maps of their areal have been compiled. It has been revealed that propagation of the *Nepeta* species at distinct systematical groups is different. Female dioecious female monoecious were observed at the Cataria section. Female dioecious is only characteristic for *Oxynepetea* section.

**PP-325**

**A BETTER QUALITY OF HENNA POWDER IN THE EXPERIENCE OF BISKRA'S RURAL WOMEN**

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The henna powder is one of the more important natural cosmetic product used especially by the women in Algeria to dye their hair and to stain the hand, nails and feet. To obtain a better powder of henna is one of the concerns of bride's mothers during the obtaining of this material very important for the wedding ceremony. For this objective we led an investigation in the most producing henna regions in Biskra (a South East department in Algeria), interview with rural women concerning the manipulations made on post harvest to obtain a good quality henna powder.

The investigated rural women gave us the main as well as the necessary conditions to obtain desired dye since the stage of harvest of henna, the place of drying of the production, the collection of leaves and the ways of grinding it, all those steps to have finally the best tattoo on hands and feet of the bride.



**PP-326**

**HISTORY OF SAFFRON (*CROCUS SATIVUS L.*) USES IN IRAN AND OTHER COUNTRIES**

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Saffron is a spice derived from the dried stigmas of the plant *Crocus sativus L.*, known by ancient Iranians and other nations and has remained among the world's luxurious and pricey substances throughout the history. The plant had many uses around the world during history; even though some of these uses were forgotten. Cognizance about different uses of saffron during past time can help to find the best uses at present to meet the current needs. In this review paper different uses of saffron throughout the history among different nations are investigated. Saffron has been used not only as a spice in culinary, but also as perfume, calligraphy substance, a dye (carpet and fabric dyeing), and as a medicinal plant in different purposes: Treating eye problems to genitourinary and many other diseases in various nations and cultures; it was also used as a tonic agent and antidepressant drug among many nations. Hence, as an important medicinal plant, it is a subject with multipurpose potentials to be considered for new drug design.

**PP-327**

**USING OF MEDICINAL AND AROMATIC PLANTS AS ADDITIVE IN TRADITIONAL CHEESE**

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Properties of medicinal and aromatic plants are due to the presence of various complex chemical substances from different composition which named secondary metabolites. Recently these plants are used in several fields such as food, perfumes, pharmaceutical industries and natural cosmetic products. Introducing the plants which are used in homemade food products in some traditional societies, can help to develop food sector's growth. Moreover, it is well known that organic agriculture and food sector's growth is remarkable. Using of aromatic and medicinal plants in traditional cheese production is widespread in West Azerbaijan province, Iran. Using of the plants, make cheese delicious and tasty. Moreover, innovative use of certain aromatic plants by local people in production of natural cheese probably covers in order to prevent growth of some fungi. The aim of this review paper is to introduce the plants which use in traditional cheese production in the region.

**PP-328**

**USING OF MEDICINAL AND AROMATIC PLANTS IN CHALDIRAN,  
WEST AZERBAIJAN, IRAN, AS THERAPEUTIC EFFECT IN BATH**

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Ethno botanists are frequently involved in the initial documentation of plant remedies used in traditional and popular domestic medicine. Some medicinal and aromatic plants are used in different ways by people; therapeutic bath is one of them. Therapeutic bath plants for the relaxation of muscles, elimination or reduction of muscle spasms, and for the overall enhancement of a person's mood. Local people recognized the positive effect of therapeutic baths with some medicinal and aromatic plants on joint, neck and back pains; the therapy which is used by older persons recently. The study was carried out in Kurtkendi village of Chaldiran in West Azarbaijan province, Iran to deal the plants that used in bath. The information about therapeutic bath was obtained by asking questions from local people. The species of Romex, Mentha, Urtica, Phoenicolum and Malva genus are the medicinal and aromatic plants which used in therapeutic bath.

**PP-329**

**SOME IMPORTANT MEDICINAL PLANTS OF IRAN**

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Plants have been one of most available resources usable for treating diseases. Recently, medicinal and aromatic plants have received much attention in several fields. 5000 species among plants are used for medicinal purposes. Researchers are interested in biologically active compounds isolated from plant species for the eradication of pathogenic microorganisms because of the resistance that microorganisms have acquired against antibiotics. So, identification and preservation of these valuable resources are necessary. Iran has a total surface of  $1.6 \times 10^6$  km<sup>2</sup> and the number of known plant species in whole Iran is nearly 7,300 species. The Flora Iranica is the major taxonomic and nomenclatural reference. Iran is an ancient country in usage of herbal plants. In this review paper some medicinal plants such as *Crocus*, *Thymus*, *Satureja*, *Stachys*, *Ziziphora* and *Ocimum* are discussed.

**PP-330**

**ETHNOBOTANICAL SURVEY OF MEDICINAL PLANTS USED IN EL BAYADH DISTRICT ( ALGERIA) TO MANAGE DIABETES AND HYPERTENSION**

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The ethnopharmacology investigation remains the principal way to improve, evaluate, and finding bioactive substances derived from medicinal plants. Algeria has a large plant biodiversity account more than 4125 species (123 Families) and is endowed with resources of medicinal plants growing on various bioclimatic zones from subhumide to semi-arid and Saharan. Our investigation is the first one which deals with an ethnopharmacological study on medicinal plants especially used for the treatment of diabetes and hypertension in the South Algeria (El Baydh region). The study presents the uses of plants in traditional herbal medicines in semi-arid region (El Bayadh), determines the homogeneity of informant traditional knowledge and the preferred medicinal plants used to treat diabetes and hypertension. The results can used as platform for bioactive substances discovery and further development.

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**PP-331**

**BIODIVERSITY AND DYNAMIC OF MICROALGAE AND  
CYANOBACTERIA FROM FRESHWATER STREAMS OF DJURDJURA  
NATIONAL PARK FOREST OF DARNA (NORTH ALGERIA).**

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The biodiversity of microalgae and cyanobacteria from one of the unexplored habitats of freshwater streams of Djurdjura national park forest of Darna, North Algeria was studied during 12 months since March 2014 to February 2015. They reveal a high specific diversity of flora examined: a total of 29 species representing 18 genera have been identified. A dominance of Chlorophyceae (40%) and Cyanophyceae (30%) compared to other classes identified was noted. The appreciation of the dynamics of phytoplankton showed that the population density is higher in rainy season than dry season.

**PP-332**

**LICHENS, THE PHARMACEUTICALLY RELEVANT METABOLITES,  
AS INDICATORS OF ENVIRONMENTAL POLLUTION\***

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Lichens produce metabolites proven useful in the medical community. Most metabolites produced by lichens are structurally and functionally similar to broad-spectrum antibiotics while few are associated respectively to antiseptic similarities. Bio indicator can be a whole ecosystem, community of organisms, populations or separate individuals. Basically, it may be any organism, but the most appropriate are those organisms that are widespread and can be readily determined. They allow assessing the level of pollution in a short time and the response that exhibits in contact with toxic substances is clear, fast and distinctive. Lichens satisfy these properties, and therefore serve as good bio indicators. Sensitizing properties exhibit especially epiphytic lichen species whose sensitivity is used in bio monitoring. The result of intensive development of extractive industries (e.g. Coal mining) is waste in the form of heaps. Heaps are characterized by specific ecological conditions for plants. The rock, which occurred after ore mining, generally has extremely high levels of contaminants that exceed their natural content in soil. Because of the toxicity of the substrate here can grow only those varieties which are capable of forming a specific strategy and various mechanisms enabling them to survive the inhospitable conditions of the contaminated area.

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**PP-333**

**ETHNOBOTANICAL SURVEY OF PLANTS USED IN  
AFYONKARAHISAR-TURKEY**

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In this research, natural herbs grown in Afyonkarahisar vicinity have been investigated. 31 settlements in the area (5 districts, 8 towns, 15 villages and 3 neighborhood centers ) 46 resource people were interviewed. 178 different uses of natural plants have been recorded and 130 taxa belonging to 39 families were identified. Of 178 different uses, those figures were indicated; 84 uses (%47) for medicinal, 68 (%38) for food, 16 (%8,9) for feed, 3 (%1,6) household goods, 3 (%1,6) painting, 3 (%1,6) for manuel arts and 1 (%0,5) for other purposes.



**PP-334**

**PHARMACOPEIA ANALYSIS OF *Citrus aurantium* GROWN in TURKEY**

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*Citrus aurantium* var. amara is one of the citrus species, which belongs to Rutaceae family. This plant, which is grown in temperate regions, in tree form, does not shed its leaves. The flavedo part of the fruit of *C. aurantium* is traditionally used as expectorant, to eliminate gastrointestinal problems related to the heart burn, vomiting, bile, and to treat diarrhea in folk medicine. The aim of the study, is to collect *C. aurantium* from different regions of our country, and determine their comparative suitability to European Pharmacopeia (7.0) which is a reference book of their therapeutical values are accepted drugs or effective substances and contains many properties, from diagnosis to storage conditions of the drugs and active substances. In conclusion, microscopical and chemical analysis showed that the 3 out of 12 collected plant drugs from different regions (Adana, Antalya, Istanbul, Izmir, Mersin Inc., some districts) were found to be suitable to the Pharmacopeia (7.0). Our study will be pioneer for the *in vitro* and more over *in vivo* clinical studies with the samples suitable for Pharmacopeia in Turkey.

**PP-335**

**MELATONIN PLANTS**

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Melatonin, means melanophore-contracting hormone (Greek: μᾶρος=black; τάση= tension), firstly was isolated from bovine's pineal gland. Later on it is observed that there is melatonin in many organisms such as algae, fungi, bacteria, vertebrates and even in the oldest simple forms and in higher plants. Studies have shown that melatonin has different activities in different organisms, some of these activities are antioxidant, anticancer, immunomodulatory, sleep-arranging and antimalarial. Biosynthesis of melatonin in plants is similar to in vertebrates. First evidence of presence of melatonin in plant was obtained from *Lingulodinium polyedrum* (syn. *Gonyaulax polyedra*) and *Pyrocystis acuta*. In this review report, biosynthesis, quantities in different plants, quantity methods (RIA, HPLC, HPLC-ECD, HPLC-FD, HPLC-MS and HPLC-UV) of melatonin, and their activities were presented.

**PP-336**

**POLLINOSI STUDY OF GRASS AND OLEACEAE IN THE REGION OF  
OUENZA (ETHNOBOTANICAL STUDY)**

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Many grass and Oleaceae pollens, and other families, especially in the spring cause in individuals predisposed, seasonal allergies. This work has allowed us to study the allergic perspective in particular two different botanical families "grass and Oleaceae" known in our regions and causing a lot of inconvenience to the surrounding population. A survey was conducted in the city of Ouenza, based on a random population and closed by a statistical study allowed us to identify the importance of these families in allergy. The results showed a good response to allergy, allergy mainly caused by pollen grains especially in spring, but the grass family is the most criminalized.

PP-337

**ONTOGENETIC STRUCTURE OF COENOPOPULATIONS AND  
NATURAL STOCKS OF MAIN OF MEDICINAL PLANTS OF  
KYRGYZSTAN**

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Carried out a study by the ontogenetic structure of populations of different life forms of desert plants in the Issyk-Kyñ hollow. On a permanent transects conducted research on seeds (se), seedlings (p), one-two-three year old juvenile (j), the young immature (im), adult vegetative (v), young (g1), mature (g2) and old (g3) generative; subsenile (ss) and senile (s) individuals from different biomorphic in different ecological-coenotical conditions habitats. Established that the studied populations of desert plants were basically standard, partial and aged. Ontogenetic spectrum with a significant predominance of old (g3), subsenile (ss) age state group and generative subsenile individuals. Mortality (death), the most significant in the early ontogeny in virginal period (pv). As they get older (g1-3, ss) reduced the percentage of die out individuals. Phytomass accumulation study populations showed that all partial coenopopulations maximum of top phytomass falls on mid-age generative condition (g2) of individuals. The lowest weight subsenile (ss) groups and presence of a stenocardia of pressure. According to the nonparametric correlation analysis characteristics of the period of selection of a therapeutic dose of warfarin haven't been significantly connected among themselves.

In the work presents the results of a study to identify the stocks of raw main species of medicinal plants in the Northeast of the Tien Shan, in particular: Termopsis Turkestanica – *Thermopsis turkestanica*, Ural licorice – *Glicyrriza uralensis*, Aconit – *Aconitum leucostomum*, Hellebore Lobel – *Veratrum lobelianum*, Harmala ordinary – *Peganum harmala* – perspective medicinal plants sufficiently high raw potential. In all studied communities were defined floristic composition, layering, phenological phases, the abundance of species. Defined biological and operational resources of medicinal raw materials, the volume of annual limits of work piece. Composed spot areas of distribution of the studied medicinal plants and identifies specific areas where you can carry out science-based raw materials procurement, without prejudice to the environment, taking subject to the recovery ability of populations.

PP-338

**ANTIBACTERIAL AND ANTIOXIDANT PROPERTIES OF ESSENTIAL OIL EXTRACTED FROM BERRY OF TWO MOROCCAN POPULATIONS OF *JUNIPERUS OXYCEDRUS* L.**

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*Juniperus oxycedrus* subsp. *oxycedrus* (Cupressaceae) is a medicinal plant which has long been used in traditional medicine as antispasmodic, antimicrobial, antidiarric. The therapeutic benefits of medicinal plants are often attributed to their antioxidant properties. The present study was conducted to evaluate in vitro antibacterial and antioxidant properties of essential oil extracted from berry of two Morocco natural populations of *Juniperus oxycedrus* subsp. *Oxycedrus*.L. The essential oils were analyzed by GC and GC–MS. The main components of both oils were  $\alpha$ -pinene (69.43% and 48.12%), Germacrene D (16.62% and 32%),  $\beta$  pinène (3.28% and 2%), Myrcene (4.19% and 2.12%) of the Tighadwine and the Ourika populations respectively. Other components were more presented in the essential oil of the Ourika population (>1%) as  $\beta$  caryophyllene (1.49%),  $\alpha$  humulene (1.48%) and  $\delta$  cadinene (2.38%). The essential oils of both populations exhibited antibacterial activity against *Escherichia coli*, *Pseudomonas aeruginosa* and *Staphylococcus aureus*. Moreover, the essential oil of the Tighadwine population efficiently inhibited the growth of *Enterococcus hirae*. In vitro evaluation of antioxidant activity of essential oil with the DPPH method showed a significant activity of both populations with IC<sub>50</sub> values of 31.96  $\mu$ g /ml for the Tighadwine population and 31.23 $\mu$ g /ml for the Ourika population. In conclusion; our results revealed that the essential oil of *Juniperus oxycedrus* subsp. *oxycedrus*.L exhibits interesting antioxidant and antibacterial activity, and could be used as a natural preservative in food and /or pharmaceutical industries.

**PP-339**

**CHANGES IN ANTIOXIDANT METABOLISM OF WEAT PLANT  
(*TRITICUM DURUM* L.) BY SEAWEED EXTRACTS APPLICATION  
UNDER SALT STRESS CONDITION**

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Salinity is one of the most brutal environmental factors limiting the productivity of crop plant and can have a devastating effect on plant metabolism and induces oxidative damage by reactive oxygen species (ROS) production in plant cell (Ahmad and Umar 2011). Seaweed of marine macro algae are a potential renewable resource in marine environment and are often used as amendments in crops production system, develop tolerance to environment stress and enhance antioxidants proprieties of plant (Zhang and Schmidt 2000).

In our study, we evaluate the impact of the foliar applications of seaweed extract (SWE) obtained from *Ulva rigida* species on salt stress tolerance in wheat plants (*Triticum durum* L.). Some physiological and biochemical parameter such as, growth parameters, chlorophyll content, carotenoides, total phenolic content and antioxidant enzyme activity: Superoxide dismutase (SOD), Catalase (CAT), Ascorbate peroxidase (APX )of wheat plants (*Triticum durum* L.) were studied under salt stress condition. The application of SWE enhances vegetative growth and improves leaf pigment (chlorophyll and carotenoid) in plant under as compared to control plant. Also, total phenolic content was increased and the optimum level was attained with 25% treatment of SWE. There was a significant enhancement in SOD, CAT and APX activities. These enzymatic activities increased considerably when plants were sprayed with 25% of *Ulva rigida* extract under salt stress. In conclusion, The SWE application can contribute to protection of plant against oxidative deterioration and improve salt stress tolerance.

**TOPIC IV**

**PLANT BIOTECHNOLOGY & BIOTRANSFORMATION**

**PP-340**

**ESSENTIAL OIL OF ARTEMISIA SAHARAN (SOUTHERN ALGERIA) AS A GREEN INHIBITOR FOR THE CORROSION OF STEEL IN HYDROCHLORIC ACID 1M**

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The essential oil of *Artemisia herba alba* collected in Aines-sefra-Algeria (south of Algeria) was tested as an inhibiting corrosion on carbon steel in 1M HCl solution by weight loss measurements, electrochemical polarisation. The results obtained showed that the dissolution rate of the steel depends on the concentration of oil and the immersion time. The inhibition efficiency was found to increase with oil content to attain 92 % at 2 g/l after 24 hours immersion. The increase in corrosion potential and the decrease in corrosion current densities of steel confirm the results found by weight loss measurements. A more dominant electrostatic interaction (physical adsorption) than the chemical adsorption is observed between the charged molecules and the oil surface of the steel. The calculated adsorption thermodynamic parameters ( $\Delta G_{ads}$ ,  $\Delta H_{ads}$ ,  $\Delta S_{ads}$ ) indicated that the adsorption was a spontaneous, exothermic process accompanied by an increase in entropy. These parameters indicated the formation of a protective layer which is insoluble and usually contains oxygen and nitrogen heterocyclic compounds. These compounds were confirmed by the presence of alkaloids, flavonoids, saponins and anthraquinones. The effect of temperature on the corrosion behaviour of steel indicates that inhibition efficiency of the natural substance decreases (72 to 92 %) with the rise of temperature.



**PP-341**

**SYNTHESES OF DERIVES BENZOTHIAZOLINONES ANTI-BACTERIENS ACTIVITY**

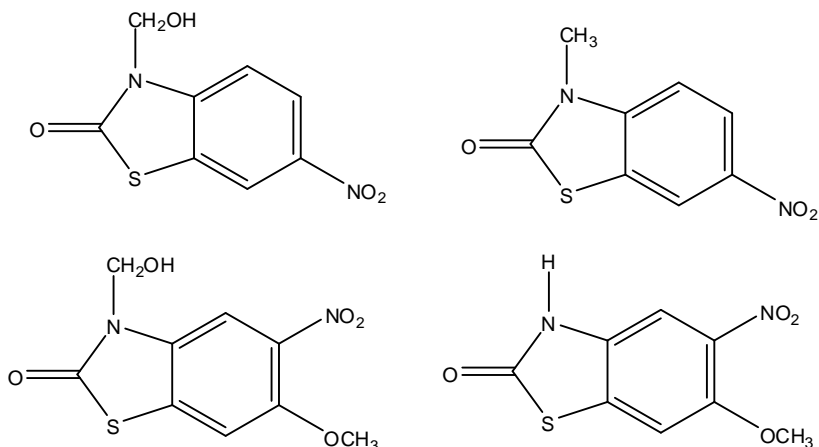
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The capacity antibacterial of certain heterocyclic structures seems to be conditioned by the presence of the grouping nitro in their formulation <sup>1, 2</sup>. This is why it seemed to us interesting to prepare and study the following series of the compounds (Fig. 1)



**Fig. 1**

In addition to the nature and the position of the modifying substituent present on the homo cycle or the heterocyclic, this lipophilic sulphur vector has character acide<sup>3</sup> could be a conveyor of various choices of drug, in particular in the increase in their cerebral concentration compared to other fabrics.

The preliminary pharmacological evaluation highlighted for some of these compounds, of the properties anti-bacteriens close to those to Nitroxoline used like reference product.

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**PP-342**

**EUGENOL AN ESSENTIAL OIL OF CLOVE ACTS AS A GREEN CORROSION INHIBITEUR FOR MILD STEEL IN HYDROCHLORIC ACID SOLUTION**

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Corrosion is due to an electrochemical or chemical action of the environment on metals and alloys<sup>1</sup>. This has important implications in various fields, especially in industries. Replacement of corroded parts, accidents and pollution risks are frequent events which sometimes have severe economic impacts. The use of inhibitors is a practical technique to secure metals and alloys from aggressive environment. Large numbers of organic compounds revealed that N, S and O containing organic compounds may be efficient inhibitors. However, these products are generally obtained by chemical synthesis and therefore have a negative impact on the environment, and they are often expensive and non-biodegradable. Thus, the use of natural products as corrosion inhibitors has become a key area of research because plant extracts are viewed as an incredibly rich source of naturally synthesized chemical compounds that are biodegradable in nature and can be extracted by simple hydrodistillation with low cost. The extracts of their leaves, peels, seeds, fruits and roots have been reported as effective corrosion inhibitors in different aggressive environments<sup>2</sup>.

The aim of this study was to determine the chemical composition of some eugenol derivatives obtained from essential oil of clove, and to study their inhibitive action as a eco-friendly and naturally occurring substance on corrosion behavior of mild steel in 1M HCl by gravimetric measurements method and electrochemical techniques such as potentiodynamic polarisation, linear polarisation and electrochemical impedance spectroscopy (EIS).

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PP-343

**EXTRACTION, PURIFICATION AND CHARACTERIZATION OF CURCUMINOIDS FROM TURMERIC (*CURCUMA LONGA*) AND THEIR APPLICATION AS GREEN CORROSION INHIBITORS FOR MILD STEEL IN HCl SOLUTION**

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Turmeric comes from the root of the *Curcuma longa* plant and has a tough brown skin and a deep orange flesh. Turmeric has long been used as a powerful anti-inflammatory in both the Chinese and Indian systems of medicine. Turmeric was traditionally called "Indian saffron" because of its deep yellow-orange color and has been used throughout history as a condiment, healing remedy and textile dye. Turmeric is rich in curcuminoids. Curcuminoids vary in chemical structures, Physico-chemical characteristics. The present work reports on extraction method using solid-liquid extraction. Isolation and purification of curcuminoids was carried out by column chromatography. The identification of curcumin derivatives in maximum resultant extract (by methanol) was performed using various spectroscopic techniques (NMR <sup>1</sup>H, IR). Percentage yield of curcumin by HPLC was 14% .extracted curcuminoids were subjected to spectrophotometer to check its percentage amount in extracted sample. Different solvent were used for extraction, among them methanol showed maximum yield of each curcuminoids. Separations of curcuminoids were tested in TLC chloroform: methanol at 98:2 showed better resolution of R<sub>f</sub> value at 0.70, 0.45, 0.25, as Curcumin, Demethoxycurcumin, Bisdemethoxycurcumin respectively. The methanol extract was subjected to silica gel column chromatography with chloroform: methanol at increasing polarity followed by TLC to check purity of extracted curcumin<sup>1</sup>.

These three curcuminoids are natural aromatic compounds and they are responsible for the yellow color of turmeric. The structural of these curcuminoids itself which possess heterocyclic compounds with polar functional group, conjugated double bonds, hydroxyl, oxygen and the non-toxicity factors that show the ability to act as organic corrosion inhibitor, there comes our interests to choose turmeric extracts to be used as eco-friendly corrosion inhibitor on mild steel in 1 M HCl by using gravimetric measurement<sup>2</sup>.

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PP-344

**DEVELOPMENT OF SIMPLE QSPR MODELS FOR PREDICTING THE ACID DISSOCIATION CONSTANT OF SOME DRUGS**

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This work presents a study aimed at the theoretical prediction of pKa values of benzoic acids in aqueous solution we investigated the solute-solvent interactions of these acids and their corresponding anions. The deprotonation Gibbs free energies in aqueous solution have been computed by our last version of the polarizable continuum model (SMD), that it was used to describe the solvent. The framework set by the thermodynamic cycle have been studied for describing protonation in aqueous and gas phases. The pKa values have been calculated using the density functional theory (DFT) with B3lyp and 6-311++G(d,p) basis set. Using these methods, an excellent correlation was found between the deprotonation Gibbs free energy changes and the experimental data of 51 compounds acids in aqueous for the majority of the acids studied than other recently published results. The mean absolute deviation of the calculated pKa values is < 0.36 in pKa units, for the benzoic acids considered with R<sup>2</sup>= 0.93

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PP-345

**3D-QSPR MODELS FOR PREDICTING THE PKA, THE DISSOCIATION CONSTANT OF SOME ANILINES**

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The three-dimensional quantitative structure-Propriety relationship (3D-QSPR) studies and ab initio calculations were performed on a series of Anilines in aqueous solution. A reasonable pharmacophore model was built with the QSPR methods, the MLR analysis and DFT calculations. An excellent correlation was found between the calculated and the experimental dissociation constant “pka” data of 90 compounds acids in aqueous for the majority of the acids studied than other recently published results. The Correlation coefficient  $R^2= 0.90$

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**PP-346**

**EFFICIENCY OF THE THIOLUTIN ANTIBIOTIC PRODUCED BY  
*SACCHAROTHRIX ALGERIENSIS* NRRL B-24137 TO CONTROL  
FUSARIUM WILT OF FLAX**

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Thiolutin is an antibiotic produced by *Saccharothrix algeriensis* NRRL B-24137. This actinomycetes strain produces several antibiotics which belong to dithiolopyrrolone group, with strong antifungal activities. Thiolutin, was known to be reproduced by some *Streptomyces* species, but it was discovered for the first time in the genus of *Saccharothrix*<sup>1</sup>. The objective of this work is to produce a large quantity of Thiolutin by *S. algeriensis*, in order to purify it and study its influence on the vascular wilt of flax. This antibiotic was produced on a semi-synthetic medium, extracted from the culture filtrate by dichloromethane and purified by HPLC.

The influence of thiolutin on the expression of vascular wilt of flax was also studied at a concentration of 5 mg of antibiotic per 100 g of dry soil, where the wilting in flax was markedly decreased. The effectiveness (% decrease of the disease) reached 82% compared to the control. Furthermore, when introduced into soil, thiolutin allowed a decrease in population of pathogenic agent, *Fusarium oxysporum* f. sp. *Lini*, 113 times compared to the control. Other parameters were considered, such as, the presence or absence of soil microflora (sterile or non-sterile soil) and the influence of thiolutin on germination and plant growth.

**References**

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**PP-347**

**IN VIVO IMPROVING OF ALKALOIDS ACCUMULATION IN  
*HYOSCYAMUS ALBUS* L. BY THE INTERACTION BETWEEN  
CYTOKININS AND AUXINS**

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This work reports the effect of interaction between cytokinins and auxins on improving the alkaloids accumulation in *Hyoscyamusalbus* L. (Family: Solanaceae, commonly known as: White henbane, contained tropane alkaloids: atropine and scopolamine). Plants of this specie were grown under controlled conditions, and treated with plant-hormones: Auxins by: 2,4-Dichlorophenoxyacetic acid (2,4-D) and 3-indole acetic acid (IAA), Cytokinins by: kinetin (K) and Benzyl amino purine (BAP), at 0 and 10 mg/L rates isolated and interacted. The results showed that treatment of 2,4-D and K at the highest applied rates 10mg/L increased the accumulation twofold rate estimated to 1.798% in the root plant part and 0.914% in the aerial plant part, as compared with witness witch accumulated the amount of 0.801% in root part and 0.524% in shoot part. The TLC for alkaloid extracts shows that *Hyoscyamusalbus* L. contains 06 alkaloids and the applied treatments have not an effect on alkaloids quality.

**PP-348**

**QUANTIFICATION OF ANTI-NUTRITIONAL SUBSTANCES IN THE FRUITS OF HONEY LOCUST (*GLEDITSIA TRIACANTHOS* L.): PERSPECTIVES OF VALORIZATION IN ALGERIA**

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Honey locust (*Gleditsia triacanthos* L.), also called sweet-locust or thorny-locust, is a moderately fast growing tree. Because it has proven very hardy and tolerant of drought and salinity, it is widely planted for windbreaks and soil erosion control. It was largely recommended like food of the cattle at the beginning of the 20<sup>TH</sup> centuries, since it can provide a source of fodder, protein and metabolic energy. The tree was introduced in Europe in 1700 when it became current in the Western areas, central and Southerners, and was introduced by the colonists into our country Algeria in 1949. Honey locust is able to form dense thickets of thorny vegetation which provides an excellent cover for a broad variety of game and birds and its flowers are incredibly attractive for pollinating insects and form thus a source of pollen and nectar for honey.

At the aim of valorization of this species, we were interested by the evaluation of the composition of its fruits (pods, seeds) out of polyphenols, condensed tannins and hydrolysable tannins, regarded as anti-nutritional substances.

The obtained results confirmed that the fruits of *G. triacanthos* are characterized by very low values in anti-nutritional factors with the percentages according to: condensed tannins (0, 13% - 0, 03%), hydrolysable tannins (0, 78% - 0, 45%) and total phenols (0, 44% - 0, 16%).



**PP-349**

**EXTRACTION AND QUANTITATIVE DOSAGE OF THE CELLULOSE AND BIOMETRICS OF THE FOLIAR FIBERS OF ASPHODELUS MICROCARPUS SALZM & VIV**

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Asphodels are monocotylédones perennials, belonging to the family of Liliaceae and to the kind Asphodelus. Most of the species grow around the Mediterranean Basin. In Algeria, we find this species in forests and pastures in Tell, High plateaus and Saharan Atlas. To know better this vegetable with the aim of better one valuation adds us to us carried a biochemical study of the cellulose and the biometrics of fibers

The extraction of the cellulose is made by two protocols, the results show that the extracted cellulose by using the protocol of [1] Present a rate more important than that obtained by the protocol of [2], (67,8 %; 43,2 %) Which returns this plant as a source of important exploitation in the industrial domain. The biometric results of the study show that this plant is classified among plants with short fibers with an average length of 0,63mm, Fibers present forms of the heterogeneous extremities, they are of disentangled, rounded off shape, in truncated extremity and in bevel.

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<sup>2</sup> Huwyler H R., Franz G., ET Meier H., 1979. In: Chikhi A., Bouasria A., 2003. Dosage biochimique des polysaccharides pariétaux des palmes du *Chamaerops humilis* L de la région de Tlemcen. Mémoire d'Ingéniorat, USTO MB, 53 p.

**PP-350**

**ERADICATION OF *PSEUDOMONAS AERUGINOSA* BIOFILM BY SOME PLANTS EXTRACTS**

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In the present study three isolates belonging to *Pseudomonas aeruginosa* and one reference strain of *P. aeruginosa* ATCC 27853 were tested for biofilm formation on two types of support (glass and polystyrene), using two cultures medium Tryptone Soy Broth (TSB) and Modified Biofilm Broth (MBB). The results showed that the quantity of biofilm formed depends on the nature of culture medium, where the rate of the adherent bacteria was more significant in TSB medium. Polystyrene was more favorable to bacteria for adherence compared to glass. Our study included the testing of extracts of three plants: *Allium sativum*, *Aloe vera* and *Lawsonia inermis* on biofilm eradication formed by *P. aeruginosa* ATCC 27853. The effect of these plant extracts on planktonic cells was also studied. The results showed that *Allium sativum* and *Lawsonia inermis* inhibit both bacterial growth and biofilm formation and no activity was detected for *Aloe vera* extract.

**PP-351**

**SUPERCRITICAL CO<sub>2</sub> FRACTIONATION OF SAGE LEAVES AS A METHOD TO IMPROVE LABDANE DITERPENE RECOVERY**

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The use of supercritical fluid technology as an innovative technology to extract bioactive compounds has grown considerably in recent decades. In the past few decades however, sage has been the subject of an intensive study for its phenolic antioxidant components. In this study, sage leaf oil was isolated by a supercritical fluid extraction using CO<sub>2</sub> in which the extraction was followed by a two-stage fractional separation.

Experiments were conducted at 50 °C and 180 bar and fractionation of the extract was accomplished maintaining separator (S1) at 0 °C and separator (S2) at 20 °C. The sage leaves were also extracted with Soxhlet extraction, using hexane solvent. The chemical compositions of the extracted oils were analysed using a gas chromatography-mass spectrometer (GC-MS). The SFE yield was 2.59 % comparable in magnitude to that of the hexane Soxhlet extraction of 3.89 %. The chemical compositions of the extracts were quite different for the two extraction methods. The extract from the SFE and fractionation was characterized by the occurrence of labdane type diterpenes (35.37%) in high amounts with *epi*-13-manool (34.95%) as main compounds, while the oil extracted by soxhlet contained a high amount of waxes compounds (38.19 %) with octacosane (13.86%) as main compounds.

**PP-352**

**TISSUE CULTURE POSSIBILITIES AND CHALLENGES IN *LILIUM CANDIDUM***

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In this study, it is aimed to evaluate and review of studies about *in-vitro* micropropagation of *Lilium candidum*. *L. candidum*, with its fragrant and showy flowers, is considered as one of the most expensive ornamental plants in the world. Its distribution area is determined as Balkans and West Asia. The extract of *L. Candidum* contains various biologically active compounds. These compounds are used in cosmetic industry due to their antimutagenic and especially antioxidant effects and in medical industry due to the antiviral activities. *L. Candidum* production in the world is not enough for research. In addition to this, it is a very expensive raw material. Because of the above stated reasons, researches are limited and research costs are increased. Reproductionability of *L. Candidum* depends on explant type, components of culture medium and especially cold treatment. Twin scales, leaf and leaflet were generally studied as explant in regeneration researches and especially it was found that twin scales are the most suitable explant type. Among the studies on bulblet development, the best results in terms of the maximum bulblet diameter and the number of bulblet were obtained in MS medium including generally BAP, Kinetin, 2iP cytokinins and NAA, 2-4,D and IBA auxins. In several studies, bulblet development in medium prepared with combination of BAP-IBA and BAP-NAA has been successful yachieved. The maximum number of shoot formation was obtained in MS medium including combination of NAA-BA. Cold treatments done for acclimatization of *L. Candidum* have also provided a successful micropropagation. Inserting of in vitroproduction in industrial scaled-bioreactors and increasing the secondary metabolite accumulation with abiotic and/or biotic stress application in micropropagation studies of *L. candidum*is thought to be useful for medical and cosmetic industry.

**PP-353**

**VALIDATED HPTLC METHOD FOR QUANTITATION OF  
PROTODIOSCIN IN *TRIGONELLA FOENUM-GRAECUM***

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A simple, rapid, sensitive High Performance Thin Layer Chromatography (HPTLC) method was developed for the estimation of protodioscin from *Trigonella foenum-graecum*. Chromatographic separation was achieved on aluminium plates precoated with silica gel 60F<sub>254</sub> as stationary phase and chloroform: methanol: glacial acetic acid (6.5:3.0:0.5 v/v/v) as mobile phase. Densitometric evaluation was carried out after derivatizing the plates with Ehrlich's reagent (1 g p-dimethyl aminobenzaldehyde in 25% methanolic HCl). After derivatization scanning was performed at 515 nm. The R<sub>f</sub> value of the protodioscin was found to be 0.31 ± 0.02. The response in terms of peak area was found to be linear over the concentration range from 400-1400 ng/spot with mean recovery of 100.90 ± 3.00 %. The developed method was validated as per ICH guidelines<sup>1</sup>. Limit of detection and limit of quantitation was found to be 100 ng/spot and 330 ng/spot respectively. The method was found to be accurate, precise and robust. The developed method was successfully applied for the estimation of protodioscin from the seeds, leaves and roots of *Trigonella foenum-graecum*.

Guideline, ICH Harmonised Tripartite. *Validation of Analytical Procedures: Text and Methodology Q2 (R1)(2005)*

**PP-354**

**OPTIMIZATION OF THE EXTRACTION BY HYDRODISTILLATION OF  
*EUCALYPTUS GLOBULUS* ESSENTIAL OIL BY USING RESPONSE  
SURFACE METHODOLOGY**

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The present work deals with the optimization of the extraction by hydrodistillation<sup>1</sup> of *Eucalyptus globulus* essential oil by using response surface methodology. The study is related to five factors: the extraction time, the temperature, hydration status, water to plant material ratio, and the fragmentation of the plant. Optimization was carried out according to the method of the planning of the experiments by using a fractional factorial design<sup>2</sup>.

This plan associated with a mathematical model in the form of polynomial with the first degree, allowed to calculate the mean responses, the effects of the factors and their interactions<sup>2</sup>. The yield obtained under the proposed condition in the laboratory was very close with the predicted one, proved the reliability of the employed model.

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**PP-355**

**PLANT REGENERATION FROM CALLUS OF *TEUCRIUM POLIUM* GEYRII EXPLANTS, MEDICINAL PLANT IN SOUTHERN ALGERIA**

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In order to contribute to the valorisation of local medicinal plants known for their therapeutic properties, we choose a plant of Tamanrasset which is a mountainous region of the Algerian central Sahara: *Teucrium polium* Geyrii, from the family of lamiaceae named by the Tuareg Takmazzut. It is much appreciated and highly prized in folk medicine. Its effects are related to the presence of phenolic compounds, which have a very important antioxidant potential. To produce in large quantities these polyphenols, we placed in culture explants of *Teucrium polium* in order to induce callus and regenerate plantlets from these calli.

Callus was initiated from apical buds, flower parts previously sterilized on culture media of hormonal combination of either BAP / or kinetin ANA / ANA. After obtaining callus, transplanting are performed on new media containing BAP only. After 20 days of cultivation, observations under the binocular loupe reveal the appearance of small leaf primordia that develop on several small stems. These small seedlings are separated in new individual culture media favoring the development of aerial apparatus to prepare them for rooting. Quantitative assays polyphenols have revealed high contents.

**PP-356**

**EXTRACTION AND CHARACTERIZATION OF *CRITHMUM MARITIMUM* ESSENTIAL OIL FROM BEJAIA REGION (ALGERIA) BY GAZ CHROMATOGRAPHY COUPLED TO MASS SPECTROMETRY (GC/MS)**

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*Crithmum maritimum*, commonly known as sea fennel or rock samphire, widely distributed along coastal areas of the Mediterranean Sea and of the Atlantic Ocean. This plant used in folk medicine for their antiscorbutic, carminative, diuretic, digestive, purgative and vermifuge properties. The aim of this work was the determination of chemical composition for *Crithmum maritimum* essential oil (EO) extracted by hydrodistillation method, using GC/MS apparatus. *C. maritimum* was harvested in Jun 2013 from Bejaia region (Algeria). Few studies have been reported about the EOs chemical composition of this species harvested from other region in the world, whereas, the chemical composition of *C. maritimum* EOs grown in Algeria, have not been reported before. The major compounds were  $\gamma$ -terpinene (50.48%), thymol methyl ether (33.65%) and  $p$ -cymene (12.57%).

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**PP-357**

**SELECTIVE FRACTIONATION OF BIOACTIVE TRITERPENES FROM ROSEMARY LEAVES BY SUPERCRITICAL CO<sub>2</sub>**

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Supercritical fluids (SCFs) are alternative solvents in the field of Green Chemistry that are being developed as advanced separation techniques. When using conventional solvent extraction methods is it very difficult to control the selectivity of the extraction process. For this reason supercritical fluid extraction with fractionation is a very attractive option for extracting selective compounds from herbs and plants.

In this work, Supercritical carbon dioxide (SC-CO<sub>2</sub>) was applied to fractionate rosemary supercritical extracts in order to produce fractions with high concentration of pentacyclic triterpenes, these triterpenes are promising leading compounds for the development of new multi-targeting bioactive agents. Supercritical rosemary extraction was carried out by operating at 180 bar and 50 °C in the extraction vessel, and on-line fractionation in a two-step depressurization system to selectively precipitate the pentacyclic triterpenes. Phytochemical composition of extracts were analyzed by means of GC-MS and HPLC. The results indicated that SFE and fractionation is an advantageous method over Soxhlet extraction in terms of recovery of target compounds.

**PP-358**

**HPTLC METHOD FOR QUANTITATIVE DETERMINATION OF ROSMARINIC ACID AND EVALUATION OF ANTIOXIDANT CAPACITY IN THE EXTRACTS OF THREE ALGERAIN MINTS**

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HPTLC-densitometric method was developed for the quantitative determination of rosmarinic acid (RA) in Algerian mints, *Mentha spicata* L., *Mentha pulegium* L. and *Mentha rotundifolia* auct. The extracts of these plants were also screened for their effects on linoleic acid peroxidation. The analyses were performed on HPTLC silica gel 60 F<sub>254</sub> plates with chloroform: acetone: formic acid (75:16.5:8.5, v/v) as the mobile phase. RA was determined in UV at 365 nm and fluorescence at  $\lambda_{exc}$  325 nm with a 550 nm filter, respectively. Chromatographic resolution permitted reliable quantification in both measurement modes and calibration curves were linear in a range of 150 - 1000 ng/spot. *M. spicata* was found to contain significantly higher concentrations of RA. The densitometric quantification was found to be simple, allowing the analysis of many samples in a short time with reasonable precision (total precision for *Mentha spp* extracts, 5.1 and 5.8 % for UV and fluorescence detection, respectively). Densitometry can be used for routine determination and quality control of RA in herbal and formulations containing *Mentha* species. The HPTLC data, allied to assays of linoleic acid peroxidation prevention, suggest the potential of *M. spicata* (52% Trolox<sup>®</sup> equivalents) as a natural source for inhibitors of lipid peroxidation.

**PP-359**

**ACCUMULATION OF SOME POLYPHENOLS INDUCED BY  
*VERTICILLIUM WILT* OF OLIVE *OLEA EUROPAEA* L. (VAR.  
*CHEMLAL*) IN NORTH ALGERIA**

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*Verticillium wilt* of olive which the causal agent is *Verticillium dahliae* Kleb., has not been enough studied in Algeria. In spite of its early appearance dates that back to 1990, it causes serious damages. Because of the severity of this disease, the best efficient way to fight it, seems to be the genetic one, which consists in using resistant varieties. The aim of this work is to know more about *Verticillium wilt* of olive and also the defense reactions the plant could set up against this parasitic attack.

We quantified lignins<sup>1</sup>, components of the cell wall which is the first barrier encountered by the pathogen and also anthocyanins, a flavonoids class, which can be induced by biotic or abiotic trauma and which are involved in tolerance of plants to various stresses such as pathogen attacks. The results revealed a higher content of lignins in diseased stems; this phenomenon intensifies their cell wall solidity and resistance .Anthocyanins are highly accumulated in leaves and stems affected by the disease; this result also shows that these molecules intervene in plant defense.

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**PP-360**

**PREPARATION AND CHARACTERIZATION OF HERBAL  
NANOFORMULATION CONTAINING *ANDROGRAPHIS PANICULATA*  
NEES EXTRACT**

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*Andrographis paniculata* Nees extract was embedded and dispersed in Eudragit S 100 polymer as smooth spherical nanoparticles which may prove to be a novel drug delivery system. Methanolic extract of *Andrographis paniculata* Nees (Acanthaceae) was prepared and standardised for andrographolide content using HPLC. Three formulations containing 50, 100 and 150mg of extract were prepared by solvent displacement method using Eudragit S 100 polymer. Parameters including drug: polymer ratio, stabilizer, solvent and stirring speed were optimized. Characterization of the formulations was carried out using particle size analysis, PDI, Differential scanning calorimetry (DSC), X-Ray Diffraction, Scanning Electron Microscopy techniques, entrapment efficiency and in vitro drug release studies. Particle size of the nanoformulations was found to be within the range of 300-400nm, with entrapment efficiency more than 75% and drug release more than 55% after 8hours.

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**PP-361**

**QUALITATIVE AND QUANTITATIVE ANALYSIS BY GC-MS OF  
*ALLIUM TUNCELIANUM* OF METHANOL EXTRACT**

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Garlic is a worldwide cultivated crop species which is well-known for its health beneficial effects. *Allium tuncelianum* is a species of garlic. *Allium tuncelianum* is from Amarillidaceae family, it is an endemic plants to the Munzur Valley in Tunceli, in eastern Turkey. *Allium tuncelianum* single gear, small tooth-like formations located on the back of the shell, aromatic, unlike the other is a type that can blossom and seed. Aromatic structure is a plant essential oil fraction containing. Aromatic structure plants have been used in a lot of medicinal case for years. This work aimed that qualitative and quantitative analysis by GC-MS of *Allium tuncelianum* due to the aromatic structure and other organic component. *Allium tuncelianum* of methanol extract used in this work. Consequently determined that *Allium tuncelianum* of methanol extract has a lot of component and their amount. This component and their amount as follows. Ethylene oxide heptamer and Decaethylene glycol 0.66 %, 1,8,18'-Bi(1,4,7,10,13,16-hexaoxacyclononadecane) 1.07 %, n-Octadecyl-cyclohexane and (Z)-7-Hexadecenoic acid 2.12%, Dimethyl docosan-1,22-dioic acid and Tridecanedioic acid 3.35 %, n-Hexadecanoic acid 5.29%, 9,12-Octadecadienoic acid 15.59%, (Z)-9-Octadecenal 18.53%, 9-Octadecenoic acid 53.40%.

**PP-362**

**MEDICINES-ST. JOHN'S WORT INTERACTION: ROLE OF  
CYTOCHROME P450**

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St John's Wort (*Hypericum perforatum*) is a Mediterranean plant which has an antidepressant activity confirmed by more than thirty placebo-controlled studies, particularly in light and moderate depression. St John's Wort interacts with a large number of medicines and plants by enzyme induction: more than 70 substances have been identified as interacting with St John's Wort. Many recent studies have shown that induction phenomenon is attributed to hyperforin. Hyperforin has high affinity and activates the nuclear receptor PXR (Pregnane X Receptor) which induces expression of the CYP3A4 gene. Therefore hyperforin causes greater metabolism of the active ingredients mainly degraded by CYP3A4 such as: oral anti-coagulants, Digoxin, the hormonal contraceptives, immunosuppressives.... In this review, a critical examination of the pertinent scientific literature is undertaken in order to evaluate the risk of interactions that St John's Wort can cause when taken in combination with drugs metabolised by Cytochrome P450. Additionally, this work also allows us to establish the benefit / risk balance of *Hypericum* in comparison with conventional antidepressant drugs.

**PP-363**

**THE HEMICELLULOSE FRACTION PARIETAL ARISTIDA PUNGENS:  
SOURCE OF BIOMOLECULES**

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The present study concerns the search for biological activities of oligosaccharid fractions produced by acid hydrolysis of the *Aristida pungens* hémicellulosic, (Poaceae) a perennial grass growing in the dry regions of North Africa. After fractionation and molecular analysis of the fractions, several oligosaccharid populations has been identified. The heaviest oligomeric fractions are mainly composed of glucose residues, while other smaller, consist mainly of xylose and arabinose to a lesser extent. These oligosaccharide fractions were then tested on the development of clover seeds (dicotyledon plant) and barley (monocotyledon plant) and also on their ability to induce defense responses of leaf fragments barley. The results suggest that some oligosaccharide fractions have the ability to stimulate and / or inhibit the growth of roots, hypocotyls clovers and / or coleoptile of barley. Finally, two fractions appear to have a defense elicitor activity in barley because they are able to modify activities phenylalanine ammonia lyase (PAL), laccase, peroxidase and catalase compared to controls.

**PP-364**

**ASYMMETRIC REDUCTION OF KETONES BY BIOCATALYSIS USING  
*MESPILUS GERMANICA*. L FRUIT GROWN IN ALGERIA**

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Stereoselective reductions of heteroaryl ketones containing furan, thiophene, chroman, and thiochroman moieties are of utmost importance in organic synthesis since the resulting chiral alcohols are used as antioxidants, or building blocks<sup>1</sup>. Asymmetric reduction of ketones with chemical catalyst or biocatalyst is a promising route for the production of enantio enriched alcohols. In the context of developing green and sustainable chemical processes, biotechnologies are attractive alternatives. The biocatalytic reduction of ketones was performed using medlar (*Mespilus germanica*. L.) fruit grown in large amounts in Algeria.<sup>2</sup> Variety of heterocyclic aromatic ketones was reduced with medlar as catalyst in aqueous media. Prochiral ketones containing furan, thiophene, chroman, and thiochroman moieties are reduced with up to 98% ee. High enantioselectivities have been observed especially for the bioreduction of tetralone and thiochromanone with respectively 89% and 98% ee. These chiral benzylic alcohols are used as synthon-key in various syntheses of the many drugs.

In conclusion, Bio-reduction catalyzed by medlar fruits provides an attractive approach to access chiral alcohols with excellent enantiomeric excess. These results show that medlar fruits have enzyme system with ability to enantioselective reduction of ketone. Indeed, fruits represent an alternative source of “new” enzymes for use as catalysts in organic synthesis.

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**PP-365**

**THEORETICAL INVESTIGATION OF THE INCLUSION COMPLEX  
PYRIDOXINE/ $\beta$ -CYCLODEXTRIN**

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Non-covalent intermolecular interactions such as hydrogen bonds play a crucial role in many areas of modern chemistry, from molecular biology to supramolecular chemistry. The concepts of such interactions in Cyclodextrin complexes constitute an important factor in the molecular recognition. The purpose of the present study is to investigate the contribution of HBs interactions, in the stability of the inclusion complex formed between the drug molecule (Pyridoxine) and  $\beta$ -cyclodextrin. The computational calculations were performed employing *PM3MM*, *ONIOM* and *DFT* methods.

Results gave geometrical structure in which the pyridine ring of the drug molecule is completely encapsulated in  $\beta$ -CD's cavity and the primary hydroxyl groups are projected in the upper part of the wider rim of  $\beta$ -CD. Three HBs were established with the three hydroxyl groups of Pyridoxine, the primary hydroxyl group O156–H165 was close to 2-OH of  $\beta$ -CD, while the O158–H167 bond is directed toward the O60 of the adjacent glucopyranose residue. A third HB located at the wider rim of  $\beta$ -CD involved the H166 and O63 atoms. To accurately characterize the HBs interactions established in the stable complex, an analysis using *QTAIM* and *NBO* calculations was achieved<sup>1</sup>. Theoretical results suggest that the molecular recognition is attributed to HBs interactions.

**References**

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**PP-366**

**ESTABLISHMENT OF CELL SUSPENSION CULTURES OF *Hypericum retusum* Aucher FOR THE PRODUCTION OF PHENOLIC COMPOUNDS**

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*Hypericum* species are used as medicine due to their therapeutic efficacy. In this study, cell suspension cultures of *H. retusum* Aucher were successfully established in MS(Murashige & Skoog) medium containing 0.1 mg L<sup>-1</sup> BAP (Benzilaminopürin) and 0.5 mg L<sup>-1</sup> 2,4 D (2,4-Diklorofenoksi asetik asit). We investigated the effects of sucrose concentrations (15, 30 and 50 gL<sup>-1</sup>), different light conditions(constant light, constant dark and control) and the initial medium pH(4.5, 5.8 and 6.5) on the biomass accumulation and the production of phenolic contents(hypericin, pseudohypericin, hiperoside, quercetin and chlorogenic acid) in suspension culture of *H. Retusum* Aucher. The determination of phenolic compounds was performed by LC-MS/MS.

Our data suggested that the best biomass accumulations were obtained from MS medium supplemented with 30 gL<sup>-1</sup> sucrose, pH 5.8 and under the darkness conditions. The highest phenolic compounds were provided from on MS medium containing 15 gL<sup>-1</sup> sucrose. The phenolic compound contents of suspension culture varied among the treatments under the different light conditions and at initial pH.

PP-367

**CINCHONA ALKALOIDS AND DERIVATIVES USED AS EFFICIENT ADDITIVES IN *CANDIDA RUGOSA* LIPASE CATALYSED KINETIC RESOLUTION.**

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The *Candida Rugosa Lipase* (CRL type VII, ATCC14830) is widely used as an efficient biocatalyst in bio-technology/bio-industry processes. Especially, for hydrolysis of oils and fats. Unfortunately, in some cases, such as, enzymatic kinetic acetylation of alcohols, this lipase presents moderate reactivity and selectivity. This problematic may be resolved by dealing with basic parameters having a crucial effect on the enzymatic efficiency, such the nature of nucleophile, the organic solvent and the residual water in the reaction media or by introducing additives<sup>1</sup>.

Herein, we describe the influence cinchona alkaloids and their derivatives as additives on the transesterification enzymatic resolution of a primary 1,2-substituted ferrocenyl alcohol, using *Candida Rugosa Lipase* (CRL, type VII) as a catalyst. The obtained results show that the use of the *o*-(4-chlorobenzoyl) hydroquinine as additive in the enzymatic transesterification in the presence of *Candida Rugosa Lipase* (CRL) of 2-hydroxymethyl-1-phenylthioferrocene exhibit a large enhancement of the reactivity and the selectivity with E= 143 at C= 53% with vinyl acetate as the acylating agent in toluene<sup>2</sup>. In conclusion, the use of additives such as alkaloids might offer a useful alternative in poorly selective enzymatic acylation reactions.

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**PP-368**

**IN VIVO EVALUATION OF CUTANEOUS WOUND HEALING  
ACTIVITY OF *PHLOMIS BOVEI DE NOE*, LEAVES**

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The present study was to evaluate in vivo cutaneous wound healing activity Phlomis bovei. Leaves and to validate its traditional use as medicine for wound healing. Healing is a biological phenomenon that is automatically and immediately implemented by the body that is able to repair the physical damage of all tissues except nerve cells. Lot of medicinal plants are used for the treatment of a wound. Our ethnobotanical study has identified 19 species and 13 families of plants used in traditional medicine in Oran-Algeria for their healing activities.

The Phlomis bovei De Noe was the species most recommended by herbalists. Its phytochemical study revealed different secondary metabolites such as terpenes, tannins, saponins and mucilage. The evaluation of the healing activity of Phlomis bovei in wistar albinos rats by excision wound model showed a significant amelioration with 5% increase of the surface healing compared to the control group and a gain of three days of epithelialization time with a scar histologically better.

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**PP-369**

**INVESTIGATION ON NEW CLAY – ESSENTIAL OILS SYSTEMS\***

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Antibiotic-resistant bacteria have been identified as a severe problem in human and veterinary biomedical field. Given the fact that essential oils are known for their potential in solving this problem, in the present work we investigated also the possibility of using natural vehicles like layered silicate or zeolite particles as delivery systems. Several inorganic particles have been used like illite (French green clay or yellow clay), motmorillonite or zeolite (clinoptillolite, phillipsite, and analcime). Their ability in loading highly volatile essential oils was strongly dependent on their ability to offer either intergallery loading spaces, either porosity depending on their nature and structure. Loading essential oils in clay minerals or zeolites have been proven as an efficient way for essential oils processing, manipulation and delivery. The adsorption/desorption phenomena were investigated on isothermal conditions (37 °C) by thermoanalytical techniques (TGA-DTG). Releasing the bioactive species can be tailored by the use of different clay types. Several types of essential oils extracted from aromatic plants were used: *Thymus vulgaris*, *Rosmarinus officinalis*, *Myrtus communis* and *Oregano syriacum*. The effect against different bacteria and fungi (*C. Albicans*, *Enterobacter*, *Enterococcus faecalis*, *E. coli*, *P. aeruginosa*, *S. aureus* and *Aspergillus* spp.) was followed in comparison with pure essential oils.

In conclusion, the layered silicate or zeolite particles are effective vehicles for essential oils delivery with successful results against a wide spectra of pathogens like *C. Albicans*, *Enterobacter*, *Aspergillus* spp., *E. Coli*, and antibiotic-resistant bacteria like *Enterococcus faecalis*, *P. Aeruginosa* and *S. Aureus* when are used in the right compositional set-up.

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**PP-370**

**VALIDATION OF TLC-VIDEODENSITOMETRIC METHOD FOR  
SIMULTANEOUS DETERMINATION OF FOUR ISOFLAVONES IN  
HERBAL MATERIAL**

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Videodensitometry combined with (HP) TLC is gaining popularity due to very low cost of analysis and low toxicity to environment as compared to HPLC. Hereby we report validation of videodensitometric method for determination of four isoflavones in herbal material using Sorbfil software for chromatogram analysis. The method was validated by the assay tests of detection (LOD) and quantification limit (LOQ), calibration curve, repeatability and recovery. For chromatographic analysis, HPTLC Pre-Coated High performance Silica gel 60 F-254 plates (Merck, DE) were used. As mobile phase cyclohexane:dioxane:acetic acid (30:10:1 v/v/v) was employed. LOD and LOQ for daidzein, genistein, formononetin and biochanin A were 69.5, 64.6, 27.7 and 25.0 ng respectively. The relationship between the concentration of standard solutions and the peak response was linear within the concentration range of 40 to 400 ng/spot for all four standards. Repeatability and recovery were 10.1-12.8% and 83-89%, respectively. The method was employed for analysis of isoflavon content in several plants from leguminosae family.

The results showed that the tested chromatographic conditions, combined with videodensitometric analysis, were applicable for the simultaneous quantification of four isoflavones in herbal extracts.

PP-371

**SOMATIC EMBRYOGENESIS AND SUITABLE CALLI PRODUCTION FOR SECONDARY METABOLICS USING IMMATURE EMBRYOS OF *TCHIHATCHEWIA ISATIDEA* BOISS\***

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*Tchihatchewia isatidea* Boiss is endangered genus in Turkey and also may be used ornamental, dye and cosmetic plant with their attractive flower colours and nice smell. The aim of the study was to achieve high compact and friable calli production and regeneration of the plant by somatic embriyogenesis. Immature seeds of surface sterilized fruits were removed. The seed coat encasing the immature embryo was peeled away and the seed was squeezed hard using scalpel handle until the immature zygotic embryo (approximately 2-3 mm in length) was on the loose. Immature embryos were transferred to callus induction medium (N<sub>6</sub> medium supplemented with 2.5 mg/L 2,4-D, 200 mg/L casein, 2.3 g/l L-proline, 20 g/L sucrose and 7 g/L agar) then transferred to shoot induction MS medium supplemented with different combinations and concentrations of BAP, TDZ, KIN, 3% (w/v) sucrose medium supplemented with and 0.7% (w/v) agar. The compact, friable and suitable calli production for secondary metabolics and the highest regeneration (4.16 shoots per explant) were obtained on MS shoot induction medium supplemented with 1 mg/l KIN, 0.50 mg/l TDZ ve 0.50 mg/l IAA by somatic embriyogenesis.

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**PP-372**

***IN VITRO* GERMINATION OF ENDEMIC AND ENDANGERED SPECIES  
*MUSCARI AZUREUM* FENZL AND *MUSCARI AUCHERI* (BOISS.) BAKER**

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*Muscari azureum* Fenzl and *Muscari aucheri* (Boiss.) Baker are endemic/endangered species of Turkey, mainly propagated by bulbs and threatened by extinction. The aim of the study was to achieve high germination ratio of these endangered species using different temperatures, basal medium and concentrations of KNO<sub>3</sub>. The seeds of the species were collected from Ankara, Kayseri, Adana, Amasya, Tokat and Çorum provinces located at central of Turkey. Plants from each accession were taken and mixed to make the bulk samples for seed germination studies. The seeds were also surface sterilized in 50% commercial bleach (Axion) for 20 min, rinsed four times and transferred to 1/2 MS medium supplemented with 3% (w/v) sucrose and 0.7% (w/v) agar or placed between sterile filter papers immersed at liquid medium containing no KNO<sub>3</sub>, 2% and 3% KNO<sub>3</sub> at 10-15-25 °C. The best germination ratios for *M.azureum* (5.0 %) and *Muscari aucheri* (7.5 %) were achieved on the seeds placed between sterile filter papers immersed at 3 % KNO<sub>3</sub>, at 15 °C under *in vitro* conditions.

\*This study was supported by TÜBİTAK Project (code 106O034)



PP-373

### THE ADVANTAGES OF NANOTECHNOLOGY-BASED DRUGS WITH MEDICINAL PLANTS IN THE PHARMACEUTICAL INDUSTRIES

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Medicinal plants and their active compounds such as flavonoids, tannins and terpenoids have been the major sources of pharmaceutical industries around the world from ancient times. Current pharmaceutical drug industries for drug discovery from medicinal plants have focused on nanotechnological process that have some advantages than other drug discovery and delivery processes. Nanotechnology-based drugs with medicinal plants have not only increase the solubility and absorption of active components, but also reduce the required therapeutic dose and side effects. Although the active compounds of medicinal plants are highly soluble in water, they are unable to demonstrate highly absorption and efficacy, because of their high molecular size, so they cannot cross the lipid membranes of the cells. Therefore it can be required to use nanotechnology-based drug delivery systems (polymeric nanoparticles, solid lipid nanoparticles, liquid crystal systems, precursors systems for liquid crystals, liposomes and micro emulsions) combined with herbal medicines. There are some examples that are combined nanotechnology with medicinal plants for pharmaceutically: lipid-based systems incorporated green tea and ginseng extracts (*Panax ginseng* CA Meyer), nanoparticles using *Radix salvia miltiorrhiza* Bunge and a methanolic extract of *Ocimum sanctum* L., liposomes with *Artemisia arborescens* L., *Cratylia mollis*, *Silybum marianum* and *Camptotheca acuminata*, curcumin-loaded polymeric nanoparticles that are extracted from *Curcuma longa* and honokiol-loaded polymeric nanoparticles that is extracted from *Magnolia officinalis*, liquid crystal systems from *Carapa guyanensis* Aubl, *Prunus persica*, *Bixa orellana* and *Calendula officinalis*, *Tripterygium wilfordii* Hook. F and *Syagrus romanzoffiana* (Cham.) Glassman are incorporated into nanoemulsions. It can be concluded that nanotechnology-based drug systems with herbal medicines are important for pharmaceutical industries that will be of a great value to the therapy development and drug-delivery systems in the pharmaceutical industries in the future.

**PP-374**

**CHEMICAL COMPOSITION OF ESSENTIAL OILS FROM *MENTHA SPICATA* L. SUBSP. *SPICATA* AND *M. X PIPERITA* L.**

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The genus *Mentha* L. belongs to the family Lamiaceae is represented in Turkey by 15 taxa belonging to 8 species including hybrids. It is found in temperate regions of Eurasia, South Africa, the north, west and east portions of Europe, as well as Turkey and Russia and many species have been traditionally used as medicinal and aromatic herbs. This study reports on the chemically characterized essential oil from *Mentha spicata* L. subsp. *spicata* and *M. x piperita* L. Both essential oils were subjected to hydrodistillation and were obtained in essential oil of 2.015% and 5.605%. The oils were analyzed by gas chromatography–mass spectrometry (GC-MS). Thirty-six components were determination in the oil of *M. spicata*, representing 98% of the total oil. The major constituents were carvone (49.8%), dihydrocarvone (31.2%) and L-limonene (5.2%). In the essential oil of *M. x piperita*, forty-one components were identified; representing 98.5% of the total oil, carvone (59.3%), dihydrocarvone (5.9%) and 4-terpineol (5.1%) were the major components.

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