The First Mediterranean Symposium on Medicinal and Aromatic Plants (MESMAP-2013)

April 17-20, 2013

ABSTRACT BOOK

TURKISH AIRLINES

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1st Mediterranean Symposium on Medicinal and Aromatic Plants

MESMAP-2013

ABSTRACT BOOK

April 17th – 20th, 2013

Gazimagosa (Famagusta)
Turkish Republic of Northern Cyprus

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***Alphabetical order according to surname**

Dear colleagues,

We were happy to meet you in the 1st Mediterranean Symposium on Medicinal and Aromatic Plants (MESMAP-2013) to present your research activities and share your experiences in this high profile event with us. The symposium was held on April 17-20, 2013 in Gazimagosa (Famagusta), Turkish Republic of Northern Cyprus (TRNC), which will be organized by Faculty of Pharmacy, Eastern Mediterranean University (EMU) joint with AMAPMED (Association of Medicinal and Aromatic Plants of the Mediterranean).

The scientific program covered all related aspects of Medicinal and Aromatic plants. It was also provided a platform for herbal medicines, botany, plant biotechnology, ethnobotany, phytopharmacology, pharmacognosy, agriculture and forestry, plant biology, phytochemistry and aromatherapy. Participants more than thirty countries met and planned further collaborations each other. In addition to the scientific activities, rich social programs throughout the symposium provided for informal interactions, which include welcome reception, gala dinner, congress tour, and closing ceremony.

We hope that participants all over the world would have an amazing experience and good memories to take back their homes. We would like to thanks for all MESMAP-2013 participants for their valuable contributions and hope to meet those respected scientistst in MESMAP-2015 near the Mediterranean Sea.

Best regards,

Symposium Chairs,

Prof. Dr. Ilkay E. ORHAN
Dean of Pharmacy Faculty
Eastern Mediterranean University
Turkish Republic of Northern Cyprus

Prof. Dr. Nazım ŞEKEROĞLU
President of AMAPMED
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MESMAP – 2013
SCIENTIFIC ORAL PROGRAM

17 APRIL 2013, WEDNESDAY		
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MESMAP – 2013 PRESENTATIONS

INVITED LECTURES (1 – 11)

KEYNOTE LECTURE

MEDICINAL PLANTS AND THE DEVELOPMENT OF NEW DRUGS

Vincenzo De Feo, Laura De Martino, Emilia Mancini

Department of Pharmacy, University of Salerno, Via Ponte don Melillo, 84084 Fisciano (Salerno), Italy

The study of medicinal plants is often based on the knowledge about the uses of indigenous plants by the indigenous people. Ethnobotany can be considered as the interactions between man and plants and can offer phytochemical and therapeutical material for the development of new drugs. Moreover, in most of the preliterate traditions, several medicinal plants may assume sacred and/or magical along with therapeutic roles, because of their potency in altering the state of mind. The study of these plants can help in the research of metabolites active on central nervous system. Ethnobotanical, phytochemical and pharmacological studies have been carried out on some plants (*Brugmansia arborea* L., *Valeriana adscendens* Trel. and *Iresine herbstii* Hook.), used in the traditional practices in the shamanism of the Northern Peruvian Andes. The pharmacological assays showed a real pharmacological activity on CNS, suggesting that these plants act as psychotropic agents, thus confirming their ritual use. In Western countries, however, medicinal plants can have a role also today, in preventive medicine and in the treatment of human and environmental disorders.

INVITED LECTURE-I

INNOVATIVE UTILIZATION OF BIORESOURCES FOR NOVEL DRUG CANDIDATES

B. Sener[1], I. Erdogan Orhan[1,2]

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Plants are the oldest friends of mankind. They not only provide food but also serve humanity by preventing and caring different ailments. Medicinal plants are the source of a large number of essential drugs in Western Medicine and they are not only the primary source of health care for most of the world's population living in developing countries but also enjoys growing popularity in developed countries. The growth of the pharmaceutical industry and the increasing development of new synthetic and biological medicines have not diminished the importance of medicinal plants. There is still a great need for novel compounds with unique mechanisms of action to treat diseases such as Cancer, Alzheimer's along with other neurodegenerative diseases, Arthritis and Diabetes. Besides, multi-resistance development by the parasites to the present drugs also constitutes another problem for the treatment of parasitic diseases as well as tuberculosis. Therefore, natural products continue to provide a diverse and unique source of bioactive lead candidates for drug discovery, however maintaining their continued eminence as resource compounds is challenging in face of the changing face of pharmaceutical industry and the changing nature of biodiversity prospecting brought about by the Convention on Biological Diversity. During the 21st century, increasing interest in the industrialized nations have greatly expanded and accompanied by calls for assurance of quality, efficacy and safety. Therefore, appropriate research methodology, standardization of phytomedicines as well as national policy for legislation, regulation and licensing of phytomedicines by health authorities have to be realized. Turkey is one of the rich countries in the world for biological sources depending on different geographical, ecological and aquatic environments as well as passageway between Europe, Asia and Africa. Our researches have been focused to develop bioactive compounds from Turkish medicinal plants as leads for drug candidates during the past 30 years. This work is based on bioassay-directed isolation techniques by using sensitive bioassays and mechanism-based screening protocols as well as information of folkloric utilization of medicinal plants.
The lecture will be highlighted on bioactive compounds arising from the screening of some Turkish medicinal plant extracts[1,2].

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INVITED LECTURE-II

DISCOVERY OF DRUGS FROM MEDICINAL PLANTS - THE ROAD TO EL DORADO

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Just like *Eldorado* (legendary lost city of gold), the road to the discovery of successful drug from medicinal plants could be full of challenges and adventures. The myriad of structurally diverse compounds found in nature makes them play an important role as a unique source for drug discovery, but they often play hard-to-get. Even though, most of the FDA approved drugs are either natural products or natural product-derived compounds. Natural products are characterized by its unorthodox and often unanticipated chemical structures that offer novel leads of clinically useful drugs. Studies have demonstrated that the hit rate of natural products is on average 3-10%, compared with ~ 0.03% of that of compounds from synthetic origin[2,3]. Drug discovery could follow any of the two approaches i.e. cell-based and/or target-based. Enzymes represent the major class of drug targets. Recent reports show that about 50% of small molecule drugs are enzyme inhibitors[1].

This lecture will give an overview of our research on the inhibition of neglected diseases-related enzymes. Our cell-based research will also be highlighted. This research has led to the identification of very interesting anti-mycobacterium properties of some Sudanese medicinal plants.

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INVITED LECTURE-III

STEVIA PLANT UPTAKE AND DETERMINATION OF HEAVY METALS IN ACID SOIL CONDITION FROM CULTIVATED ZONE OF SOUTH INDIA

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The six month field experiments was conducted at Ripponpet, South India (Dist. Karnataka) under an acidic soil zone (pH 6.10) to procure the high yield foliage production and to determine the accumulation of non-essential heavy metal contents (Ni, Pb, Cr, and Cd) in dried leaves of *Stevia* plant by application of bio-fertilizers. Samples were digested by the wet method and flame atomic absorption spectrophotometry (AAS) was used for determination of these metals[1]. The results revealed dried *Stevia* leaves contains very trace amount of Ni, Pb, Cr, As and Cd whereas the amount of leaf biomass increased up to six months of the study (341 g) procured from acidic soil zone. The level of heavy metal content differed in the same *Stevia* plant collected from experimentally different plots with applied biofertilizers. However, the amount of heavy metal contains in dried *Stevia* leaves were found to be varied in acidic soil zone but calculated lesser than that of toxic level[2]. This may be due to nature of soil environment and intake of nutrients by supplied biofertilizers in soil.

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INVITED LECTURE-IV

APPLICATION OF COUNTER-CURRENT CHROMATOGRAPHY FOR THE ISOLATION OF COUMARINS FROM POLISH MEDICINAL PLANTS FROM THE APIACEAE FAMILY

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Natural products are commonly considered as complex mixtures of active compounds and consequently their purification becomes a particularly challenging task. Many scientists are focused in finding not only the proper separation conditions but also in developing the chromatographic method produces the optimum separation efficiency. High-speed counter-current chromatography is a separation technique which involves two immiscible phases, one as a stationary phase (retained in a coil by a centrifugal force) and second as the mobile phase. The method is rapid and easy to scale up. It also has no solid support and can be used for compounds with vastly different polarities.
HSCCC was applied for the isolation of either minor or major coumarins or coumarin-like compounds from different Polish medicinal plants from the Apiaceae family (*Peucedanum, Heracleum, Angelica* genus). Before, the most efficient extraction methods were found and the proper two phase solvent systems were created. Purified compounds were tested for biological activity, such as antiepileptic, anxiolytic, and cholinesterase inhibitory activity.

INVITED LECTURE-V

CAFFEIC ACID DERIVATIVES: PHENYLPROPANOID, PHENYLETHANOID GLYCOSIDES

İhsan Çalış

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Hydroxycinnamic acids, *p*-coumaric acid, ferulic and caffeic acids always occur as universal constituents of higher plants. These are simple phenylpropane derivatives and found as bound with ester or glycosidic linkages in plant tissues. The combined forms of hydroxycinnamic acid with quinic acid are the most frequent mentioned phenolic compounds in the phytochemical studies. Chlorogenic acid, rosmarinic acid, 1,3-dicaffeoylquinic acid (cynarin), 2,3-dicaffeoylquinic acid (cichoric acid) are the well known hydroxycinnamoyl derivatives. Some of them are found as sugar ester or glycosides. Phenylpropanoid glycosides are one of the widely known representatives of these types of metabolites. The first remarkable work described these compounds as orobanchin, a derivative of caffeic, 3,4-dihydroxyphenylethanol, glucose and rhamnose in 1966[1]. Due to the presence of a C_6-C_3 fragment as an ester unit (cinnamoyl derivatives) and the C_6-C_2 fragment as aglycone moiety (phenylethanol derivatives), they have been reported as phenylpropanoid and/or phenylethanoid glycosides in the proceeding researches[2]. Not only distribution of diverse structural patterns of hydroxycinnamic acids in the plants have been suggested to be valuable taxonomic markers, interest has also been growing in phenolic compounds due to their presumed role in the prevention of various diseases[3-6].

Along above mentioned lines, the phytochemical and biological activity studies performed on the plants selected from Lamiaceae (*Galeopsis*, *Phlomis*, *Scutellaria*, *Leonurus*, *Marrubium*, *Stachys*, *Sideritis*, *Teucrium*), Scrophulariaceae (*Pedicularis*, *Lagotis*, *Rhynchocorys*, *Scrophularia*, *Verbascum)*, Oleaceae (*Fraxinus*), Plantaginaceae (*Digitalis*, *Veronica)* and Globulariaceae (*Globularia*) will be presented. Most of these plants are known as herbal drugs in traditional medicine and some of them are used as herbal teas in Turkey.

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INVITED LECTURE-VI

CELLULAR REDOX REGULATION BY OLIVE AND POMEGRANATE EXTRACTS ACCOMPANY TO CARDIOPROTECTION AND NEUROPROTECTION

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Formation and accumulation of AGEs (advanced glycation end products) and ALEs (advanced lipid peroxidation end products) are related to the aging process and are accelerated in diabetes. These reactive carbonyl compounds (RCCs) contribute to the progression of vascular injury, hypertension, cardiomyopathy and neurodegenerative decrement leading to serious complications. In the cellular mechanism, RCCs induce "carbonyl stress" characterized by the formation of adducts and cross-links on proteins, which progressively results in impaired protein function, cell dysfunction, inflammatory response and apoptosis. The prevention of carbonyl stress involves the use of free radical scavengers, antioxidants and cellular redox regulators. Thus, we aimed to examine the signaling properties of AGEs/ALEs and AGEs/ALEs-precursors, their role in the pathogenesis of cell damage, and the effects of different herbal extracts and derivatives efficient in neutralizing carbonyl stress *in vitro* and *in vivo*. We compared the effects of an oleuropein reach and a hydroxytyrosol rich olive leaf extracts with the effects of standard compounds (quercetin, hydroxythyrosole and oleuropein) on HNE-induced toxicity in rat cardiomyocye (H9C2) cell cultures. Both extracts reduced HNE-toxicity, improved viability, attenuated ROS generation and protected $\Delta\Psi(m)$. The effects of extracts on $\Delta\Psi(m)$ was more than the individual effects of quercetin, oleuropein or hydroxytyrosole. SAPK/JNK and Hsp27-induced increase in the presence of HNE was inhibited especially by quercetin and other olive polyphenols. Olive polyphenols induced down-regulation of cl-caspase 3 and cl-PARP in cells under conditions of HNE-induced cellular stress. We also examined the effects of Olea europea L. (olive) leaf and fruit extracts and oleuropein on cytokine-induced or H_2O_2-induced β-cell toxicity. INS-1 cells incubated with olive extract showed a significant reduction in cytokine- and H_2O_2-induced ROS production, caspase 3/7 activation, and ameliorated abnormal antioxidant defense, mithocondrial function and insulin secretion. In other group of studies, pomegranate (Punica granatum L.) ethanolic seed and hull extracts were tested, in comparison with a commercial sample, for the inhibition of aldose reductase, an enzyme involved in the etiology of diabetic complications. On the other hand, the effect of pomegranate seed oil (PSEO), rich in n-5 PUFAs) on activation of cultured BV-2 microglia was investigated. Unlike to stobadin and quercetin, only the PUFAs preparations effectively inhibited the apoptotic markers in microglia exposed to the toxic LPS concentration. Our data point to the first evidence of immunomodulation and cytoprotection of microglial cells by the pomegranate seed oil-derived n-5 PUFAs, indicating thus their neuroprotective efficiency comparable to one of n-3 PUFAs. Acknowledgements: Supported by KOSGEB-2011-0850, Gazi University research foundation BAP-01/2012-70, and EU-COST Actions, B35 and BM1203.

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INVITED LECTURE-VII

SECONDARY METABOLITES FROM TURKISH *ASTRAGALUS* SPECIES AND THEIR BIOACTIVITIES

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Astragalus L., one of the largest genera of flowering plants with about 3000 different species belonging to the family Leguminosae, is represented by 445 species in the flora of Turkey, of which 224 are endemic[1,2]. Gum tragacanth, a very well-known foodstuff and pharmaceutical emulsifier, is an economically important natural product obtained from *Astragalus* species growing wild in Turkey. In Turkish folk medicine, the aqueous extracts of some *Astragalus* species are used to treat leukemia as well as healing wounds. They are also famed for their immunomodulator, antimicrobial, antiperspirant, anti-inflammatory, diuretic and tonic effects[3]. Polysaccharides and saponins are the major classes of chemical compounds isolated from *Astragalus* species; however, the most investigated constituents are saponins. Previous studies have shown that cycloartane- and oleanane-type glycosides isolated from *Astragalus* show interesting biological properties, including immunostimulating[4], anti-protozoal[5], antitrypanosomal[6], antiviral[7], cytotoxic[8], and cardiotonic[9] activities. Based on the traditional claims and distinctive chemistry of the *Astragalus* genus, our team decided to focus on phytochemistry, chemotaxonomy and bioactivity of Turkish *Astragalus* species. Until now, 25 out of 445 Turkish *Astragalus* species, from 13 different sections, have been investigated for their secondary metabolite contents. These studies resulted in the isolation of mainly cycloartane-type glycosides including five different aglycones, together with various group of secondary metabolites (oleanane-type saponins, phytosterols, flavonoids, simple phenolic glycosides, amino acid conjugates and maltol glycosides). Our in vitro and in vivo bioactivity studies on the immune system modulation and wound healing properties of crude *Astragalus* extracts and their purified metabolites have provided important results substantiating their traditional use. Besides, new compounds were prepared from *Astragalus* cycloartanes by microbial biotransformation and semi-synthesis studies to obtain more potent chemical entities.
This lecture will provide an overview about the chemistry and bioactivity studies performed on Turkish *Astragalus* species.

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INVITED LECTURE-VIII

TREASURE FROM GARDEN: METABOLOMICS, PHARMACOGNOSY AND BIOTECHNOLOGY OF *VERBASCUM* SPP.

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Verbascum L. (Scrophulariaceae), common name mullein, is a genus of 360+ species of flowering plants, predominantly distributed in Asia, Europe, and North America. *Verbascum* plants have been used medicinally for centuries in folk medicine as a remedy for respiratory problems such as bronchitis, dry coughs, whooping cough, tuberculosis, and asthma.

NMR-based metabolomics approach was applied to study metabolic differentiations of five mullein species. ^{1}H NMR fingerprinting in combination with principal component analysis allows classification of *Verbascum* species in two groups: group A (*V. phlomoides* and *V. densiflorum*) and group B (*V. xanthophoeniceum*, *V. nigrum* and *V. phoeniceum*). In addition, it was found that the plants in group B synthesize higher amounts of bioactive iridoid (*e.g.* pharmaceutically-important harpagoside) and phenylethanoid glycosides (verbascoside, forsythoside B and leucosceptoside B)[1]. The antioxidant and anti-inflammatory activities of *Verbascum* plants were evaluated using several *in vitro* and *in vivo* assays[2]. Furthermore, the iridoid glycoside harpagoside has been thoroughly evaluated in models of acute and chronic inflammations (*e.g.* zymosan-induced arthritis in mice). Genetically transformed root cultures (*via Agrobacterium rhizogenes*-mediated transformation) of several *Verbascum* species were induced for the first time and their biosynthetic potential was thoroughly investigated.

In conclusion, *Verbascum* plants could serve as attractive mines of powerful antioxidant and anti-inflammatory compounds for the food, cosmetics, and pharmaceutical industries.

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INVITED LECTURE-IX

FROM PLANTS IN THE ARAB AND AFRICA TO MEDICINES IN THE NORTH: BIO-PROSPECTING, RESEARCH / DEVELOPMENT, BENEFIT SHARING, CONSERVATION, AND LEGISLATION

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The ownership, control, and distribution of benefits from the use of biodiversity have been contested vigorously - through economical, political, and legal for centuries. Today pharmaceutical companies constitute an important group of actors focusing on bio prospecting. More than two thirds of all plant species are also located in the third world, attracting bio prospectors searching for medicinal plants. In recent years, especially since the coming into force of the CBD, we use some agreements between source countries/institutions and recipients, for access to biological resources for the purpose of research, development and commercialisation.

The scope of our on-going research is to contribute to a scientifically based picture of bioprospecting by focusing on a few case studies using an interdisciplinary approach. Case studies have been carried out in Morocco. These will be illustrated by our on-going research activities. In these cases, we examine the effects of bio-prospecting on conservation and development: i.e., the conservation of MAP, the phyto-pharmacological investigation, activity-guided fractionation isolation, different bioassays (*in vitro* and *in vivo* test systems), structure determination, cultivation, and the economic and social development in source countries. It is suggested that HMAPs have the potential to contribute to medicinal, local economies, subsistence health needs, and improved natural resources management, leading to the conservation of biodiversity and a promising economic development opportunity for the Arab/Africa countries as the region is endowed with an immense agro-ecological diversity; a wealth of plant biodiversity.

INVITED LECTURE-X

QUALITY CONTROL & STANDARDIZATION OF HERBAL MEDICINAL PLANTS & PRODUCTS - FROM FIELD TO FIRM

M. Kamil

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In spite of recent developments of antibiotics and newer synthetic drugs, a vast majority of people depend on traditional medicines for their primary health care needs and it can safely presumed that a major part of traditional therapy involves the use of plant extracts or their active principles. In the recent years with ever growing commercialization in the field of herbal medicines, there has been an instant demand for quality control of the drugs used in this system. The studies on the identity, purity and quality of the genuine drug will enhance information in checking the adulteration. A set of standards would not doubt be detterent on substitution and adulteration and also an aid for 'Drug law Enforcement'. In the present paper, an attempt has been made for a sequential study of the Quality Control of Herbal Medicinal Products (HMP) starting from Selection of Medicinal Plants; Good Agricultural Practices (GAP); Cultivation; Good Field Collection Practices(GFCP); Organized and Unorganized Drugs; Source and Period of Collection; Identification; Storage; Chemical Standardisation; Assay; Good Manufacturing Practices (GMP); Pharmacological study to Clinical Approach, with special reference to maintain Standardisation at each and every stage.

Besides above protocols, this study deals with preliminary examination of a medicinal plant, its morpho-anatomical, pharmacognostic, physicochemical and analytical parameters, foreign organic matter, pesticide residue, radioactive and microbial contamination, chemical assay, finger printing of the successive extractives using Accelerated Solvent Extractor (ASE), spectroscopic and spectrometric techniques e.g. IR ,UV, TLC & HPLC, GC/MS, LC/MS, phytochemical screening, quantitative analysis of inorganic constituents through Atomic Absorption Spectrometer and over an above discussed in detail the challenges of standardization with special reference to marker compounds in plant species and their fingerprinting. Different stages, i.e Quality control studies of Raw Medicinal Plants, Controlled Studies of Method of Processing, Quality Control Studies of Finished Product, Standardization Procedures at each stage from birth of the plants up to clinical application of herbal medicine will be dealt with reference to some medicinal herbs. An emphasis has been given on the protocols which are required for Registration of Herbal Medicinal Products (HMP).

ORAL PRESENTATIONS (1 – 40)

ORAL PRESENTATION - 1

SURVEY OF PLANTS OF SALINE HABITATS AS A SOURCE OF BIOLOGICALLY ACTIVE COMPOUNDS

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The field and literature research of different plant communities developed on range of salt affected soils of the Southeast and central Europe allowed us to identify significant number of already acknowledged and under-researched medicinal plant species capable to grow in conditions of increased soil salinity. Among them, the highest abundance and frequency exhibit *Achillea millefolium* aggregate (mainly *A. collina*), *Mentha pulegium, Artemisia santonicum, Chamomilla recutita, Taraxacum serotinum,* and *Polygonum aviculare*, as well as several typical halophytes of the genus *Plantago* L., such as *P. maritima*, *P. tenuiflora* and endemic *P. schwarzenbergiana*. Review of recent studies on evaluation of halophytic species for their secondary metabolites and related biological interactions points out that obligate halophytes such as *Crithmum maritimum, Cakile maritima, Eryngium maritimum, Atriplex halimus*, etc., have been characterized by the presence of different phenolic compounds responsible for antioxidant effects[1]. Our own results performed on near of 20 halophytes collected from different types of salt affected soils in Serbia, indicate their solid capacity for free radical scavenging, which mostly referred to *Artemisia santonicum*, *Mentha pulegium* and, especially to *Statice gmelinii*.
It has been already accepted that halophytes evolved very efficient system of radical oxygen scavenging as adaptive mechanism linked to salt stress[2].

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ORAL PRESENTATION - 2

ACCIDENTAL FATAL INGESTION OF COLCHICINE CONTAINING LEAVES FROM AUTUMN CROCUS, *COLCHICUM AUTUMNALE* L., (LILIACEAE): THREE CASES REPORT FROM BOSNIA AND HERZEGOVINA

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A logical way to group poisonous plants is by their poisonous principles, which cause toxic effects when ingested by humans and animals. In this work we report a fatality due to accidental colchicine intoxication by ingestion of autumn crocus or meadow saffron, (*Colchicum autumnale*). All parts of this plant contain colchicine, a highly poisonous alkaloid, and 20 other alkaloids. The accidental ingestion of autumn crocus is a rare event and to our knowledge only six cases has been described in detail. Our study describes three cases (2 females, 1 male) of poisoning by accidental ingestion of autumn crocus. The poisoned persons were originally from Bosnia and Herzegovina, and they ate a salad of plants with green leaves regarded as wild garlic (*Allium ursinum*). Two persons died at home one day after ingestion of the salad. Only one poisoned person survived. He was admitted to the hospital and treated with supportive therapy, mechanical ventilation, noradrenaline, crystalloid solutions and fresh frozen plasma. Also, our work describes the biochemical toxicology of colchicine and its quantification in biological materials.

ORAL PRESENTATION - 3

THE AMERICAN UNIVERSITY OF BEIRUT-NATURE CONSERVATION CENTER: A SUCCESSFUL DIVERSIFIED AND DECENTRALIZED APPROACH TOWARDS NATURE CONSERVATION

N. A. Saliba

Director of the AUB-Nature Conservation Center, Jordan

The AUB-Nature Conservation Center (AUB-NCC) started as a university-wide initiative led by faculty members with a strong commitment to nature conservation, biological diversity and the sustainable use of the region's natural resources and landscapes. AUB-NCC's objective is to develop a biodiversity conservation framework for Lebanon and the Middle Eastern region via research, education and outreach. The interdisciplinary research and education focus on investigating multiple facets of nature conservation, especially the scientific, sociopolitical, cultural, and economic factors that may be involved. The outreach activities adopt a micro-level approach to conserving species of native flora and fauna. It also uses a decentralized strategy that stimulates and enhances the willingness of local communities to become guardians and primary beneficiaries of this biodiversity. To support the achievement of these goals, AUB-NCC has acted as a multidisciplinary platform bringing stakeholders together from different sectors, to initiate, develop, and promote active programs that address local challenges in nature conservation.
In this talk, I will present evidence for the successes of AUB-NCC and discuss the intellectual challenges faced when offering community-based solutions grounded in state of the art research methodologies.

ORAL PRESENTATION - 4

INTERSPECIFIC HYBRIDIZATION OF FIVE ECONOMICALLY IMPORTANT OREGANO SPECIES

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Oregano species are widely distributed in the Mediterranean basin and are commonly used as spice in foods and as essential oil in pharmaceutical and cosmetic industries. Five economically important oregano species *O. syriacum, O. onites, O. vulgare, O. minutiflorum* and *O. majorana*, were crossed to obtain interspecific hybrids with high herbage yield and essential oil content. Ten interspecific hybrids *O. syriacum* x *O. onites, O. syriacum x O. vulgare, O. syriacum* x *O. minutiflorum, O. syriacum* x *O. majorana, O. onites x O. vulgare, O. onites* x *O. minutiflorum, O. onites x O. majorana, O. vulgare* x *O. minutiflorum, O. vulgare* x *O. majorana,* and *O. minutiflorum* x *O. majorana,* were obtained from the crosses. Oregano parents and their hybrids were planted in a completely randomized design with three replications in 2001 and 2002 growing seasons in Hatay, Turkey. The measured plant parameters were plant height, herbage yield, herbage color, essential oil content and essential oil components. Dry herbage yield varied between 652 and 4136 kg/ha. The highest herbage yield was obtained from *O. syriacum* x *O. onites* while the lowest was obtained from *O. minutiflorum*. Essential oil content varied between 1.23 and 4.5%, the lowest and the highest essential oil was obtained from *O. majorana* and *Syriacum x onites*, respectively. Among the oregano hybrids, the major essential oil components were carvacrol, thymol, linalool, myrcene, α-terpinene, □-terpinene, β-caryophyllene, cymene, terpinen-4-ol, *p*-cymene. With respect to herbage color, the brightness (*L*), redness (*a*) and yellowness (*b*) values were significantly different among hybrids. The most desirable herbage color was obtained from the cross between *O. onites* and *O. vulgare* with the *L, a* and *b* values 47.90, -11.06, and 17.71, respectively.
Considering the herbage yield and essential oil content, *O. syriacum* x *O. onites, O. syriacum* x *O. vulgare,* and *O. onites* x *O. vulgare* were found the most proper hybrids for oregano production under the Eastern Mediterranean conditions.

ORAL PRESENTATION - 5

EVALUATION OF ANTIOXIDANT AND ANTIMICROBIAL ACTIVITIES FROM *RHAMNUS ALATERNUS* L.

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Rhamnus alaternus L. a medicinal plant largely used in Algerian traditional medicine is a shrub belonging to Rhamnaceae family. The aerial parts of the plant (stems and lives) were subjected to maceration in methanol (EMTF), whereas the roots were extracted in methanol (EMR) using a Soxhlet apparatus. The decoction has been conducted both on the aerial parts (EATF) and roots (EAR) using distilled water. The yields were: 11 %, 10 %, 6 % and 8 % (w/w) for EMTF, EMR, EATF and EAR respectively. Total phenolic contents were determined using Folin-Ciocalteau reagent and found to be: 218 (EATF), 153 (EAR), 74 (EMTF) and 74 (EMR) mg caffeic acid equivalent/ g of fresh weight. Flavonoids were evaluated by $AlCl_3$ method and shown to be 108 (EATF), 113 (EAR), 66 (EMTF) and 49 (EMR) mg quercetin equivalent/g of fresh weight. The flavones and flavonols were estimated to be 44 (EATF), 48 (EAR), 18 (EMTF) and 15 (EMR) mg quercetin equivalent /g of fresh weight. Antioxidant activity was evaluated using β-carotene/linoleic acid system, it ranged between 72 and 82 % for all extracts and seems to be close to that of BHT 95 % when used at 2 mg/ml after 48h incubation. Free radical scavenging effects were evaluated by 2, 2-diphenyl-1-picrylhydrazyl ($DPPH^{\cdot}$) test. The IC_{50} of the extracts were 37 (BHT), 52 (EMR), 66 (EATF), 66 (EAR) and 71 µg/ml (EMTF). The antimicrobial sensitivity of the extracts towards eleven bacterial strains (Gram+ and Gram-) was assessed using the disc diffusion agar test; only one extract (EMR) has developed an inhibitory effect against five bacteria tested namely: *E. coli*, *S. aureus*, *K. pneumoniae*, *E. faecalis* and *P. aeruginosa*. The minimal inhibitory concentration (MICs) was 0.2 mg/ml for *P. aeruginosa* and 6.25 mg/ml for the remaining bacteria strains.

ORAL PRESENTATION - 6

CRITICALLY ENDANGERED *SALVIA* SPECIES IN CYPRUS

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Salvia veneris Hedge is an endemic perennial herb in Northern Cyprus and it has an extremely local distribution within the west of Degirmenlik village. It is estimated that there are approximately 4000 individuals. *Salvia veneris* is a protected plant species both under local and international legislations and it is categorized as `Critically Endangered` by IUCN (2006) due to its declining population on the island. It has been also included as a priority species in Annex II of the EC Habitats Directive. In this paper, the current conservation status of this endemic plant is described, local ecological characteristics explained, current threats are highlighted and future conservation strategies are discussed.

ORAL PRESENTATION - 7

MORPHOLOGICAL AND MOLECULAR CHARACTERISATION AND *IN VITRO* PRESERVATION OF *CYCLAMEN* SPECIES GROWN NATURALLY IN TURKEY

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The origin of 20 *Cyclamen* taxon belongs to Primulaceae is Mediterennean region and grown under trees and bushes. There are 10 *Cyclamen* species grown naturally in our country. Five endemic *Cyclamen* species are grown in Turkey where is a gene center of many plant species. *Cyclamens* are under extinction due to destruction of natural habitats, unconcious usage of agricultural areas and taking out the tubers continuously from nature for export. For this reason, conservation studies and biotechnological researches on cyclamen which is an important genetic resource are significant. *In vitro* conservation and cryopreservation techniques are used to preserve plant genetic resources using biotechnological techniques. This research covers Mersin, Adana, Antalya, Muğla, Izmir, Çanakkale and Yalova provinces, where all *Cyclamen* species grown naturally. In this study, experiment will be carried out with determined *Cyclamen* populations in these provinces. Morphological and molecular characterisation were done for all *Cyclamen* species, *in vitro* preservation and cryopreservation studies were carried out for 4 endemic *Cyclamen* species. Molecular characterisation of plant materials collected from different regions of Turkey was done using RAPD and SRAP markers. To investigate *in vitro* preservation possibilities of *Cyclamen* which is an important genetic resource in our country, the media of somatic embryogenesis was optimized using different plant growth regulators (2,4-D and 2IP) for different species, embryogenic suspension cultures was performed and *in vitro* cryopreservation protocols were improved. In *in vitro* preservation period, different osmotic reagents (mannitol and sorbitol) and different temperatures were treated, genetic stability of obtained calluses was tested in special period using SSR primers.

ORAL PRESENTATION - 8

AN ETHNOBOTANICAL STUDY ON PLANTS USED BY THE LOCAL PEOPLE OF ALASEHIR (MANISA) IN TURKEY

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This study aimed to identify plants collected for various purposes by the local people of Alaşehir, located in the west of Turkey, and to document the traditional names, preparation and uses of these plants. For this purpose, the center of Alaşehir and all of the 62 villages have been visited over a period of 2 years. During the field works, 1058 plant specimens were collected. Demographic characteristics of participants, local plant names, utilized parts and preparation methods of the plants were investigated and recorded. At the end of the interviews with region people, a total of 240 species belong to 69 families and 201 genera were determined that these plants are used as food (144 taxa), folk medicine (208 taxa), handcrafts 117 taxa), decoration (34 taxa), animal food (107 taxa), fuel (22 taxa). An additional 95 taxa were recorded as serving widely varied uses such as in beekeeping, hunting, and roof covering, and as sedatives, toys, perfumes. The usages of 16 taxa are recorded in Alaşehir for the first time. In addition, total approximately 1200 vernacular names belonging to wild or cultivated 241 taxa are presented in this study.

ORAL PRESENTATION - 9

CONSIDERATIONS ON THE STATE OF THE ART AND TRAINING OF MEDICINAL AND AROMATIC PLANTS SUSTAINABLE WILD HARVESTING

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PLANT WILD project[1] aims to establish the necessary tools applicable to adults training in relation with aromatic and medicinal plants (MAPs) wild harvesting (WH). Information of plant WH in each partner country (Lithuania, Portugal, Spain and Turkey) was gathered, for detecting implementation level of sustainability issues and identifying needs on future training. Some topics were analyzed: a) State of the art of WH, for commercial and non-commercial use; b) Legal framework and adoption by collectors; c) Guidelines and certification rules applied; d) Existing sustainable wild harvesting (SWH) training and stakeholders needs. In conclusion, all four countries have a strong tradition on gathering plants resources, but it is difficult to establish the line between commercial and non-commercial WH of MAPs. Moreover, some species are collected in very few quantities, so unregistered in official statistics. Cultural tradition, socio-economic issues and natural or anthropogenic impact on the environment determines how WH activity is monitored, regulated and controlled, being organic certification the most used. There are very few adult regular training activities, not enough for raising society awareness. All stakeholders are important to be trained or informed on WH, being collectors, forest owners and policy makers, key agents when SWH must be improved.

[1]2009-2013.Forest Plant Wild Harvesting Learning in Europe (PLANT WILD). Grundtvig Learning Partnership, Lifelong Learning Programme, Education and Culture DG.

ORAL PRESENTATION - 10

ANTIMUTAGENIC EFFECT OF GREEN AND BLACK TE EXTRACTS ON DIFFERENT TUMOR CELL LINES *IN VITRO*

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In the present study, aqueous extraction was performed on both green and black tea leaves then confirmation with conventional qualitative chemical tests providing the following groups of extracts; G1(green tea polyphenols), G2 (green tea terpenoids), B1(black tea polyphenols), and B2 (black tea terpenoids). Median lethal dose for G1 and B1 extracts were evaluated in female BALB/c mice. The results were 5.356 and more than 5 g/kg body weight for G1 and B1, respectively. A new modified method was established for reading the color density of cell lines stained with crystal violet at 492 nm as indicator of cell growth. This modified method seems to be as sensitive as the original one. The growth inhibition of G1, G2, B1, and B2 extracts after 3 days exposure to serially diluted concentrations starting from 1000 µg/ml to 0 µg/ml (control), on murine mammary adenocarcinoma (AMN3), human rhabdomyosarcoma (RD) and human larynx carcinoma (Hep-2) cell lines were assessed. The results were highly significant inhibition of each of the extracts on the three types of cell lines and the response of each cell line was also different in a highly significant manner from cell line to another. The median inhibitory concentration (IC_{50}) in AMN3 cell line was ~258 and 419 µg/ml for G1 and B1, respectively. On the other hand, the values for G2 and B2 were ~ 252 and 675 µg/ml, respectively. In case of RD cell line the IC_{50} for G1 and B1 were ~114 and 189 µg/ml, respectively, and ~254 and 255 µg/ml for G2 and B2, respectively. The IC_{50} for Hep- 2 cell line were ~ 341 and 323 µg/ml for G1 and B1, respectively while the results for G2 and B2 were ~ 285 and 305 µg/ml, respectively. In case of normal mouse embryo fibroblast cell line, G1 and B1 didn't affect the growth after three days of exposure to similar concentrations tested on AMN3, RD and Hep-2 cell lines. Cytogenetic test for cell lines treated by G1and B1 extracts at doses 1000, 500, and 250 µg/ml after 3 days of exposure revealed no metaphases to be detected. In conclusion, four distinct groups of extracts from green and black tea were extracted. Polyphenols from green and black tea revealed broad margin of safety in mice. All groups of extracts undoubtedly showed significant growth inhibition of cell line AMN3, RD and Hep-2. Yet, green tea polyphenols were almost more potent in growth inhibition than black tea polyphenols on AMN3and RD cell lines. While Hep-2 cell line showed stronger growth inhibition with black tea polyphenols than green tea polyphenols. On the other hand, green tea terpenoids were more potent in growth inhibition on AMN3 and Hep-2 cell lines than black tea terpenoids and the growth inhibition on RD cell line was similar. Interestingly, G1 and B1 extracts showed selectivity in that they did not affect the growth of normal mouse embryo fibroblast cell line.

ORAL PRESENTATION - 11

EVALUATION OF ANTIDIABETIC ACTIVITY OF SOME JORDANIAN MEDICINAL HERBS

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Diabetes mellitus is a global disease associated with reduced quality of life and increased risk factors for mortality and morbidity worldwide. In this study, 12 commonly used Jordanian herbs were selected to evaluate their anti-hyperglycemic activity and to investigate the direct effect of these extracts on insulin secretion from the perfused rat pancreas and insulin secreting cell line Rin. Seven out of the 12 tested herbs (*Artemisia herba alba, Urtica dioica, Olea europea, Lupinus albus, Trigonella foenumgraecum, Achillea fragrantissima* and *Cinnamomum zeylanicum*) did not decrease plasma glucose on all tested time points when compared to control rats, received only glucose (0.5g/kg b.w.). Whereas, *Nigella sativa, Citrullus colocynthis, Phoenix dactylifera, Ceratonia siliqua* and *Peganum harmala* significantly decreased plasma glucose at 30, 60 and 120 min after glucose load. The later herbs were tested for their ability to secrete insulin in the rat pancreatic perfusion and Rin cells. All 5 tested herbs increased insulin secretion from the perfused rat pancreas with different secretory capacity. *Peganum harmala* demonstrated superior insulin secretion capacity when compared with the other 4 tested herbs. *Citrullus* did not significantly increase insulin secretion in Rin cells, whereas *Ceratonia* and *Phoenix* mildly increased insulin secretion (1.25-1.5 folds) with no clear dose-dependent effect. However, nigella increased insulin secretion by ~1.4, 1.5 and 1.9 folds at 30, 100 and 300 µg/ml, respectively. *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 µg/ml, respectively. Further works on identification and purification of the different components of promising herbs are needed.

ORAL PRESENTATION - 12

EFFECT OF DIFFERENT SOWING DATES AND ROW SPACINGS ON YIELD AND QUALITY CHARACTERISTICS OF CHAMOMILE (*MATRICARIA RECUTITA* L.) CULTIVARS AT YALOVA ECOLOGICAL CONDITIONS

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This study was conducted under Yalova ecological conditions in Ataturk Central Horticultural Research Institute in the years of 2008-2009 and 2010-2011. The experimental design was split-split plots with four replications. Research materials were three *Matricaria recutita* L. cultivars and one population from Yalova flora. Research was consist of 4 cultivars, 3 different sowing times (early November, early December and late December)and 3 different row spacing (15 cm, 30 cm, 45 cm, 60cm). In the trial, plant height (cm), fresh flower yield (kg/ha), flower diameter (mm), dry flower ratio (%), dry flower yield (kg/ha), fresh herbage yield (kg/ha), dry herbage yield (kg/ha), essential oil content (%), essential oil yield (l/ha) and essential oil components were investigated. The highest fresh flower yields were obtained from Zloty Lan cv. as 5480 kg/ha and in 5628 kg/ha for first and second years respectively. The highest dry flower yield (1240 kg/ha) was obtained from Bona cultivar in first year where as Zloty Lan gave the highest dry flower yields (1157 kg/ha) in second year.

Note
This study "Effect of Different Sowing Dates and Row Spacings on Yield and Quality Characteristics of Chamomile (*Matricaria recutita* l.) Cultivars at Yalova Ecological Conditions" is part of Dr. D. Arslan's doctoral dissertation.

ORAL PRESENTATION - 13

BROWN SEAWEED; *PADINA PAVONICA* AS BIOSTIMULANT OF PLANT GROWTH AND DEVELOPMENT IN HORTICULTURAL BIODEGRADABLE SUPPORT

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An innovative horticulture nutrient and biodegradable support is described in this paper for replacing plastic culture pots. This support is prepared with fiber-based lignocellulosic plant (Loopha) having a water holding capacity higher than that of the regular soil and that is also biodegradable. Brown seaweed *Padina pavonica* was incorporated as an organic fertilizer of plant growth. Chemical analysis of the aqueous extract of this alga showed the presence of macronutrients such as nitrogen (N), phosphorus (P) and potassium (K) necessary for development and growth of plants. Agar-agar was added as a solidifying agent. A medium containing only soil and another containing soil with chemical fertilizer served as controls. Sunflower seeds grown in medium supplemented with brown seaweed; (*Padina pavonica* + agar (4% or 6%) + Loopha have a growth rate (length and diameter of the stem, number of leaves) that is slower than the plants grown in a medium with a comparable amount of the soil with chemical fertilizer. However, the plants in the soil and others in the soil with chemical fertilizer and the media (seaweed + Loopha + agar 4%) have not completed their growth while the plants grown in the media (seaweed + Loopha + agar 6%) continued to grow. A biodegradability test showed that a piece of support (seaweed + agar 1.5% + Loopha), buried in the ground and watered every four days for four weeks, presented a degradation rate higher than the support with only Loofah and agar 1.5%, while a piece of plastic container remained intact under the same conditions. The results of our study have shown that this support has helped to extend the duration of growth and enhanced the quality of the plants. Ultimately, the fabricated support presented fertilizer properties, water retention and biodegradability and could serve in horticulture as an alternative to plastic pots and chemical fertilizer.

ORAL PRESENTATION - 14

IS MARKETING OF MEDICINAL AND AROMATIC PLANTS FAIR? LESSONS FROM KÖPRÜLÜ KANYON NATIONAL PARK, TURKEY

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Medicinal and aromatic plants (MAP) provide a variety of essential benefits (e.g. food and medicine) and also case income for the local people in Köprülü Kanyon National Park (KKNP) located in Turkey. Unfortunately, a number of factors (e.g. absence of marketing mechanism) threaten the long-term sustainability of these species as well as the livelihoods of the rural poor. Accordingly, the purpose of this paper is to assess whether marketing of MAP can serve in a fair manner in terms of biodiversity conservation and poverty alleviation in KKNP. The method of the study included two stages: identification of the MAP species in trade and investigation of marketing mechanism. The results of the open-ended interviews with a range of groups revealed that 20 MAP species were harvested and 7 of those species were traded. Investigation of the marketing mechanism showed that the marketing structure for the species in trade included two chains (middlemen and trade companies) between collectors and consumers. It was estimated that 471.80 tons of MAPs was harvested and US$ 263,930 cash income was generated in the national park in 2005. Assessment of the price differentials between the collectors and consumer levels showed that middlemen, trade and export companies generated significant amount of income from the marketing of MAP[1].

[1]G. Cetinkaya: Conservation and sustainable wild-collection of medicinal and aromatic plants in Köprülü Kanyon National Park, Turkey. *The Journal of Medicinal Plant Research*, 4(12) 18, 1108-1114, 2010.

ORAL PRESENTATION - 15

EFFECT OF CHICKEN MANURE, SOIL TYPE AND SALINITY ON GROWTH AND YIELD OF SPEARMINT (*MENTHA SPICATA* L.) GROWN IN SUDAN

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A pot experiment was carried out for the growing season 2008-2009, at the demonstration farm of the Medicinal and Aromatic Plants Research Institute (Khartoum, Sudan), to investigate the growth response and oil content of Spearmint (*Mentha spicata* L.) as affected by two chicken manure rates added as follows: control treatment 0.0 and 16 tons/ha and two salinity levels (Tap water EC=0.26 dsm-1 and saline water EC=1.0 dsm^{-1}), were examined in two Vertisol soils, namely, Shambat soil and Soba soil, where Soba soil suffer from accumulation of salts which adversely affects its productivity[1&2]. The treatments were arranged in a split-split plot design with three replicates where salinity levels were assigned to the main plots, soil types assigned to the sub-plot and chicken manure assigned to the sub-sub plots. The plants were harvested two times, the first cut after two months and the second five weeks later. Parameters measured include, plant height, number of branches/ stem, fresh and dry herbage yield, roots fresh and dry weight and oil content. There was a significant effect of soil type, where Shambat soil out yielded Soba soil and salinity found to reduce all measured parameters significantly while addition of chicken manure resulted in a significant increase in all parameters, having a positive effect in alleviating salinity effect.
In conclusion, reclamation of marginal lands with chicken manure found to improve both growth and yield attributes of spearmint.

[1]Eltilib, A.M. A.;Ali,A.M. and, Abdalla, M. A.(1993) Effect of chicken manure on growth and leaf NPK content of Okra on two soil types U.K. J. of Agr. Sci. Vol., No. 2, 16-35.
[2]Ali, M.A. and Fadul, O.A.A.(1977). 1. Irrigation of saline-sodic site in the Sudan Gezira. 11.Salt movement and sodicity changes. Trop. Agr.(Trindal) 54 (3): p. 279-283.

ORAL PRESENTATION - 16

MEDICINAL PLANT BIODIVERSITY IN SALT RANGE REGION OF PUNJAB, PAKISTAN

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The Salt Range is a hills system in the Punjab province of Pakistan, deriving its name from its extensive deposits of rock salts. The Salt Range is one of the most important and largest ranges of its type in Pakistan, Asia and the world as a whole with the average height 1000 m. Communities use different plants for protecting their houses, cultivated land and other plants to feed their roaming goats and sheep in the pastures and to protect some grass land in the range. Many plants are uprooted and many are heavily collected due to their medicinal uses at a local and national level. Land ownership conflicts are one of the reasons for the non-existence of positive developmental work in the area. Human populations have long caused local extinctions of organisms (better documented for animals than plants), suffered periodic shortages of natural resources (for example, as demonstrated by recurrent famines) and been responsible for local environmental degradation (such as deforestation and soil erosion). The root cause of plant loss is the huge and growing size of the human population, creating pressure to destroy natural habitats, expand and intensify agriculture, and collect more resources from wild plants. Intensive farms contain little botanical diversity compared to their more traditional counterparts. This study was conducted in remote areas of Salt Range, Punjab, Pakistan. Area is unique with wild life biodiversity and diverse communities who heavily dependent on medicinal plant wealth of this range. Main emphasis of this study was to document indigenous uses of medicinal flora by interviewing native communities including men, women, herbalists and resource persons. The methodology comprised questionnaire methods to document indigenous knowledge of local communities who are the main user of plant resources in this region. In total of 40 medicinal plants were reported to be used as herbal medicines for various ailments. It is observed from this study that Salt Range medicinal flora currently faced the problems of threats including unscientific collection of medicinal plants by herbal sellers, herbalists and outsiders. It is suggested that conservation of medicinal wealth of Salt rang is given priority by ecologists, taxonomists and policy makers in order to intact and conserve this national heritage for future generation.

ORAL PRESENTATION - 17

CONTRIBUTION TO THE KNOWLEDGE OF THE FOLK USES OF MEDICINAL PLANTS IN HODNA REGION (M'SILA, ALGERIA)

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The aim of this study is to establish a profile of the knowledge of the uses of medicinal plants by traditional healers, herbalists and villagers in the Hodna region, Algeria. This study conducted between 2005 and 2011, gathered information on the medicinal plants traditionally used in this region. 1900 question cards were established in order to obtain information on medicinal plants in the area study. In all, we interviewed 302 informants (44 women and 258 men), whose age ranged between 22 and 92 years. The research resulted to the identification of 95 plants belonging to 41 families and 75 genera. The dominant families are Lamiaceae (19 species), Asteraceae (11 species) and Rosaceae (5 species); the most common preparations are infusion and decoction. The uses of folk medicinal plants are mainly used for the treatment of eczema, arterial hypertension, diabetes, leishmaniasis, diseases of the stomach and others.This study allows for identifying many high value medicinal plant species, indicating high potential for economic development through sustainable collection of these medicinal plants. The documented medicinal plants can serve as a basis for further studies on the region medicinal plants knowledge[1] and for future phytochemical and pharmacological studies[2].

[1]M. Sari, D. Sarri, N. Hendel, A. Boudjelal (2012). Ethnobotanical study of therapeutic plants used to treat arterial hypertension in the Hodna region of Algeria, *Global J Res. Med. Plants & Indigen. Med*., Volume 1(9), 411–417.
[2]A. Boudjelal, C. Henchiri, L. Siracusa, M. Sari, G. Ruberto (2012). Compositional analysis and in vivo anti-diabetic activity of wild Algerian *Marrubium vulgare* L. infusion, *Fitoterapia*, 83, 286–292.

ORAL PRESENTATION - 18

DETERMINATION OF QUALITY ASPECTS AND SELECTION OF NATIVE GROWN LAUREL (*LAURUS NOBILIS* L.) IN HATAY PROVINCE OF TURKEY

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This study was conducted to determine the laurel genotypes with different and high quality characteristics in Hatay province of Turkey. Fifty four male trees and 149 female trees total of 203 laurel genotypes were marked and the following characteristics of the marked genotypes were determined. Fruit weights (0.67-2.26 g), fruit lengths (11.09-24.43 mm), fruit width (8.93-14.86 mm), ovalite coefficient (0.96-0.49), stone weight (0.42-1.45 g), stone ratio (40.38-77.44%), dry matter ratio of the fruits (40.84-74.72%), fruit oil ratio (18.73-38.04%), fruit flesh oil ratio (19.96-68.13%), stone oil ratio (11.49-27.49 %), leaf area (5.75 cm^2-49.0 cm^2), dry leaf weight (315.53-884.65 g) and chlorophyll value of the leaves (35.70-66.90). The leaf essential oil ratios were changed between 0.45% and 6.0%. The essential oil compositions were studied by GC-MS and eucalyptol were dominant compound of 162 genotypes. The fatty acid compositions of the fruits were analyzed and dominant compounds were also determined (lauric acid 16.57%, palmitic acid 18.57%, oleic acid 38.08% and linoleic acid 23.90%).
As a result, K9, K2 and HB5 labeled genotypes as regards to lauric acid and HB8, K4, B34, B29, O6, SY10, E1, YY7, ER26, O8, YY3, AY3, K14, YY8, ER35, ER7, E10, HB11 and ER18 labeled genotypes as regards to essential oil ratio were found to be promising genotypes. The studies should be continuing on these genotypes and the nursery trees of these genotypes should be used in the new plantations of laurel orchards.

ORAL PRESENTATION - 19

RECOVERY AND CHARACTERIZATION OF CHEMICAL AND OIL ESSENTIAL MICROBIOOGIQUE ORIGANUM ELANGATUM AND COMPACTUM OF MOROCCO

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This work seeks to exploit the essential oils of *Origanum elangatum* and *Origanum compactum* of Morocco through the study of their antibacterial and antifungal activity and their chemical compositions. Samples of *O. elangatum* Barred from Bab and Taffert provided performance (respectively 3.86 and 2.66%), while those of *O. compactum*. From Talambote Tanaqoub and provided a slightly lower yield (2.40 and 2.25% respectively). Chromatographic analysis (GC and GC / MS) showed that the essential oil of *O. elangatum* of Taffert contains carvacrol (39.05%) as major constituent, But thymol (2.79), the γ-terpinene (0.35%) have lower percentages than *O. compactum* of Tanaqoub that is dominated byγ-terpinene (26.11%) and thymol (20.49%). The antimicrobial activity of the two oils was investigated vis-à-vis seven microorganisms. The two species of HE *Origanum* studied have shown active and all microorganisms inhibited at a concentration of 1/2000 V / V. The seeds are the most sensitive *P. expansum* and *Aspergillus niger* whose growth was inhibited 1/3000V/V. the HE of O. *elangatum* Bab Barred. For fungi wood rot, note that *Coniophora puteana* is inhibited at 1/3000 V / V both HE of *O. elangatum*. This bioactivity is mainly due to the richness of these species in phenol, including carvacrol and thymol which the antimicrobial potency has already been demonstrated. The bioactivity of these essential oils suggests application prospects in the fields of food industry, cosmetics and pharmaceuticals.

ORAL PRESENTATION - 20

THE CHEMICAL COMPOSITIONS OF ESSENTIAL OIL AND ANTIBACTERIAL ACTIVITIES OF *SALVIA TOMENTOSA* L. GROWN IN TURKEY

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This research was carried out at Mudurnu Süreyya Astarcı Vocational Higher School, Abant Izzet Baysal Universitiy and the Department of Field Crops, Faculty of Agriculture, University of Ankara in 2009-2010. The plantation was established in 2009. At the first year, only one cutting was done. The plants were harvested at pre-flowering, 50% and full stages in first cutting of the second year. In second cutting, since the plants were not flowering, the cutting was only done at pre-flowering stage. Essential oils extracted by hydrodistillation from the aerial parts were analyzed by GC-MS. The amounts of essential oils obtained from pre-flowering, 50%, and full flowering stages in first cutting were 0.95%, 0.87%, and 0.65%, respectively. Also, the essential oil was recorded as 0.91% in second cutting. The essential oils investigated were characterized by the predominance of three components: beta-caryophyllene (20.15% to 25.92%), alpha-pinene 819.88% to 38.41%), and alpha-humulene (10.14% to 12.59%). Because of increasing pressure of consumers and legal authorities, the food industry has tended to reduce the use of chemical preservatives in their products to either completely nil or to adopt more natural alternatives for the maintenance or extension of product shelf life[1]. Therefore, the essential oils and ethanol and water extracts of plant materials were evaluated for their antimicrobial activity against ten bacteria by the disc diffusion assay. Generally, the essential oils and the plant extracts exhibited antibacterial activity against *S. aureus*, *S. epidermidis*, *S. pyogenes*, *P. vulgaris*, *K. pneumonia*, and *E. cloacae.*

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ORAL PRESENTATION - 21

COMPARISON OF ESSENTIAL OIL RATIO IN SOME CULTIVATED MEDICINAL PLANTS WITH WILD SPECIES

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Medicinal plants are one of the most important plant groups in nature which have the various medical properties. As we know, effect of these plants is related to the compositions and their percentage in herb and growth location is one of the important factors in the production and value of essential oils. This study was conducted to compare essential oil value of two groups of plants. The first group contains *Achillea millefolium* L., *Mentha longifolia* Huds., and *Ziziphora tenuior* L. collected from Ahar region before flowering stage as wild species and the second group includes *Apium graveolens* L., *Mentha longifolia*, and *Thymus persicus* (Ronniger ex Rech.f.) collected from the cultivated fields of around Tabriz city. The essential oil ratios of plants were obtained at the laboratory of Agricultural Faculty of Islamic Azad University, Shabestar branch during 2010. The specimens were dried in cool shadow and in the temperature of the lab room. The essential oil content was determined from aerial parts of plants and using a Clevenger-type apparatus and samples were distilled by water. The results showed that mean of essential oil ratio in wild species were in *A. millefolium* (0.8%), *M. longifolia* (1.1%) and *Z. tenuior* (1.5%) and in cultivated species were *A. graveolens* (0.33%), *M. longifolia* (1.4%) and *T. persicus* (0.8%).

ORAL PRESENTATION - 22

LYOPHILISATION PROCESS AS A MODERN TECHNIQUE FOR ISOLATION NATURAL SUBSTANCES

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Research activities within the project of isolation natural components - anthocyanins were focused on the development of the extraction process using a variety of chemical solvents that allow obtaining higher concentration of interested therapeutically active substances and their stabilization by lyophilization process while maintaining their biological properties. Measurement of total anthocyanins in the obtained extracts from selected plant species (*Vaccinium myrtillus, Vaccinium corymbosum, Aronia melanocarpa* and *Sambucus nigra*) were carried out by differential spectrophotometry. These extracts were then used to study their stabilization using technology of freeze-drying. To create an optimal freeze-drying method for each extract separately, cryoscopic analysis were done to carried out the crystallization temperature, sublimation temperature, the primary drying pressure of the primary drying, temperature and pressure of secondary drying which are important to adjust lyophilization process. Implementation of basic research experiments in various stages of project's, clearly confirmed the assumption that freeze-drying method can isolate natural substances (anthocyanins) and thus stabilize them and to maintain their biological activity. The current project brought a solution to improve infrastructure of the organization, beneficiary incentives, which are reflected in the completion of the field of research and development with the purchase, installation and operationalization of equipment.

ORAL PRESENTATION - 23

PREVENTIVE *IN VITRO* STUDY OF DNA PHOTODAMAGE BY ARGAN OIL

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UVB is experimentally demonstrated to be the most effective light to induce skin cancer, and can cause DNA damage and generates photoproducts, predominantly in tandem pyrimidine sites such as cyclobutane pyrimidine dimers, pyrimidine (6–4) pyrimidone, and Dewar photoproducts which induce mutation in the epidermal cells, leading to the development of cancer cells[1]. *Argania spinosa* (Sapotaceae family) is an endemic tree of south-western Morocco where it constitutes the third most common tree. The oleaginous fruits of argan tree furnish edible and marketable oil "argan", it has been used in the traditional Moroccan medicine for centuries to cure skin diseases[2]. The purpose of this work is to evaluate and to demonstrate the protective effect in vitro of cosmetic and alimentary argan oil against the DNA damage caused by UV light, by using of analogue of DNA molecules thymidylyl-(3',5')-thymidine (TpT) synthesized.
The results showed that argan oil has a potential chemopreventive of DNA molecules against UV damage even dilution (10:90) v:v by paraffin oil. Knowing the interesting chemical composition of this oil, rich in unsaturated fatty acids and minor components, we can consider that these molecules may contribute, alone or in synergy, of the photoprotective effect from argan oil.

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[2]Bellakhdar, J., 1997. La pharmacopée marocaine traditionnelle. Ibis Press, Paris, pp. 486–488

ORAL PRESENTATION - 24

IN VITRO ESTIMATION OF NEUROBIOLOGICAL EFFECTS OF *PHLOMIS GRANDIFLORA* H.S. THOMPSON (LAMIACEAE) AND HPLC CHARACTERIZATION OF ITS MAIN EXTRACTS

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The genus *Phlomis* L. (Lamiaceae) represented by thirty-four species in Turkey. Since some *Phlomis* species have been used for memory-enhancement, in the current study, the ethanol and methanol extracts and the subextracts (hexane, chloroform, ethyl acetate, and *n*-butanol) prepared from the aerial parts of *Phlomis grandiflora* growing in Turkey were investigated for their neurobiological effects using *in vitro* methods. The extracts and subextracts were subjected to several enzyme inhibitory assays including acetylcholinesterase (AChE), butyrylcholinesterase (BChE), and tyrosinase (TYRO), which are related to Alzheimer's and Parkinson's diseases. Since oxidative stress has been suggested to be one of the critical factors in neurodegeneration, the samples were assayed in a number of antioxidant test systems, namely quenching activity against 2,2-diphenyl-1-picrylhydrazyl (DPPH), *N*,*N*-dimethyl-*p*-phenylendiamine (DMPD), and nitric oxide (NO) radicals as well as ferric ion-chelation capacity, ferric- (FRAP), and phosphomolibdenum-reducing antioxidant power (PRAP). Total phenol and flavonoid quantities of the samples were determined spectrophotometrically. In addition, a number of selected phenolic acids were analyzed by HPLC in the ethanol and methanol extracts of *P. grandiflora*. Our findings point out that the main ethanol and methanol extracts and the ethyl acetate and *n*-butanol sub-extracts of *P. grandiflora* displayed stronger radical quenching activity, whereas most of the extracts and subextracts were either ineffective or had low effect in the enzyme inhibition assays. The ethanol and methanol extracts of the plant were shown to be rich in phenolic acids, although their quantity was revealed to have a variation in these extracts.

Acknowledgement
This study was financially supported in part by Gazi University Project Foundation (EF-02/2006-22).

ORAL PRESENTATION - 25

ESSENTIAL OILS OF *MENTHA PULEGIUM* AND *MENTHA ROTUNDIFOLIA* FROM THE HUMID AREA OF ALGERIAN NORTHERN EAST

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The genus *Mentha* (Lamiaceae) includes aromatic herbs of difficult taxonomic classification due to a great variability in their morphological characters and the existence of an important chemical polymorphism, commonly used as herbal tea, flavoring agent and medicinal plant. In Algeria, *Mentha pulegium* L. and *Mentha rotundifolia* (L.) Huds. are used in traditional medication in the treatment of flatulent, dyspepsia and intestinal colic thanks to its carminative and antispasmodic properties. To know the importance of this plant, essential oils obtained by hydrodistillation from aerial parts of *Mentha pulegium* L. and *Mentha rotundifolia* (L.) Huds. were analyzed by GC-FID and GC-MS. Many components (30) were identified in *M. pulegium* oil with pulegone (62.24%) and neomenthol (14.48%) as major components, whereas *M. rotundifolia* (65.33%) and □-caryophyllene (3.05%) where the ones of the 38 components detected in *M. rotundifolia* oil.

ORAL PRESENTATION - 26

IN VITRO ANTIMICROBIAL ACTIVITY OF FRUITS CRUDE EXTRACTS OF *ANOGEISSUS LEIOCARPUS* (DC.) GILL. AND PERR.

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Anogeissus leiocarpus (D.C.) Gill. and Perr. is a tree up 20 meters high and belongs to the family Combretaceae,locally known as alsahab.The decoction of the barks are used for whooping cough and fever in Sudan. The aim of this paper is to investigate the antimicrobial activity of *Anogeissus leiocarpus* fruits extracts against different standard organisms and clinical isolates. The chloroform, methanol and aqueous extracts of *A.leiocarpus* fruits were tested for antimicrobial activity against one Gram positive bacteria (*Staphyllococcus aureus*) and four Gram negative bacteria (*Escherichia coli, Klebsiella pneumoniae, Proteus vulgaris*, and *Pseudomonas aeruginosa*) and against three fungi (*Aspergillus niger, Candida albicans, and Saccharomyces cerevisiae*) in comparison to two reference antibiotics (ampicillin and gentamicin) and two references antifungal drugs (clotrimazole and nystatin) using the cup plate agar diffusion method[1]. The active methanol and aqueous extracts of *A. leiocarpus* were further tested against 30 clinical isolates, isolated randomly from different sources, different hospitals and their minimum inhibitory concentrations were also determined. In conclusion, the high activity of the plant can justify its folkloric uses. Therefore, the fruits methanol and aqueous extracts of *A. leiocarpus* might be directed to further investigation for identification of active compounds responsible for its antimicrobial activity.

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ORAL PRESENTATION - 27

MELATONIN CONTENTS OF TWO WILD *TANACETUM* SPECIES FROM KAHRAMANMARAS, TURKEY

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Genus *Tanacetum* belongs to Asteraceae (Compositae) family, comprising 44 species in Turkey. *T. densum* subsp. *amani* collected from Ahir Mountain and *T. armenum*from Isık Mountain in summer 2012.Melatonin (N-acetyl-5-methoxytriptamine) is a neurohormone synthesized from L-tryptophan via serotonin. The presence of melatonin in higher plants has been reported[1], and concerning with the physiological and pathophysiological functions including regulation of circadian rhythms, prevention of ischemia – reperfusion damages, relief of chronic pain, enhancement of immunity, oncostatic effects, treatment of the neurological disorders such as migraine and antioxidative properties were reported[2]. Many plant species contain melatoninin as microgram *per* gram range or much lower. The plant leaves were extracted with methanol-water and sonicated in ultrasonic bath and then analyzed with HPLC-UV at 280 nm. In this study, melatonin content was found with 5.48 ug/grf or *T. armenum* and 8.46 ug/gr for *T. densum* subsp. *amani*.
In conclusion, melatonin content was detected for the first time in two wild *Tanacetum* species from Turkey. These species include higher or similar melatonin content once compared with previous literatures about *Tanacetum* species.

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[2]M. Ansari, Kh. Rafiee, N. Yasa, S. Vardasbi, S.M. Naimi, A. Nowrouzi: Measurement of melatonin in alcoholic and hot water extracts of *Tanacetum parthenium*, *Tripleurospermum disciforme* and *Viola odorata*. Daru Journal of Pharmaceutical Sciences,18, 173-178, 2010.

ORAL PRESENTATION - 28

ESSENTIAL OILS FROM THE AERIAL PARTS OF *ANACYCLUS PYRETHRUM* L., SPECIES GROWING IN THE NORTHERN WEST OF ALGERIA

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Anacyclus pyrethrum L. (Asteraceae), commonly known as "African pyrethrum" and referred to as "Tigenthast", is a perennial, procumbent herb, which is native from Northern Africa and is cultivated in the Mediterranean[1]. *Anacyclus pyrethrum* L. which is widespread in the mounts of Tlemcen (west of Algeria), is being widely used in the local traditional medicinal treatment system for a variety of several diseases: rheumatic and neuralgic affection of the head, the tooth and face[2]. A literature survey showed no previous reports of the analysis of the volatile components of this plant.

In this study, the hydrodistilled essential oil of the aerial parts of *Anacyclus pyrethrum* L. was analyzed by GC and GC – MS. The oil obtained is a pale yellow liquid with a typical odor. A total of eighty seven compounds accounting for over 90% of the total oil yield, were identified in the oil. Unlike most essential oils, that of *Anacyclus pyrethrum* L. has several major compounds, most of which are oxygenated sesquiterpenes (37.1-37.5%) and sesquiterpene hydrocarbons (25.2-28.5%), a characteristic of the Asteraceae family. The nature of these compounds confirms the majority uses of this plant.

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ORAL PRESENTATION - 29

A NEW POTENTIAL NUTRACEUTICAL PLANT FOR TURKEY: *VACCARIA HISPANICA* (MILL.) RAUSCHERT

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Increasing need and demand for nutraceutical world market, estimated to reach about 500 billion $, created a renewed interest in breeding and genetic studies of aromatic and medicinal plants[1]. A new such species, *Vaccaria hispanica* (Mill.) Rauschert (Caryophyllaceae), is being studied for its potential economic value in nowadays. Treated as a weed for a long time, this species is now considered a gold mine for its superior starch granules, triterpenic saponins, and cyclopetide content suitable for drug delivery[2]. Excluding flora-vegetation based topics, studies to promote economic potential of *V. hispanica* are lacking in Turkey. However, according to the results of our preliminary studies in the seeds of a wild *V. hispanica* population; a very well-constructed, honeycomb-looking and a-1µm-average size starch grains were observed in scanning electron microscope. On the other hand, protein, fat and saponin content of the same seeds are found to be 13.86, 2.33 and 2.80 g /100 g dry seed, respectively.
Our preliminary results were found in accordance with the prior findings. For this reason, initiating phytochemical, cultivation and breeding studies on *V. hispanica* is believed to promote economic use of an underused species, and to present a new species to Turkish pharmaceutical industry.

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ORAL PRESENTATION - 30

PLANTS FROM THE EASTERN MEDITERRANEAN WITH POTENT ANTICANCER PROPERTIES

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The Nature Conservation Center at the American University of Beirut has played a pioneering role in the identification, fractionation, and anticancer research in the region. We have identified East Mediterranean medicinal plants with anticancer activities, purified their active components, and studied their mechanism of action. Extracts from 40 Mediterranean plants were screened against normal and several types of cancer cells leading to the identification of *Centaurea ainetensis* and *Achillea falcata* as potential source of anticancer compounds. Bioassay-guided fractionation of extracts from these two plants led to the isolation of sesquiterpene lactones with potent anticancer properties. Sesquiterpene lactones are plant secondary metabolites with promising antitumor activities, some of which are currently in cancer clinical trials[1]. We determined the mechanisms of bioactivity of the purified sesquiterpene lactones at the cellular, molecular, and structure-activity relationship levels.

Mediterranean plants are rich sources of anticancer sesquiterpene lactones. We are currently derivatizing the active sesquiterpene lactones to improve potency. Moreover, we will use novel nanoparticle-based strategies to enhance drug bioavailability and efficacy of these sesquiterpene lactones as potential anticancer therapeutics. Finally, we are optimizing cultivation protocols of targeted wild plants to promote their sustainable use and ensure conservation of biodiversity.

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ORAL PRESENTATION - 31

THE ETHNOBOTANICAL FEATURES OF SOME NATURAL PLANTS USED BY THE PEOPLE IN ALANYA AND GAZİPAŞA (ANTALYA)

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This study investigates ethnobotanical uses of wild plants in Alanya and Gazipaşa districts in Antalya Province in Mediterranean region of Turkey. Hundred and three persons coming from 17 villages, 14 districts and four towns were interviewed. Two hundred and ten species, belonging to various plant families, were identified for which 456 different usages of them were recorded. Informants reported ethnobotanical uses for 210 of the identified species: Medicinal (163), food (100), fodder (32), spice (37), dye (9), handicrafts (45) and various other purposes (70). Medicinal carob tree molasses (*Ceratonia siliqua*) production was particularly noted.

ORAL PRESENTATION - 32

BIODIVERSITY OF WILD OLIVE IN IRAN: GENETIC, CYTOGENETIC AND MORPHOLOGICAL DIVERSITY

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The olive tree (*O. europaea* subsp. *europaea* var. *europaea* L.) is an ancient plant species with medicinal values having both cultivated and wild forms[1]. To get idea about biodiversity of olive trees of Iran an extensive study was carried out based on morphological, cytological and molecular characteristics. Morphometric studies of these plants by clustering and ordination methods separated wild olive trees from cultivars. Cytological studies although showed diploid nature of both types of olives but indicated their distinctness in chiasma frequency and chromosome pairing. RAPD, ISSR and SSR molecular markers showed genetic diversity among olive trees. Phylogenetic trees obtained grouped the individuals of each population together forming a distinct cluster, separated from the other populations due to their genetic distinctness. STRUCTURE analysis and reticulation study showed presence of specific allelic composition in different geographical regions of the country wile genetic exchange occur among some of the populations. These findings show availability h high genetic diversity in olive trees of Iran which may be used for breeding and hybridization programs.

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ORAL PRESENTATION - 33

ANTI-INFLAMMATORY AND WOUND HEALING ACTIVITIES OF *CAMPANULA LYRATA* LAM. SUBSP. *LYRATA*

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Campanula species have been used for the anti-inflammatory and wound healing effects in Turkish folk medicine. The objective of the present study is to evaluate the *in vivo* anti-inflammatory and wound healing activities of *Campanula lyrata* Lam. subsp. *lyrata.* Carrageenan- and serotonin- induced hind paw edema, 12-*O*-tetradecanoyl-13-acetate (TPA)-induced mouse ear edema and acetic acid-induced increase in capillary permeability models were employed in mice for the anti-inflammatory activity assessment. Wound-healing activity was evaluated by the linear incision and the circular excision wound models along with the hydroxyproline determination and histopathological analyses. Methanol extract displayed remarkable anti-inflammatory effect in the carrageenan and serotonin-induced hind paw edema model and in acetic acid-induced increase in capillary permeability model. Methanol extract was also found to have significant wound healing potential in the linear incision and the circular excision wound models. Methanol extract ointment treated group tissues also showed enhanced hydroxyproline content. The results of the present research revealed that the significant anti-inflammatory and wound healing activities of *C. lyrata* methanolic extract could be attributed to the flavonoid content of the plant. The present study confirms the anti-inflammatory and the wound healing activities of *C. lyrata*.

ORAL PRESENTATION - 34

CHEMICAL COMPOSITION AND ANTIMICROBIAL ACTIVITY OF ESSENTIAL OILS OF SPECIES OF MOROCCAN JUNIPER

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The essential oils from branches of *Juniperus thurifera*, *Juniperus oxycedrus*, *Juniperus phoenicea* and *Juniperus communis* (Cupressaceae) collected in different regions of Morocco are extracted by hydrodistillation and analyzed by GC and GC-MS. Forty-eight constituents were identified for the essential oil of the branches of *Juniperus thurifera*, forty-seven of *Juniperus oxycedrus*, fifty of *Juniperus phoenicea* and forty-five of *Juniperus communis*. The majors constituents obtained are monoterpenes: sabinene for essential oils of the branches of *Juniperus thurifera* (52.64%) and *Juniperus communis* (27.51%) and α-pinene for those of *Juniperus oxycedrus* (52.13%) and *Juniperus phoenicea* (76.33%). The antimicrobial activity of essential oils was studied against nine strains of bacteria, three molds and four fungi decay wood.

ORAL PRESENTATION - 35

NEW FORMULATION TECHNIQUES OF OLD HERBAL MEDICINES

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Medicinal plants have a variety of chemical entities with very different chemical, physical and biological properties. Application of herbal remedies in the treatment of the diseases has been greatly widespread in past decades. The need to prepare standard, stable with controlled and targeted drug release formulations are going to be the main aims of the cosmetic, herbal and pharmaceutical companies. In the past few decades, considerable attention has been focused on the development of novel drug delivery system (DDS) for herbal drugs.[1] There are many reports regarding the use of polymers, nanotechnology, liposomes, niosomes, solid lipid nanoparticles (SLN) and targeted DDS to the herbal medicines.[2]

The aims of this study are to report our experiences for formulation of sunscreen containing nanoparticles of *Teucrium polium* extract, buccoadhesive tablet of *Myrtus commounis*, SLN of *Quercus infectoria* and *Terminalia chebula*, mouthwash of Quince seed mucilage and etc.

The results showed that formulations of the extracts or essential oils in the novel DDS can improve the stability of the main constituents, control the release, extend the durability of the DDS, and in some cases organoleptic properties of the preparation.

It can be concluded that formulation of the herbal medicines by new techniques is an important necessity of the modern medicine.

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ORAL PRESENTATION - 36

USE OF IMMATURE EMBRYOS FOR *IN VITRO* MICROPROPAGATION OF ENDANGERED GEOPHYTES

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The natural propagation ratio of most endangered geophytes (flower bulbs) is also low as each bulb generally produces only 1-3 bulblets in a 3 year period. They can be propagated from seed; however, it may take five or more years from seed to develop plant capable of flower production. This low propagation ratio inhibits large-scale cultivation of these plants. Although bulb scales have been extensively used for *in vitro* micropropagation of geophytes previously, multiplication rate remained low and explants were often associated with heavy bacterial and fungal contamination in these studies. In the present study, immature embryos of endemic and endangered geophyte species in *Sternbergia*, *Muscari*, *Fritillaria* and *Tulipa* genera at different developmental stages were cultured on different nutrient media supplemented with various concentrations of plant growth regulators. Large numbers of bulblets were regenerated from these explants after 12-14 months of culture initiation. Regenerated bulblets were then subcultured onto different media to increase their sizes and for root formation. Depending on the genera, in some species majority of bulblets were developed into full plants, whereas in many species bulblets were not developed in soil and finally they died. The procedure described here may also form the basis of bioreactor culture of geophytes.

ORAL PRESENTATION - 37

VOLATILE COMPOUND FORMATION DURING ARGAN KERNEL ROASTING

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Argan oil, the basic ingredient of the Amazigh diet, has become a major player in the competitive virgin oil kingdom. This is due to its unique taste and numerous nutritional and pharmacological properties. Virgin edible argan oil is prepared by cold-pressing argan kernels previously roasted at 110°C for up to 25 minutes. The concentration of 40 volatile compounds in virgin edible argan oil was determined as a function of argan kernel roasting time. Most of the volatile compounds begin to be formed after 15 to 25 minutes of roasting. This suggests that a strictly controlled roasting time should allow the modulation of argan oil taste and thus satisfy different types of consumers. This could be of major importance considering the present booming use of edible argan oil.

ORAL PRESENTATION - 38

EFFECT OF DRY METHODS ON CHEMICAL COMPOSITIONS OF BUSH TEA

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Bush tea leaves contains 5-hydroxy-6,7,8,3',4',5'-hexamethoxy flavon-3-ol[1] which is considered to be a new flavonoid, 3-0-demethyldigicitrin, 5,6,7,8,3',4'-hexamethoxyflavone and quercetin[2]. The standard production protocol or methods for drying bush tea have not been established. The objective of this study was to investigate the effect of drying methods on bush tea on chemical compositions. Results of this study demonstrated that total polyphenols contents improved under shade ranging from 64.2 to 83.4 mg/100g compared to sun and oven dried which ranged from 56.2 to 64.2mg/100. Total antioxidants were also improved ranging from 62.6 to to 62.8 □mol/g. Oven and sun dried samples yielded lowest total antioxidant contents ranging from 44.0 to 44.4 □mol/g. Both chlorophyll and ascorbic acid (83.4 mg/100) were significantly improved by shade as well as freeze drying methods. No significant differences were observed on tannins, niacin, carotenoids as well as riboflavin contents. Therefore, for bush tea samples shade and freeze drying is recommended, but for commercial purposes, shade dried method is recommended as is its easy and cheaper to be used.

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ORAL PRESENTATION - 39

EVALUATION OF YIELD AND ESSENCE IN *ECHINACEA PURPUREA* TO APPLICATION OF ZINC SULPHATE UNDER DROUGHT STRESS

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Purple coneflower [*Echinacea purpurea* (L.) Monch] is a perennial and grassy plant. One of the main benefits of this plant is increasing the immunity power of body against the illness factors[1]. In order to study the effects of foliar application of zinc sulphate on yield and essence of *Echinacea purpurea* under water 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 2011-2012. Experimental treatments included water stress as the main factor on 3 levels (irrigate after70mm evaporation from class A basin, irrigate after120 mm evaporation from class A basin and irrigate after170mm evaporation from class A basin), Secondary factor as foliar application of zinc sulphate in 2 levels (not application, application of zinc sulphate). The result showed that foliar application of zinc sulphate had meaningful effect on biological yield, essence yield and percentage of essence. Application of water stress in purple coneflower resulted 40.1% decrease in biological yield. Microelement application of Zinc caused a rise of 29.28% in biological yield. The results of this study showed that the highest percentage of essence and essence yield with 0.782% and 20.19 Lit/h was obtained with foliar application of zinc sulphate under irrigation after 120 mm evaporation from class A basin. Application of zinc sulphate increased 32.64% percentage of essence.

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ORAL PRESENTATION - 40

SEED GERMINATION AND YIELD OF TOMATO (*LYCOPERSICUM ESCULENTUM* MILL.) AS AFFECTED BY BIOPHYSICAL PRIMING TECHNIQUES

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Seed priming has been reported to enhance growth of plants. To evaluate the effect of seed priming techniques materials (ultrasonic, gamma, beta and laser irradiation, magnetic field) and hydro-priming, as control on germination, growth and yield of tomato, laboratory and greenhouse experiments were conducted in Islamic Azad University, Tabriz Branch, using completely randomized design, with three and four replicates, respectively. The results revealed that the highest seed germination percent occurred in those seeds treated with laser and magnetic field for 15 minutes and lowest from seeds treated with ultrasonic irradiation[2]. When seeds were primed with gamma irradiation, seedling vigor index of tomato plants increased by 74% more than those primed with distilled water. Highest fruit yield of tomato from seeds treated with magnetic field for 15 minutes was about 545.3 g.plant^{-1} and lowest yield of tomato was obtained from seeds treated with beta irradiation for 10 minutes (31.90 g.plant^{-1})[1]. Tomato seeds irradiated with magnetic field for 10 and 15 minutes had highest harvest index, 19.39 and 19.42%, respectively, as compared to those of hydro (2.35%) and beta (1.29 %) primings. It may be concluded that tomato producers could improve crop yield by seed priming with magnetic field for 15 minutes.

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POSTER PRESENTATIONS (1 – 284)

PP-1

ASSESSING THE POTENTIAL OF MEDICINAL AND AROMATIC PLANT CULTIVATION AS A RURAL DEVELOPMENT STRATEGY IN ROMANIA

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Considering the last decades' trend of the international market for medicinal and aromatic plants (MAPs) it is expected that the volume of the international trade of MAPs to continue to increase. Romania has a high potential for MAPs cultivation as the country's different climates and various soil conditions allow cultivation of various species, significant land surfaces are available and a significant percent of the population is employed in agriculture. Moreover, as most of the individual agricultural surfaces are highly fragmented and the majority of households in rural areas are producing for mere survival, there is an acute need for new development strategies in order to improve living standards in rural areas. Building on the authors own research in Nepal, this article envisions a rural development initiative based on MAPs cultivation and sketches a business model for a cooperative. The article tries to identity the enabling environment for the adoption of MAPs cultivation taking into account cultural traditions, market trends, NGOs initiatives and governmental support. In addition, the article drafts a business plan for MAPs cultivation by a cooperative. Lastly, the article defines further research areas concerning the best regions for MAPs species for cultivation in Romania and financing options.

PP-2

FLORAL EPIDERMAL CHARACTERS OF THREE SPECIES OF GENUS *SALVIA* GROWING NATURALLY IN THE KINGDOM OF SAUDI ARABIA

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The epidermal characters of the floral parts ,calyx and corolla, for three species of genus salvia belonging to the family Lamiaceae.*Salvia aegyptiaca* L.,*Salvia deserti*Decne, and *Salvia spino*sa L.growing naturally in the Kingdom of Saudi Arabia,surface preparations of floral parts were mounted in 50% v/v glycerol solution either directly or by clearing the organ with chloral hydrate solutionfollowed by mounting in 50% v/v glycerol solution.The studies were made with the aid of light microscope and the photographs were taken using Olympus BX41TF picture image, with camera video TK – C1381EG.The epidermal preparations of the three species were studied for their cell shape, type of cell wall, form of cuticle, number and type of stomatas, andtrichomes whether glandular or nan glandulaabove observations it can be concluded that all the three species mostly resemble each other. Most of the difference lies in the shapes of the cell and form of the trichomes. Shape of the cells varies from isodiametric to polygonal. The isodiametric cell shapes are found in *salvia aegyptiaca*. In *Salvia deserti*, the cell shapebegins to change from isodiametric to polygonal and so polygonal cells are found at veins & isodiametric in between the veins. *Salvia spinosa* again shows isodiametric or elongated cell shape. Thin, sinuous anticlinal, beaded cell wall is found in *S.aegyptiaca*, *S.deserti* has thin,anticlinal straight cell wall at the veins & sinuous in between the veins of both calyx and corolla.Smooth cuticle is found in all the three species. Stomata altogether absent in the floral epidermises of *Salvia aegyptiaca* and *Salvia deserti* while few diacytic stomata are present in *Salvia spinosa*.Among the trichomes all the three species have similar non-glandular trichomes: that are unicellular, bicellular andmulticellular trichomes, *S.aegyptiaca* having thick warty walls and the other two with thin warty walls. Glandular ones differ in having unicellular head with unicellular or multicellular stalk in *S.aegyptiaca*; unicellular head & unicellular stalk, unicellular head &bicellular stalk and multicellular head & unicellular stalk in *S.deserti* and unicellular stalk & head in *S.spinosa*.Many Lamiaceae species have been investigated because of the diversity of their glandular trichomes, these trichomes may be a site of synthesis of secondary metabolites. The family Lamiaceae is of considerable economic importance due to the presence of essential oils produced by glandular structures (Maffei et al., 1985), these trichomes, secrete low molecular weights, volatile terpenes (Fahn, 1979).

PP-3

PROTECTION AND CULTIVATION OF MEDICINAL AND AROMATIC PLANTS IN WEST MEDITERRANEAN REGION IN TURKEY

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Turkey blessed with rich genetic diversity of medicinal and aromatic plants (MAP) among that about 200 species have export potential. Cultivation practices for commercial production of MAP are commonfor some species as aspoppy, anis, rose, fennel, cumin, coriander, dill, but majority of exported herbs are harvested from wild sources. Continued commercial exploitation consequently resulted in receding the population of MAP and degradation of biodiversity.
In this project we aimed at;
-Preservation the nature against gene erosion,
-Sustainable wild-crafting and cultivating techniques,
-Generate connection between researchers, farmers and industry.
We have five outputs as below, including 24 activities with 16 trainings;
-Researchers and PGR specialists (from ministries, universities, industry, etc.) trained in evaluation and characterization of MAP activities
-Collection of endangered species of MAP, transformation for in situ and ex situ conservation and use improved.
-Awareness raised on endangered MAP species
-A National Network on MAP establishment and hosted by the BATEM.
-Capacities on MAP characterization and quality evaluation of raw material for industry improved
The project is funded by the FAO/Turkey Partnership Programme, carried out between May 2012-February 2014. BATEM is executive institute on behalf of Ministry of Food, Agriculture and Livestock. Project budget is 180.000 $.

PP-4

ASSESSMENT OF MORPHOLOGICAL VARIATION IN *HYPERICUM PERFORATUM* L. OF ALBANIA

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The objectives of this study were to evaluate the populations of St. John's wort (*Hypericum perforatum* L.) in Albania and to characterize and assessing the morphological diversity of populations of *Hypericum perforatum* L. grown in different natural sites. Evaluation of morphological and biometric diversity in twelve populations of *Hypericum perforatum* L. grown wild from different area was studied for determining valuable characters for future breeding programs and medicinal purposes. In this study, 9 quantitative and qualitative characters were evaluated. The results showed diversity of important characters among populations. Results of simple correlation revealed a high degree of correlation among some important traits studied. Principal component analysis (PCA) showed variation among accessions, where 81.5% of the total variation in the morphological data was separated on the first five components, and also explained the variation related to main effective characters such as height of plant, stem, length of leaf, width of leaf, ration length/width of leaf, flowering stem. Using R statistical software to study the variability of *Hypericum perforatum* L., provide a very interesting example for further morphologic and biometric research on less known MAP resources of the European Flora and Protect Biodiversity.

PP-5

EFFECT OF SALINITY STRESS ON THE GLUCOSINOLATE CONTENT OF BROCCOLI SPROUTS (B*RASSICA OLERACEA* VAR. *ITALICA*)

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Broccoli is associated with health benefits due to the sulfur containing glucosinolates. Glucoiberin (3-methylsulphinylpropyl) and glucoraphanin (4-methylsulphinylbutyl) of the aliphatic group along with the indole glucosinolates are the major compounds associated with the health promoting properties of broccoli[1]. The glucosinolate content of plants may vary upon the plant part examined and the developmental stage of the plant. Broccoli sprouts are considered to contain higher levels of the glucosinolates. In addition, stress factors may influence the glucosinolate content of plants since they act as a defence system for the plant. In the current research, the effect of salinity appliedas 0 (control), 50 mM and 100 mM NaCl on glucosinolate content of broccoli sprouts were investigated. The findings of the research revealed that broccoli sprouts contained high levels of glucosinolates compared with the broccoli itself but salinity provided as 50 mM and 100 mM did not have an influence on the major glucosinolates of the sprouts.

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PP-6

GFAAS DETERMINATION OF ULTRATRACE QUANTITIES OF Se IN ENVIRONMENTAL SAMPLES BY USING Mg/Pd MODIFIER

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Trace selenium determination in environmental and food samples is of great importance, because playing an important role in biologic and physiologic body functions (as an essential nutrient), selenium is characterized by its relatively narrow concentration range resulting in deficiency, essentiality and toxicity[1]. Ergene Basin pollution, inorganic trace elements in the first place in terms of environmental pollution in order to determine the parameters, representative samples were selected as possible characteristic regions. This study reports a preparation technique for the determination of Se concentration in *Helianthus annuus* L., collected from Ergene region. *Helianthus annuus* L. and its root and soils had been picked off in August –September 2010. Wet acid digestion was used for these samples. For wet acid digestion of the dried and homogenized samples, 1 gram samples were digested with concentrated HNO_3-concentrated $HClO_4$ (6:2) mixture for plant and soil parts. A graphite furnace atomic absorption method was improved and used for the determination of Se in the different samples. The method was validated through the analysis of certified reference materials [(NIM-GBW07404 (GSS-4) and WEPAL-IPE-168]. Mg/Pd mixture was used in GFAAS method as modifiers so that matrix interferences were prevented. Relative standard deviation was found below %8. The results of soil, root and plant samples were found 0.34±0.22 mg/kg, 0.09±0.15 and 0.00±0.00 respectively. The results obtained for soil samples, based on Soil Pollution Control Regulations under the specified limits.

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PP-7

INVESTIGATION OF SELENIUM IN SUNFLOWER SAMPLES BY GRAPHITE FURNACE ATOMIC ABSORPTION SPECTROMETRY

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Sunflower (*Helianthus annuus* L.) belonging to the family Asteraceae is the world's fourth largest oil-seed crop[1]. Sunflower seeds are a good source of selenium but they can be toxic to most organisms at higher concentrations. In this study, the concentrations Se in Helianthus annuus L. were analyzed using Graphite Furnace Atomic Absorption Spectrometry (GFAAS) after microwave digestion process. In this study, August-September 2010 and August-September 2011 period, including a 2-year period, a total of 18 samples points from the six stations, 216 environmental samples (soil, roots, plants) were collected from Ergene Region. Sampling, the attempt was made to minimize the error by taking samples in parallel. Microwave digestion was used for sunflower and soil samples. For this reason, samples of the dried and homogenized, 0.5 gram samples were digested with concentrated HNO3-concentrated H2O2 (6:2) mixture. In the final solutions, the concentrations of trace elements for soil and plant samples were determined by Perkin Elmer AAnalyst 800 model, Atomic Absorption Spectrophotometer (AAS). One of the main problems of determination with furnace technique is choice of the proper temperature, the optimization of the thermal program. The problem of volatility limiting the use of high temperatures at the stage of thermal mineralization is solved by the use of a modifier2. In this study, optimum temperature using modifier was determined for each sample at GFAAS. Mg/Pd mixture was used in GFAAS method as modifiers. The accuracy of the digestion procedures was determined by using standard reference material (NIM-GBW07404(GSS-4) and WEPAL-IPE-168). The precision of the techniques, expressed as relative standard deviation, was observed under 8 % for HGAAS measurements. For first year, the average concentrations of selenium in Helianthus annuus L. were found to 0.44±0.19 mg/kg in soil, 0.47±0.26 mg/kg in root and 0.39±0.34 mg/kg in plant. The average results of second year were found 0.72±0.53 mg/kg in soil, 0.71±0.51 mg/kg in root and 0.86±0.53 mg/kg in plant.

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PP-8

MORPHO-ANATOMICAL, PALYNOLOGICAL AND SEED SURFACE PROPERTIES OF *ASTRAGALUS MICROCEPHALUS*

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Astragalus microcephalus Willd. (Fabaceae) is a member of the section *Rhacophorus* Bunge and it is an element of the Irano-Turanian phytogeographic region[1]. It grows mainly in steppes of central Anatolia.Due to extraction of tragacanth and selenium, as well as a valuable tool in pharmacy which is also important economically and ecologically.In this study, morphological, anatomical, pollen characteristics and seed surface properties of *A. microcephalus* were investigated in detail. The plant consists of thorny bushes that make up pillow. Morphological characters such as the shape of paripinnate leaves, stipules andbracts, flowers whitish-yellow and purple coloured in margins, the flower number in the inflorescence, the stenonychioid type of standard and reniform type of seed can be helpful to distinguish species of *Astragalus.* There are secondary growth in stem anatomy. The stem of this species has got tragacantha canals in pith. Sclerenchyma tissue is well developed in the rachis. *A. microcephalus* has equifasial leaves. The vascular bundles are surrounded by a bundle sheath. The pollen grains of *A. microcephalus* are tricolpate and prolate-spheroidal. The exine sculpturing is microreticulate. Scanning electron microscopy (SEM) is used to determine the morphology of pollen and seed.

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PP-9

SEED MORPHOLOGY OF *HYOSCYAMUS* IN TURKEY AND ITS SYSTEMATIC SIGNIFICANCE

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The seed morphology of six species, representing genera of *Hyoscyamus* L. (Solanaceae) in Turkey[1,2] was investigated using light and scanning electron microscopy (SEM), to determine the significance of seed coat features as taxonomic characters. Macro and micromorphological characters, including seed shape, size, hilum pozition and character, seed coat apperance, cell shape, sculpture characteristics of cell walls and wall ornemantation are presented. The results indicate that the seed coat sculpture of the seeds is cerebelloid in *H. pussillus* and reticulate or reticulate-puzzle in all the remaining species. Two types of testal cells can be identified based on their general overall shape and linearity of rhe anticlinal walls. In one type, the cell shape is oblong to subpolygonal, with the anticlinal wall being sinuate to repandate; in the other type, the cell is triangular to subpolygonal, with the anticlinal wall straight or slightly curved. Fine ornemantation of the anticlinal walls of the testal cells varies from smooth to cover with, fibril, punctate or papillate projections. However, the size and shape of seeds and the pozition of hilum have partly systematic significance.

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PP-10

STUDY OF ESSENTIAL OIL QUANTITATIVE VARIATION IN *NEPETA CRASSIFOLIA* IN NATURE AND CULTIVATED CONDITION IN FOUR AREAS OF ARASBARAN FORESTS

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Nepeta belongs to Lamiaceae family, comprising about 250 species distributed mainly in south west and central Asia, Europa, North America.The medicinal properties of *Nepeta* species are usually attributed to their essential oils and flavonoids.*N.crassifolia* is a grayish-green perennial herb with woody base, and is found in southwest Asia.In Iran, it had been reported before from Mazandaran and Kermanshah, but recently, it was reported from Azerbaijan, too.For this investigation, the aerial parts and seed of *N.crassifolia* were collected from four areas of Arasbaran forests with different altitude and slope. The aerial parts were dried in shade and their essential oil was extracted by water distillation. Collected seeds were cultured in greenhouse, and then produced seedlings were transferred to main field. In second year of culture and when the plants grew to %50 flowering stage, their aerial parts were harvested and after drying, essential oil was extracted by water distillation.The essential oilS obtained from natural and cultivated condition that in fact are our treatments were compared together. These treatments with unequal replications were executed in one way analysis of variance and mean comparison of treatments was done in the probably level of %5 with L.S.D. test.Variance analysis of data shows that there are significant different between treatments concerning essential oil percent in probably level of %1. Maximum means of essential oil (0/226) is related to Arasbaran, kharil village, 1600 m, south eastern slope, and minimum means of essential oil (0/09) is related to Arasbaran, Abasabad, 1875 m, field area and without slope. Although obtained essential oil from the collected aerial parts from Abasabad is the least, but maximum amount of essential oil obtained from aerial parts of cultivated plants from this area's seeds that can be considerable in culturing and domesticating.With considering that these areas are different in altitude, slope and soil texture, according to the study, these parameters can be effective in essential oil amount and its components.

PP-11

THE EFFECTS OF NITROGEN FERTILIZATION AND SOWING METHODS ON AGRICULTURAL AND QUALITY OF POPPY (*PAPAVER SOMNIFERUM* L.) VARIATES

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This study was conducted in 2009-2010 and 2010-2011 in order to determine the sowing methods, cultivar and the appropriate dose of nitrogen fertilizer under the ecological conditions of Amasya. The study was established according to the strip plots experimental design. Plant height was 107-142 cm, number of capsules per plant was 2.002-2.708, 1000-grain-weight was 0.434-0.451 g, seed weight in capsule was 4.123-5.654 g, seed number in capsule was 8178-13967, seed yield was 76.53-161.11 kg/da, capsule yield was 67.22-134.30 kg/da, crude protein was 15.69-19.12 %, crude fat was 45.76-53.72 %, morphine was 0.312-0.817 %, tebaine was 0.035-0.147 %, codeine was 0-0.078%, oripavine was 0-0.016%, noscapine was 0-0.469 % and papaverine was 0-0.029 %.

PP-12

EFFECT OF ERYNGO EXTRACT AND 8-HYDROXYQUINOLINE SULPHATE ON THE VASE LIFE OF CUT *CHRYSANTHEMUM MORIFOLIUM* L.

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Eryngo (*Eryngium caucasicum* Trautv.) is an endemic medicinal and aromatic plant growing in the northern part of Iran. In order to study on the effect of eryngo extract and 8-hydroxyquinoline sulphate on vase life of cut *Chrysanthemum morifolium* L., a factorial experiment based on completely randomized block design carried out with 2 factors including eryngo extraction at 4 levels (0, 10, 30 and 50%) and 8-hydroxyquinoline sulphate at 4 levels (0, 100, 200 and 300 mg l-1) was done. In this experiment, the effect of two factors on petal protein percentage, vase life, solution uptake, dry matter percentage, loss of fresh weight, amount of petal carotenoid and increasing °brix at 1 and 5% probability level was significant. Mean comparison of data showed that 30% of eryngo extracts and 200 mg l-1 of 8-hydroxylquinoline sulphate singularly had highest petal protein percentage, vase life, and solution uptake. Also, the use of eryngo extract and 8-hydroxyquinoline sulphate is recommended to increase vase life and improving water relation of cut chrysanthemum. Essential oils have been applied to prolong the longevity of some ornamental plants1,2.

[1]M. Solgi, M. Kafi, T.S. Taghavi, R. Naderi: Essential oils and silver nanoparticles (SNP) novel agents to extend vase life of gerbera (Gerbera Jamesonii cv. 'Dune') flowers. Postharvest Biology and Technology, 53, 155-158, 2009.
[2]N.T. Shanan: Applicationse of essential oils to prolong the vase life (Rosa hybrida L.) cut flowers. Journal of Horticultural Science and Ornamental Plants, 4 (1), 66-74, 2012.

PP-13

TOXIC ELEMENTS PROFILES IN SELECTED MEDICINAL PLANTS GROWING ON SERPENTINES IN BULGARIA

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The populations of medicinal plants (*Hypericum perforatum, Teucrium chamaedrys, T. polium, Rhodeola rosaea, Empetrum nigrum, Ceterah officinarum* and *Asplenium trichomanes)* growing on serpentines and their soils were analyzed for Fe, Ni, Mn, Cr, Co, Cd, Cu, Zn, Pb using ICP AES after acid digestion. Screening was carried out to: 1) document evidence of heavy metals in herbs, some of them extensively used in preparation of products and standardized extracts; 2) compare accumulation abilities of ferns and seed plants; 3) estimate correlations between metal content in plants and their soils. Toxic elements content in plants varies from site to site on a large scale. The concentrations for Fe and Ni were elevated (except *H. perforatum*) while for Cu, Zn and Pb were normal. The highest concentrations were measured in both *Teucrium* species. Ferns showed the lowest Cr concentrations. Toxic Cd was above 0.3 mg kg^{-1}, a limit proposed for herbal drug (WHO, 2007)[1]. Specific differences in the accumulation of metals between ferns and seed plants were not recorded. Investigated species are not hyperaccumulators but can accumulate toxic elements in some cases exceeding permissible levels proposed by WHO (2007)[1] and European Pharmacopoeia (2008)[2]. Harvesting medicinal plants from serpentines could be hazardous for humans.

[1]WHO (World Health Organization) guidelines for assessing quality of herbal medicines with reference to contaminants and residue. WHO, Geneva, 2007, available at: http://apps.-who.int/medicinedocs/index/assoc/s14878e/s14878e.pdf.
[2]European Pharmacopoeia. Set with Supplements 6.1 and 6.2. EDQM, Strasbourg, France, 2, 2008.

PP-14

THE EFFECTS OF VARYING NITROGEN DOSES ON YIELD AND SOME YIELD COMPONENTS OF BLACK CUMIN (*NIGELLA SATIVA* L.)

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This study was carried out to determine the effects of different Nitrogen doses (0, 40, 80 and 120 kg/da) on yield and some yield components of black cumin (*Nigella sativa* L.) in Cumra, Konya ecological conditions in 2010 and 2011. Field trials were designed by Completely Randomized Block Design with four replications at the experimental fields of Cumra Vocational High School of Selcuk University. In the study, plant height (cm), the number of branch (branch/plant), the number of capsule (capsule/plant), the number of seeds in the capsule (seed/capsule), thousand-seed weight (g) and seed yield (kg/ha) were determined. According to statistical analysis, significant differences were determined among the nitrogen doses applications for the number of branch and thousand seed weight. The seed yield increased by increasing nitrogen doses then it decreased. According to the results, the highest seed yield (740 kg/ha) and thousand-seed weight (3.54 g) were obtained from 80 kg N/ha fertilizer application. The highest mean values for the number of capsule (8.58 capsule/plant) resulted in 80 kg N/ha application.

PP-15

EFFECT OF VERMICOMPOST, SOLID AND LIQUID ORGANIC FERTILIZER AND BIOLOGICAL FERTILIZER APPLICATIONS ON THE GROWTH AND CHLOROPHYLL CONTENTS OF MOUNTAIN TEA (*SIDERITIS MONTANA* L.)

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The objective of this study was to evaluate possible effects of mineral fertilizer (NPK), one solid and two liquid organic fertilizers of plant origin (DRY1, BRCK5 and B1250), one solid organic vermicompost fertilizer (VCFS) and seven N_2-fixing and P-solubilizing and siderophore producing microorganism based bio-fertilizers (*Paenibacillus polymyxa* RC05, *Pseudomonas putida*RC106, *Bacillus subtilis*RCK17, *Pseudomonas fluorescens* RCK1136, *Pantoea agglomerans* RK79, *Pseudomonas fluorescens* RC77+ *Bacillus subtilis* RC63 and *Pseudomonas fluorescens* RC77, *Bacillus megaterium* RC07) growth of mountain tea. The experiment was performed in a completely randomized design with five replicate and repeated twice. On average, application of VCFS, DRY1, BRCK5, BE1250,RC05, RC106, RCK17, RCK1136, RK79, RC77+RC63, RC77+RC07 and NPKgave increases over control respectively of by16.0, 14.7, 23.9, 14.7, 66.1, 0.4, 1.5, 37.1, 33.9, 79.1, 76.8, and 52.2% in shoot fresh weights, by 9.0, 10.3, 8.5, 10.8, 25.9, 0.3, 12.7, 15.3, 19.6, 35.4, 34.1, and 25.7% in total chlorophyllcontent, by 13.3, 28.9, 31.1, 51.1, 48.9, -17.8, 28.9, 31.1, 28.9, 64.4, 60.0, and 64.4% in leaf area index. Among the organic and bio-fertilizers, theN_2-fixing and P-solubilizing microorganism based bio-fertilizers RC77+RC63, RC77+RC07, RC05, and organic fertilizers BRCK5 and BE1250 have great potential to be used in sustainable and organic mountain tea production.

PP-16

MOLECULAR CHARACTERIZATION OF LAUREL (*LAURUS NOBILIS* L.) POPULATIONS USING SIMPLE SEQUENCE REPEAT (SSRS)

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In this study, 95 laurel genotypes with different and superior features which were selected from laurel population naturally present in Hatayprovince were used. The aim of this study is genetically characterize the 95 genotypes based on SSR markers. A total of six SSR markers are used to screen the population. The LnD106 loci are excluded due to its monomorphic allelic nature. As a result of data analysis, five polymorphic loci identified 82 alleles, and the average number of alleles was found to be 16.4. The highest number of allels was 24 with LnA2 primer. A low rate of similarity was found between genotypes. The highest similarity rate (80%) was found between E6 – O6 genotypes. The similarity rate between the other genotypes was determined lower. The result of the present study will contribute to other researches (breeding, reproduction, cultivar registration etc.) performed in the area. It will also be of significance in terms of preserving and maintaining Laurel variability in forests of Hatay. These data can be directly compared with other research which used same SSR loci or laurelgenotypes from other regions of the world.

PP-17

GENETIC DIVERSITY OF *FUSARIUM OXYSPORUM* ISOLATES ASSOCIATED WITH *CUMINUM CYMINUM* IN TURKEY

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Fusarium wilt of cumin (*Cuminum cyminum* L.), caused by a soil- and seed-borne vascular wilt pathogen *Fusarium oxysporum* f. sp. *cumini* is an economically important disease that occurs in major cumin growing areas of the world. A total of forty-two isolates of *Fusarium oxysporum* f. sp. *cumini* was isolated from symptomatic tissues of cumin plants from Ankara and Konya provinces of Turkey. Species-specific primers FOF1/R1 amplified the expected 340-bp DNA fragment from all isolates.[1] Also, the restriction digestions of polymerase chain reaction amplified nuclear ribosomal DNA intergenic spacer (IGS) were used to identify genetic variation among all *Fusarium oxysporum* isolates. PCR amplification with primers CNS1 and CNL12 yielded a single DNA fragment of approximately 2.6 kb from *F. oxysporum* isolates[2]. Cluster analysis using UPGMA showed distinct clusters based on restriction band patterns of IGS region digested with the four enzymes. These results indicate that *F. oxysporum* f. sp. *cumini* isolates are genetically distinct from each other and different subgroups of the forma speciales *cumini* were found in Turkey.

[1]P.K. Mishra, R.T.V. Fox, A. Culham: Development of a PCR based assay for rapid and reliable identification of pathogenic Fusaria. *FEMS Microbiol Lett*, 218, 329-332, 2003.
[2]D.J. Appel, T.R. Gordon: Intraspecific variation within populations of Fusarium oxysporum based on RFLP analysis of the intergenic spacer region of the rDNA. *Exp Mycol*, 19, 120-128, 1995.

PP-18

PRELIMINARY STUDIES ON DETERMINATION OF FUNGAL PATHOGENS AFFECTING CUMIN PRODUCTION OF TURKEY

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Cumin (*Cuminum cyminum* L.) is a flowering plant that extensively grown in Central Anatolia region of Turkey. Cumin seeds are used for adding condiments and flavors to food, and for medicinal and cosmetic properties. Cumin production is seriously affected by different fungal diseases. This study reviews the results of surveys conducted to identify fungal pathogen, causing economical losses on cumin production during 2011-2012. Surveys were performed in 70 fields located in Ankara and Konya provinces of Central Anatolia region. The isolates were identified based on morphological characteristics, species-specific PCR, and DNA sequencing. A total of 342 isolates belonging to the species of *Fusarium*, *Macrophomina*, *Alternaria*, *Embellisia* and *Rhizoctonia* were obtained from diseased samples. *Fusarium oxysporum* f. sp. *cumini* and *Alternaria burnsii* were determined as the most important pathogens, limiting the production of cumin in this region.

PP-19

TOTAL SOLUBLE SOLID, SACCHAROSE, FRUCTOSE AND GLUCOSE CONTENTS OF *PHYSALIS PERUVIANA* L. GROWN IN DIFFERENT FERTILIZER APPLICATION

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Goldenberry (*Physalis peruviana* L.) is a native plant from the Andes region, transcending the history of the pre-Incan and Incan periods, throughout South America. The crude extract of *Physalis peruviana* L. has been demonstrated to have strong cytotoxic activity against breast and liver cancers. The fruit is eaten fresh, in salads or in cocktails, or cooked. The fruit has been used as a good source of provitamin A, minerals, vitamin C and vitamin B-complex. The fruit contain 15 % soluble solids (mainly sugar) and its high level of fructose makes it valuable for diabetics. In this study, the aim was to determine the total soluble solid, saccharose, fructose and glucose contents of the fruits of *Physalis peruviana* L. grown under the ecological conditions of the Rize Province of Turkey. The study used *Physalis peruviana* L. grown in three different fertilizer applications, which are organic K mineral added (Karden K), calcium ammonium nitrate (CAN) and manure. In different fertilizer applications, total soluble solid, scaccharasoe, fructose and glucose contents of the fruits ranged between 12.73-14.96 %, 20.17-17.14 %, 10.82-9.24 %, 8.98-7.82 % respectively. The highest scaccharasoe and glucose values are found in manure application. The highest fructose amount in the fruits was found in Karden K application. In different fertilizer applications, the highest total soluble solid values in the fruits were found in CAN and manure applications (14.6-14.96 %).

[1]Anonymous, 2012a. AOAC Official Method 979.23 Saccharides Chapter 44.p.43-2000.
[2]Anonymous, 2012b.AOAC Official Method 977.20 Separation of Sugars in Honey 2005.

PP-20

A RESEARCH OF ANTIMICROBIAL EFFECTS OF *OENOTHERA BIENNIS* L. GROWN IN DIFFERENT FERTILIZER APPLICATION

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Evening primrose (*Oenothera biennis* L., Onagraceae) is a biennial herbaceous plant. The plant is grown for commercial purposes in many countries due to unsaturated fatty acids such as linoleic and gamma-linolenic acid its seeds contain. These fatty acids are widely used to treat atypical eczema, PMS/breast pain in women (mastalgia), arthritis, neural damages due to diabetes mellitus and many other diseases. This study was carried out in field conditions in Ordu ecology. In the study; antibacterial and antifungal effects of ethanol extracts of *Oenothera biennis* L. grown in different fertilizer applications which are organic fertilizer (Kıbele), manure and none fertilizer were tested against *Pseudomonas aeruginosa*, *Streptococcus mutans*, *Escherichia coli*, *Staphylococcus aureus*, *Aspergillus niger* and *Candida albicans* using the disc diffusion and agar dilution method. As a consequence; *Oenothera biennis* L. with organic fertilizer application showed high antimicrobial activity against *S. aureus* and *S. mutans*. Besides, manure application showed high antimicrobial activity against *S. aureus*.

Shukla, Y.N., Srivastava, A., Kumar, S., Kumar, S. 1999. Phytotoxic and antimicrobial constituents of *Argyreia speciosa* and *Oenothera biennis*. J. Ethnopharmacol., 67, 241-245.

PP-21

THE EFFECTS OF DISTILLATION TIME ON ESSENTIAL OIL COMPOSITION OF *ORIGANUM MINUTIFLORUM* O. SCHWARZ ET. P.H. DAVIS

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Origanum minutiflorum, called as "Yayla Kekiği" is an endemic origanum cultivar grown in West Mediterranean Region of Turkey. This origanum cultivar generally used in essential oil production in this region. The essential oil composition of the plant could be changed depends on its growing place, harvesting season, climacteric condition etc. Additionally, its composition could be affected from distillation process. In this study, the effect of five different distillation times (10, 20, 30, 60, 120 minutes) on essential oil composition of *Origanum minutiflorum* was investigated. It was found that the amount of essential oils and compositionsof them were significantly affected with distillation times. More than 50% of total oil was obtained with a distillation 10 minutes after boiling. Main component was determined as carvacrol and ranged between 62.60-86.40% depends on distillation time. The other main components were determined as o-cymene, γ-terpinene, borneol, and their amounts were ranged between 4.29-8.07%, 1.72-5.12%, 0.27-5.33%, respectively. As a result, various products with different composition could be obtained taking into account of distillation times.

PP-22

THE EFFECT OF DIFFERENT TREATMENTS ON SEEDS DORMANCY AND GERMINATION OF *SATUREJA KHUZISTANICA* JAMZAD

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The seed of many medicinal plants species have dormant; they do not germinate unless specific environmental signals or events occur. The current research was carried out to investigatethe effect of different treatments on seed dormancy breaking and germination stimulation of*Satureja khuzistanica* in order to determine the most effective treatment in enhancing ofgermination and primary growth of seedlings. The experiment was done in a Randomize Complete Block Design (RCBD) with 8 treatments and 4 replications. Different treatmentswere applied including GA_3 (100, 500, 1000 ppm), potassium nitrate (1%, 2%), thiourea (1, 2 M) boiling water, pre-chilling and distilled water as control treatment. To analyze the data, ANOVA was used and Duncan test was applied to compare the means. The result showed thatGA_3 andpotassium nitrate had the highest effect on seed dormancy breaking and seed germinationstimulation of *S. khusestanica* as germination percentage increased from 25% in distilled water to 98% in GA_3 (1000 ppm) treatment.

PP-23

PHYLOGENETIC ANALYSIS OF *ALTERNARIA* SPP. AND RELATED FUNGI ASSOCIATED WITH CUMIN BLIGHT BASED UPON ANALYSIS OF NUCLEAR ITS AND ALT A 1 GENE SEQUENCES

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Cumin blight caused by the two fungi *Alternaria burnsii* and *Alternaria alternata* is one of the most serious biotic constraints in cumin growing areas worldwide. Sequence analysis of the Alt a1 gene and the nuclear internal transcribed-spacer region (ITS1-5.8S-ITS2) was used to identify cumin blight pathogens and to resolve genetic relationships among *Alternaria* spp. and related fungi[1,2]. Phylogenetic analysis of the Alt a1 gene and ITS sequences revealed distinct species-clades among the *Alternaria* spp. associated with cumin. The *Embellisia* spp. grouped separately from the *Alternaria* spp. clades. The results from our study indicated *A. burnsii* is a primary pathogen in cumin blight, and the isolates possessed an identical Alt a1 gene and ITS sequence with minor variation. These data can be used in developing a unique tool for the fast detection of the pathogen in cumin seeds and plants.

[1]S.G. Hong, R.A. Cramer, C.B. Lawrence, B.M. Pryor: Alt a 1 allergen homologs from Alternaria and related taxa: analysis of phylogenetic content and secondary structure. *Fungal Genetics and Biology*, 42, 119-129, 2005.
[2]T.J. White, T.D. Bruns, S. Lee, J. Taylor: Amplification and direct sequencing of fungal ribosomal RNA for phylogenetics. In M. A. Innis, D.H. Gelfand, J.J. Sninsky, & T.J. White (Eds.), *PCR protocols: a guide to methods and applications*. San Diego, CA, USA: Academic, pp. 315–322, 1990.

PP-24

THE EFFECT OF DIFFERENT LEVELS OF ALTITUDES ON COMPOSITION AND CONTENT OF ESSENTIAL OILS OF*ZIZIPHORA CLINOPODIOIDES* IN SOUTHERN OF TURKEY

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The genus *Ziziphora* L. belongs to the Lamiaceae family and consists of four species (*Ziziphora clinopodioides, Ziziphora capitata, Ziziphora persica* and *Ziziphora tenuior*). *Z. clinopodioides* is an edible medicinal plant that its leaves, flowers and stems are frequently used as wild vegetable or additive in foods to offer aroma and flavor. The plant known locally as 'Kırnanesi' is used in the preparation of an aromatic tea for gastrointestinal disorders and as a carminative, antiseptic and wound healing material in Turkey[1].

In this study, essential oil content and compositions of seven *Ziziphora clinopodioides* plant were collected from Ermenek (Southern part of Turkey). The altitudes of collected places of plants were varied between 908 m and 1436 m. from sea level. The essential oil content of *Z. clinopodioides* plants was hydro-distilled by Clevenger apparatus, and they were determined between 0.02% and 0.50%. The highest essential oil content (%0.50) was obtained from 908 m. The composition of essential oils was analyzed by GC-MS.

[1]Baytop, T. Türkiye'de Bitkiler ile Tedavi. I.U. Yayınları No: 3255, Eczacılık Fak., 40:444, 1996.

PP-25

THE EFFECT OF HARVESTING TIME ON LAVENDER AROMATIC COMPOUNDS

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Lavender is widely usedfor aromatic, antibacterial andantiviralproperties.Lavender has been used in food industry for natural flavoring and natural food additives. In this study, Lavandersamples were collected at the time on the morning, noon and evening in the same day. The lavander samples divided into flowers, leaves and stems and aromatic compounds of these samples analyzed by GC-MS. Aim of this study investigate effect of harvesting time on the aromatic compounds of lavander. The major aromatic components of lavender flowers are linaloloxide (*cis*, isomer B), linalooloxide (*trans*, isomer A), camphor, linalool, linalyl butyrate, 4-carvomenthenol, terpinene-4-ol, and farnesol. The major aromatic components of lavender leaves are camphor, eucalyptol, linalool, tricyclo-heptan, farnesol, isoborneol, thymol, and valencence. The major aromatic components of lavender stems are linalool, camphor, 4-carvomenthenol terpinene, farnesol, and isoborneol. The most dominant aromatic component found in lavender flowers is linalool in the morning: %17.58, in the noon: %18.38 and in the evening: %26.08.
In conclusion; harvesting time affect the aromatic component of lavender plants. Different part of the lavender plants (flowers, leaves and stems) has various aromatic components.

PP-26

CHANGING OF THE ESSENTIAL OIL COMPOSITION IN BASIL (*OCIMUM BASILICUM* L.) BY APPLYING DIFFERENT BACTERIAL ISOLATES

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Ocimum basilicum L. is distributed all over the world. This plant is used as medical purposes and its essential oil especially used in cooking and cosmetics industry. Linalool was main component of essential oil of basil[1]. The bacterial application had affected fresh and dry herbage and leaves yields of basil[2]. The aim of this study is to determinate the effect of some bacterial isolates and a commercial plant activator (ISR2000) that promoting plant growth, on essential oil composition of basil plant. Field trials were arranged in the complete randomized block design with three replications in experimental area of Field Crops Department of Agricultural Faculty in Cukurova University. Four different bacterial isolates (K2C, M3, OSU142, SP245) and one bacterial activator (ISR2000) with control were used in the experiment. During the growth, bacterial application was done three times (May 26, June 2 and 9, 2011). According to the results of GC-MS, over 20 numbers of various compounds were identified in Basil essential oil on which different bacterial isolates applied. Major component of basil essential oil was linalool. Linalool amounts over all applications were varied from 34.95% to 42.58%. The highest linalool value was obtained from ISR2000 treatment.

[1]Ozek, T., Beis, S., Demircakmak, B., Baser, K.H.C., 1995. Composition of the essential oil of *Ocimum basilicum* L. cultivated in Turkey. *J. Essential oilRes*, 7, 203 -205.
[2]Taghi khani, H., Horuz, S., Kırıcı, S., Ausan, Y., 2012. Effect of different bacterial isolates on yield and essential oil content of basil (*Ocimum basilicum* L.). Medicinal and Aromatic Plants congress . Tokat, 13-15 September.

PP-27

MINERAL CONTENT CHANGE OF *CORIANDRUM SATIVUM* L. GROWN UNDER WATER DEFICIT CONDITIONS

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Minerals are important for human health by means of regulating enzyme reactions in the body, and the human body should balance their presence and amount during life[1,2]. Thus, daily diets for uptake of the minerals are significant. Recent scientific data proved that spices are good source for minerals[3]. However, growing conditions and applied agricultural practices affect mineral compositions of the crops[4]. Increase in frequency and duration of dry periods in arid and semi-arid regions in many parts of world and the problems associated with the water constraints in irrigation systems and areas may affect the bioavailability and mobility of minerals and mineral-nutrient relations in plants[5]. In this work the effects of water deficit on mineral content of *Coriandrumsativum* L. were investigated. Plants were treated with different levels of water deficit; control (C), moderate water deficit (MWD) and severe water deficit (SWD). In this context, Na, K, Mg, and Ca contents of shoot and root were evaluated with respect to the deficit irrigations. Herein, water-deficit treatments did not elicit changes in concentration of Na, Mg, and Ca except that K contents increased by the deficiency.

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PP-28

DETERMINATION OF YIELD AND SOME AGRONOMIC CHARACTERS ON VARIETY AND POPULATIONS OF CUMIN (*CUMINUM CYMINUM*L.) IN HARRAN PLAIN UNDER DRY CONDITIONS

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This study was carried out with four replicates in randomized block design as in 2010-2011 growing periods in Koruklu Talat Demirören Research Station, for the purposes of determining the yield and some agronomic characters on variety and populations (1 variety and 4 populations) in Cumin (*Cuminum cyminum* L.) under dry conditions in the Harran plain, Şanlıurfa. Accordingto the results ofthe trial, the values were obtained grain yield from 71.8 to 133.6 kg/da, essential oil ratio 3.8 - 6.2% , 1000 grain weight 2.7 - 3.1 g, plant height 28.8 - 34.1 cm, number of branches 5.7- 9.4 number /plant, number of umbel per plant 16.2- 39.7 number/plant, the number of grains in the main umbel 29.4 - 39.7 number / umbel, seed retention ratio in the main umbel from 89.3 to 97.7 % in the trial, the highest yields were recorded in Eskişehir population and Egebir variety.

PP-29

DETERMINATION OF YIELD AND SOME AGRONOMIC CHARACTERS ON POPULATIONS OF BLACK CUMIN (*NIGELLA SATIVA* L.) IN HARRAN PLAIN UNDER DRY CONDITIONS

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This study was carried out with four replicates in randomized block design as in 2010-2011 growing periods in Koruklu Talat Demirören Research Station, for the purposes of determining the yield and some agronomic characters on populations(5 populations) in black cumin (*Nigella sativa* L.) under dry conditions in the Harran plain, Şanlıurfa. Accordingto the results ofthe trial, the values were obtained grain yield from 76.2.4 to134.1 kg / da, crude oil ratio 32.9-36.0%, 1000 grain weight 1.8 -2.9 g, plant height 35.6-46.2 cm, number of branches 3.5 - 4.7number /plant, number of capsule *per* plant8.2-10.5 number/plant, the number of grains in the main capsule 72.5-97.7 number/capsule in the trial, the highest yields were recorded in Konya and Şanlıurfa populations.

PP-30

THE PESTICIDE RESIDUE DETERMINATION OF LEMON BALM (*MELISSA OFFICINALIS* L.)

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Usage of substance or a mixture of substances for killing organisms dangerous to cultivated plants directly affects the concentration of pesticide residues in the raw material of selected herb. Applications of pesticides to crops may leave residues in or on food products, and those specified derivates are considered to be of toxicological significance. Therefore the permissible concentrations of pesticide residues are important to be followed according to the known regulations. The quantitative determination of pesticide residues will be performed by capillar GC/ECD analyse and compared with maximum permissible concentrations. For the gas chromatography analysis the VARIAN STAR 3400 and VARIAN STAR 3800 with electron capture detector (ECD) will be used. The pesticide residue accumulation in Lemon Balm (*Melissa officinalis* L.) should not exceed the maximum permissible concentration of these components for food production. As a result of the study, usage of organic grow techniques and no content of synthetic fertilizers, chemicals or other polutants of a plant material should be confirmed. Obtained result can be utilized to promote ecological methotds of growing herbs and natural food product without any mark of toxic compounds.

PP-31

GENETIC DIVERSITY AND ESSENTIALOILVARIATION IN TUNISIAN MEDICINAL AND AROMATIC PLANTS

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Medicinal and aromatic plant populations were widely assessed for their chemical composition. The relationships between the chemical variation and the genetic diversity of species remain poorly investigated. Concordance and non concordance between the two sets of variation have been reported. The jointly analysis of the two sets of data is crucial in understanding population future in situ maintenance of mother materials and the development of improvement programs. We reported separated and combined genetic and chemical assessments of Tunisian natural populations of *Rosmarinus officinalis* L., *Thymus algeriensis*Boiss and Reut., *Myrtus communis*L., *Lavandula multifida* L. and *Teucrium polium* L. The level of variation among populations differed according to taxa. For all species, the genetic structure among populations, based on morphological, isoenzymatic and molecular markers was often concordantwith that of the chemical variation using terpenoids. The correlation among genetic and chemical data was significant. The variation according to geographical distances among populations and their bioclimatic location was not always revealed.Results are discussed in order to purpose appropriate conservation and improvement strategies taking into account the population size, the reproduction mode and the level of the two sets of variation within species.

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PP-32

PERFORMANCE OF SELECTED MEDICINAL PLANTS GROWN AT TWO LEVELS OF SOIL SALINITYS

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Salinity is one of the major problems contributing in the reduced yield of the crops. The adverse effect of salinity on yield could be minimized by cultivating the tolerant species and varieties1. The objective of this study is to screening for plants that can perform well under saline soil. Field and pot experiments were performed at two locations in Central Sudan namely Shambat (Ec of 4.5 dS/m) and Soba (Ec 6 dS/m). The growth and yield parameters of two varieties of Ocimum basilicum, Brassica nigra, Feoniculum vulgare), Plantago ovata L, Solenstemma argle and Tigonella plants were investigated. The different species responded differently to salinity where the growth and yield components of the plants grown at Soba soil were significantly reduced in some of tested species. The studied plants could be raised at the saline soil of Soba and there is a room for selecting tolerant species. Further researches are needed to develop suitable management practice to utilize such type of soil.

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PP-33

EFFECTS OF Zn AND Fe FOLIAR APPLICATION ON YIELD, YIELD COMPONENT AND SOME PHYSIOLOGICAL TRATS OF CUMIN (*CUMINUM CYMINUM* L.) UNDER WATER STRESS

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In order to study the effects of Zn and Fe foliar application on yield and some physiological traits of cumin (*Cuminum cyminum* L.) under water stress, an experiment was carried out at Agricultural Research Center of Kerman, Iran during 2012. Field experiment was conducted in split plot design based on randomized completely block at three replications. Main plots included water stress with dry farming and normal irrigation and sub plots were Zn, Fe, Zn + Fe foliar application and control. Results showed that maximum quantities were in normal irrigation with Zn+Fe on yield; yield component and RWC and minimum quantities were in dry land condition and control. Treatment of Zn + Fe increased protein total percent and proline content and reduced the amount of H_2O_2 and MDA. Enzyme activity such as SOD and CAT was increased but GPX activity did not show any noticeable difference.

Based on our results, it seems that the application of Fe+ Zn together caused alleviation of drought stress damages by the reduction of MDA and H_2O_2 content and increases the amount of protein total percent and proline and increase in activities of antioxidant enzymes in cumin.

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PP-34

SOIL-BORNE DISEASE MANAGEMENT BY WOOD VINEGAR AS ORGANIC PRODUCTION

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Stem white rot and fruit mold caused by *Sclerotiniasclerotiorum* and root and crown rot caused by *Rizoctoniasolani*are considered two of most cucumber distractive diseases especially in green houses. The aim of this study, the inhibitory effects ofnon-volatile and volatile metabolites of wood vinegar (WV)on the mycelialgrowth of *R.solani* and *S.sclerotiorum* and on the control of associated disease.To study the effects of thenon-volatile metabolites, fresh mycelial disks ofmentioned funguswere placed on Petri dishes containing PDA culture media and different concentration of WV(0.75,0.5, 0.37, 0.25, 0.125, 0.05, 0.025 and 0%. Daily growth of the fungus was measured up to10 days. In the case of volatilemetabolites, mycelia disks of fungus were placed on one side of a bipartite petri palte containing PDA and the above-mentioned concentration of WV were added to the other side.WV inhibited significantly the mycelial growth of both pathogens (α=0.05). Three concentrations (0.125% 0.25% and 0.50%) inhibited significantly the mycelial growth of *R.solani* were then drenched into the soil of the pots infested with *R.solani*.Disease severity was significantly reduced in all concentrations used (α= 0.05).

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PP-35

CULTIVATION POSSIBILITY OF *SALVIA TOMENTOSA* AND *SALVIA ARAMIENSIS* IN THE EASTERN MEDITERRANEAN REGION

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The genus *Salvia* (family Lamiaceae) is an annual, biannual or perennial shrubby herb represented in the Turkish flora by 94 taxa belonging to 89 species with 45 is endemic.Only a few of the *Salvia* species are cultivated. Most of the *Salvia* species are largely collected wild especially in Mediterranean basin and then sold in local markets or exported to the world markets. *Salvia aramiensis* and *S. tomentosa* species are naturally grown in Hatay province of Turkey. There has not been any attempt to cultivate these two species in Hatay. A two-year study was conducted to determine cultivation possibility of *S.aramiensis* and *S. tomentosa* under the eastern Mediterranean conditions in the 2009 and 2010 growing seasons in Hatay. The measured plant parameters were Plant height, herbage yield, essential oil content and essential oil components. Plant heights of *S. tomentosa* were 104.7 and 98.75 cm and plant heights of *S.aramiensis* were 86.25 and 95.25 cm in 2009 and 2010, respectively. *Salvia tomentosa* had the highest herbage yield with 42.58 g/plant while *S. aramiensis* had the lowest herbage yield with 38.11 g/plant in 2009. In the second year of the study, the herbage yield of *S. aramiensis* and *S. tomentosa* were 41.33 and 42.58 g/plant, respectively. Essential oil contents of *S. aramiensis* and *S. tomentosa* varied between 1.26 and 1.25% in 2009 and 1.35 and 1.21% in 2010, respectively. The major essential oil components of *S.aramiensis* were 1.8-cineole, camphor, para-cymeme, sabinene, germacrene-D, camphene and borneol.The major essential oil components of *S. tomentosa* were α-pinen, β-pinen, limonen, eucalyptol, linalool, □-myrcene, camphen,1,8-cineole,camphor, β-caryophyllene, and α-humulene.
With respect to herbageyield and essential oil content, *Salvia aramiensis* and *S. tomentosa*can be successfully cultivated under the eastern Mediterranean conditions.

PP-36

EFFECTS OF DIFFERENT TEMPERATURES AND DURATION ON GERMINATION OF CAPER (*CAPPARIS OVATA*) SEEDS*

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The genus *Capparis* L. (*Capparaceae*) consists of about 250 species distributed mostly in tropical and subtropical regions. The various parts of this plant are used as drugs, cosmetics and foods. Caper seed has poor germination because of the seed coat dormancy. Germination of caper seeds is complex traits affected by a wide range of internal and environmental influences. In this study, the effects of temperature preconditioning and period on germination of *Capparisovata* were examined. Experiments were conducted in order to investigate germination behavior of caper seeds subjected to different temperature and duration. The experiment revealed that the different temperature treatments were effective on mean germination percentage. The highest mean germination was obtained at 0ºC 29.52% and 10ºC with 27.17% and the lowest mean germination were obtained at control seeds with 8.39%. Dry heat treatments effected germination rate, but it was not enough for removing germination obstacle of caper seed completely.

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PP-37

THE DETERMINATION OF MOLECULAR DIVERSITY AMONG SOME LUCERNE (*MEDICAGO SATIVA* L.) CULTIVARS USING RAPD

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Relationships among total of 76 ecotypes of Lucerne (*Medicago sativa* L.), 70 landraces and 6 cultivars, collected in Van and neighboring provinces were investigated. The experiment was established as an augmented design in 2009. As molecular method, 17 RAPD primers were used and 106 polymorphic bands were obtained. The genetic distances between ecotypes were expressed by using Euclidean coefficients. The genetic variation among lucerne ecotypes was examined in 16 groups based on the localities, landraces and registered cultivars. The highest genetic variations and polymorphisms were found inErcis and Gurpinar localities (H = 0.179 and I = 0.277, H = 0.173 and I = 0.267) and 62.26% and 59.43%, respectively. As a result, high genetic diversity has been determined among the ecotypes and cultivars of allogamous *Medicago sativa* L.

PP-38

ARTIFICIAL NEURAL NETWORK APPROACH TO PREDICTION OF THE *ORIGANUM* LEAF AREA

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Artificial neural network is the simulation of biological neural system in a mathematical or computational model. In the agricultural sciences, software implementations of artificial neural networks approach has been inspired and largely abandoned for a more practical approach based on statistics. This research investigates the artificial neural networks utilization in improving leaf area forecasting at *Origanum* leaves (*Origanum onites* L.). Best fitting results were obtained with 2 input nodes (leaf length and leaf width), 2 hidden layers and one output (leaf area). Artificial neural network model performance was tested successfully to describe the relationship between actual leaf area and predicted leaf area. R^2 of leaf area was 0.944. Artificial neural networks model produced satisfied correlation between measured and predicted value and minimum inspection error. Recently, ANNs combined with image processing techniques have been widely used to model complex and non-linear agricultural data.[1,2]

[1]Xing-Mei Suo, Ying-Tao Jiang, Mei Yang, Shao-Kun Li, Ke-Rum Wang, Chong-Tao Wang, 2010. Artificial Neural Network to Predict Leaf Population Chlorophyll Content from Cotton Plant Images. Agricultural Sciences in China, 9(1): 38-45.
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PP-39

DETERMINATION OF YIELD, YIELD COMPONENTS AND QUALITY CRITERIA IN SAFFLOWER (*CARTHAMUS TINCTORIUS* L.) CULTIVARS UNDER THE SAMSUN ECOLOGICAL CONDITIONS

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As is known, sufflower is considered and evaluated as an oil plant. However, for several years the flowers (according to varieties, yellow, red and orange) are used as an additive in food making. Due to these reasons, many researchers have recently focused their efforts on safflower blossoms. This study was conducted on the Black Sea Agricultural Research Institute during the spring of 2011. Four different varieties of safflower were discussed in this research. In the seeds, crude protein contents were 11.48-16.14%, crude oil rates were 17.2-21.4%, crude oil yields were 14.67-30.05 kg/da and flower yields were 0.16-0.27 g/da. The flowers obtained was dissolved in the water and used for making Jerusalem artichoke pickle. On the other hand, flowers were used for dyeing cotton and they were evaluated as herbal tea.

PP-40

EFFECTS OF SALICYLIC ACID ON SOME MORPHOLOGICAL AND PHYSIOLOGICAL TRAITS OF SWEET *BASIL* (*OCIMUM BASILICUM* L.) IN DIFFERENT IRRIGATION LEVELS

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In order to study the effects of salicylic acid foliar application in different concentration on some morphological and physiological characteristics of sweet basil under water stress, an experiment was carried out by spilit-plot method on the base of randomized complete block design with three replicats in the agricultural research station of Islamic Azad University, Tabriz Branch in 2011-12 seasons. Experimental treatments included irrigation levels as the main factor on three levels (irrigation after 70 mm, 120 mm, and 170 mm evaportation from class A basin), Secondary factor included: foliar application of salicylic acid in three levels of concentration (control, 3500 and 7000 mmol/lit). In this experiment plant height, leaf number, leaf dry weight, chlorophyll content, proline, soluble carbohydrate, essence percentage and essence yield per square meter were measured. The results showed that drought stress and salicylic acid foliar application had significant effect on all studied traites. Irrigation after 120 and 170 mm evaportation from class A basin decrease plant height about 27.3 and 49.5%, leaf number 15.7 and 31.4% and leaf dry weight 34.8 and 58.9% respectively and increase chlorophyll content 28 and 33%, proline 148 and 194%, soluble cabohydrates 19 and 30.4% respectively. Salicylic acid foliar application decreases these changes, significantly. In this research, irrigation after 120 mm evaportation from class A basin increase essence percentage and essence yield 38.2 and 11.3% respectively, but irrigation after 170 mm evaportation from class A basin decrease these traits compare with control. The most essence yield was equal to 6.14 g/m^{-2} obtained in irrigation after mm evaportation from class A basin and salicylic acid foliar application with 7000 mmol/lit concentration. Therefore, using salicylic acid can reduced effects of drought sress on sweet ***basil*** traits specially essence production.

PP-41

THE STUDY OF THE VARIOUS ROSEMARY VARIETIES VOLATILE OIL AMOUNTS AND ANTIOXIDANT ACTIVITIES IN DIFFERENT HARVESTS ON FERTILE AND MARGINAL LANDS

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Rosemary (*Rosmarinusofficinalis* L.) leaves have antibacterial, antioxidant and antiphlogistic effects[1].In order to study volatile oil and antioxidant activities of various imported and local varieties of rosemary under fertileandmarginallands in TurkishMediterraneanclimate, an experiment was conducted in split-split plot design based on randomized complete block with three replications at the experiment field of the Field Crops Department of Çukurova University in 2010. Based on results, the imported varieties Chrestensen, Bornatraeger, and Sperling had highest volatile oil percent comparing with the other varieties and local varieties including Ege, Kozan, and Tarsus had low volatile oil percent comparing with the imported varieties. The first, second and third harvests had the highestpercentage of volatileoils respectively and those plants which planted on fertile land had more capability of production comparing with marginal land. Antioxidant activity results showed that free radical scavenging activity of rosemary varieties was observed to be higher on the fertile land than marginal land. Although rosemary varieties numbered 1, 2, 3, 4, 12 and 14 have higher % inhibition on fertile land, varieties numbered 3 and 14 have the same higher % inhibition on marginal land. Rosemary varieties numbered 3 and 14 showed strong free radical scavenging activity in DPPH assay in these two fields for three seasons.

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PP-42

EFFECT OF BIOFERTILIZERS, ORGANIC MANURE AND CHEMICAL NPK FERTILIZER ON THE GROWTH AND YIELD PARAMETERS OF DILL (*ANETHUM GRAVEOLENS* L.)

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Application of organic fertilizer such as vermicompost and nitrogen fixing bacteria has led to a decrease in the use of chemical fertilizers and has provided high quality products free of harmful agrochemicals for human safety.[1] For that reasons, the main objective of our research was to determine efficiency two commercial biofertilizers (Slavol, Bactofil B-10), two organic manures (specific poultry manure Royal Ofert granules and compost from *Lumbricus rubellus* i.e. vermicompost) and chemical fertilizers (NPK) on growth parameters of dill. The experiment was conducted during spring/summer 2012 in tree locality in Serbia. A field experiments arranged in a randomized complete blocks designed with four replications, and dill seed (local cultivar) were sown in continuous rows 35 cm apart. During the experiments no herbicides, insecticides or fungicides were applied. The obtained data showed that applying bioferilizers, organic manure and chemical NPK fertilizer did not influence on plant height, number of umbel per plant, fruit yield per plant and dry herb weight. But, it can be concluded that application of all investigated types of fertilizers had statistically significant influence on weight of 1000 seeds. The statistically lowest seed mass was obtained from plants which fertilized by chemical NPK ferilizer.

[1]Darzi M.T. (2012): Influence of organic fertilizer and biostimulant on the growth and biomass of dill (*Anethum graveolens*). *International Journal of Agriculture and Crop Sciences*, 3-4:98-102.

PP-43

EFFECT OF WATER DEFICIENCY AND NITROGEN APPLICATION ON *WITHANIA SOMNIFERA* L. EXTRACTS AND ROOT YIELD IN TABRIZ REGION

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In order to study the effects of water deficiency stress on *Withania somnifera*L. extracts and root yield an experiment was performed in 2010. Field experiment was carried out by a split plot design with 3 replications. Main plot were in 2 levels (complete irrigation and water deficiency when 50% flowering until seed bulking stage and after that irrigation every 3 weeks), and sub plots were 2 levels (control without N application, nitrogen application up to 150 kg/ha, in two stage: 50% flowering and seed bulking). Results of Anova and GC-MS showed that irrigation significantly effect on root fresh and dry weight, TKW, Glycine, vitasomine, nicotine and Withaferin A[1] and so nitrogen application effect on root fresh and dry weight tryptophane, nicotine, vitasomine, tropine, and Withaferin A[2] was significant. Interaction of irrigation and nitrogen on plant traits such as plant height, root dry weight, Tryptophane, Nicotine, Tropine was significant.
Results showed that in Tabriz region with drought and poor soil, every water and fertilizer deficiency led to decrease in yield and quality of *Withaniasomnifera*L.

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PP-44

AGRICULTURAL AND CHEMICAL PROPERTIES OF SESAME CULTIVARS (*SESAMUM INDICUM* L.) UNDER DROUGHT CONDITIONS

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Effects of water deficit on vegetative growth, oil yield, fatty acid composition of two sesame cultivars (Osmanlı and Muganlı-57 cv.) were investigated. Plants were treated with different levels of water deficit; control (C), moderate water deficit (MWD) and severe water deficit (SWD). Control and MWD irrigations showed better agronomic performances for both cultivars with respect to the plant height. In addition, we noted that water limitations led to substantial decrease in seed number per capsule under MWD, and SWD for Muganlı-57 cv. but plants of MWD level behaved better than the control ones for Osmanlıcv. Moreover, capsule number decreased with deficit treatments for Osmanlı cv. and the deleterious impact on capsule number was more pronounced under SWD for both cultivars in addition to the no adverse effects of drought on capsule number for Muganlı-57 cv. In addition, the large proportions of monounsaturated fatty acids (MUFAs) and polyunsaturated fatty acids (PUFAs) increased with deficiency. Water deficit decreased significantly proportion of major saturated fatty acid (SFAs) for Osmanlı cv. the proportion of MUFAs increased with deficiency. PUFAs were not significantly influenced while SFAs reduced under drought for Muganlı-57 cv. Overall; these results revealed that deficit irrigations tend to increase the degree of unsaturation of seeds.

PP-45

AN ASSESMENT OF TOLERANCE TO SALINITY OF SOME OLIVE CULTIVARS BASED ON PHENOLIC CONTENTS, PROTEIN AND CHLOROPHYLL CONTENTS

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In this study, the effects of different sodium chloride (NaCl) salinity levels (0, 75, and 150 mM) on physiological and biochemical parameters of *Olea europaea* L. cultivars (Gemlik, KilisYağlık, and Nizip Yağlık) were investigated. The highest total chlorophyll content was obtained under 75 mM salinity level while the lowest one was determined under 150 mM salinity. With respect to the cultivars, the highest chlorophyll content was found to be in KilisYağlık cv. whereas the lowest value was obtained inGemlik. There were no statistically significant differences concerned with total phenolic and protein content based on the different salinity doses. However; flavonoid content was determined to be highest under 150 mM with 50,13 mg/g QE but the lowest value was 42, 72 mg/g QE under 75 mM salinity level. Regarding with cultivars, total flavonoid content was ascertained for Gemlik cv. while it was lowest for KilisYağlık cv.Accordingly, it could be deduced that salinity decreased the chlorophyll content and cultivars showed different reactions against salinity and its doses. In addition, it influenced total phenolics and protein content in small quantities except thatflavonoids were differently synthesized against to salinity levels.

PP-46

EFFECT OF THE AMINO ACIDS PHENYLALANINE, ORNITHINE AND TRYPTOPHAN ON GROWTH AND CHEMICAL CONSTITUENTS OF ROSEMARY

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Rosemary (*Rosmarinus officinalis* L.), is a very important medicinal and aromatic plant, native to the Mediterranean region. It is a member of the mint family Lamiaceae, which includes many other herbs. In the present work, factorial experiments arranged in completely randomized design were conducted during 2011-2012 at the Jordan University of Science and Technology campus in northern Jordan, to evaluate the effect of different concentrations of the three amino acids phenylalanine, tryptophan, and ornithine, on growth and quality parameters of rosemary plant in comparison to chemical fertilizers (NPK) application. Determination of growth parameters were carried out at two destructive stages, the first one at the vegetative and the second one at full flowering stage. Fresh and dry weight of leaves, stems and shoot, the total nitrogen in the leaves1 and number of branches did not increased significantly by amino acids spraying, whereas application of NPK were significantly higher than all treatment studied. On the contrary, oil percentages were significantly increased as a result of spraying of the amino acids.

In conclusion, application of the amino acids phenylalanine, tryptophan, and ornithine, might not improve rosemary yield but it raised the oil content of rosemary plants.

[1]AOAC, 1970. Official Method of Analysis. 11th Edn. Association of Official Analytical Chemists, Washington, DC

PP-47

VARIATION OF ESSENTIAL OILS IN TUNISIAN *PANCRATIUM MARITIMUM* L.

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Thirteen Tunisian natural populations of *Pancratium maritimum* (Amaryllidaceae), collected in different island and coast habitats were assessed for their essential oil composition using GC-MS.Eighteen compounds representing 77.73% of the total oil isolated from mature entire flowers were identified. The major components were hepacosane (12.07%), hexadecanic acid (11.91%), benzyl benzoate (8.17%) and hexacosane (7.28%). However, the amount of the majority of compounds differed significantly among populations. Four population groupings were revealed based on Principal Component Analysis using all compounds for all populations. Both mainland and island populations segregate in separate groups including each a number of different populations corresponding to specific chemotypes. The population groupings occurred without evident relationship to the geographical location. The high heterogeneity among populations even at a low scale space seems to be related rather to the population size and the level of habitat destruction than to geographical distance. It should be interpreted as a result of their recent fragmentation. *In situ*and *ex situ* conservation strategies based on the variation ofboth minor and major compounds and the level of degradation of sites should be urgently considered to preserve populations mostly those with a low size to ensure their durable use.

A. Sanaa, A. Boulila, A. Bejaoui, M. Boussaïd, Najeh BenFadhel: Variation of the chemical composition of floral volatiles in endangered Tunisian *Pancratium maritimum* L. populations (Amaryllidaceae).*industrial Crops and Products*, 40, 312-317, 2012.

PP-48

INVESTIGATION OF INPUT ENERGY EFFICIENCY IN MEDICINAL PLANT OF JUJUBE TREE (*ZIZYPHUS JUJUBA* MILL.) FARMING IN SOUTH KHORASAN REGION

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Energy is one of important debates in agriculture ecology and for this reason the ratio of output and input energy in different agriculture ecosystems has been calculated. If one can reduce input energy level into farms through the indices like poisons, fertilization, tractor energy and lab our force. In addition to the net income of the farmers, this issue would play a significant role in preserving farm ecosystem from pollution and wrecker factors. For this reason energy balance sheet in Jujube Tree farms as well as input and output energy in 2011-2012 researched by distributing and questionnaire among farmers South Khorasan region. Then, the input energy amount into farms via energy-consuming factors, mentioned above, with regard to special coefficients was computed. Energy was computed on the basis of dry product function, chemical compound and its content as well. In this investigation, my colleague and I evaluated the level of stored energy 14725850/4 kcal *per* hectare and level of output energy 1800000 kcal *per* hectare. Energy efficiency on the basis of dry product function 0.11 were estimated that the greatest part of energy depended on irrigation and nitrate fertilizer that with right management may reduce consumptive energy in farm and nitrate fertilizer and, on the other hand, to increase balance sheet.

PP-49

GEOGRAPHICAL INFORMATION SYSTEM (GIS)-BASED EVALUATION OF GEOGRAPHICAL FACTOR EFFECTS ON FATTY ACID COMPOSITION AND OIL YIELD OF *OLEA EUROPEA* L.

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In the digital age that we live in, Geographical Information System (GIS) has a great concerned system of managing, analyzing, and displaying all forms of geographically referenced information. Since the disciplines of plant sciences and geography are intertwined, GIS has been increasingly performed to analyze the influence of location on the growth and distribution of plants. In this context, slope, lithology, geology, aspect and digital elevation model maps of sampling sites were composed. Herein, the relatively experimental laboratory results were discussed applying the power of new technologies with the ever-increasing vast of geospatially-based data. Fatty acid changes, essential to human health, were under discussion with the extent of varying geological and environmental factors in the present work. In conclusion, a weak correlation was obtained among slope effects on major fatty acids, and linoleic acid in the oil was not significantly found to be affected. Among the tested parameters, oil yield was more pronounced with varying slope percentage. There was a higher correlation with respect to the elevation than slope effect concerned with fatty acid components. Concerned with aspect and lithology, higher oil yields and fatty acid components were obtained in the south and southeast aspect and basaltic soils.

PP-50

PHENOLOGICAL OBSERVATIONS ON *EX-SITU* COLLECTION OF SERPENTINE PLANTS ON THE TERRITORY OF THE BOTANICAL GARDEN, BULGARIAN ACADEMY OF SCIENCES

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An *ex-situ* collection of serpentine plants was made in the Botanical Garden at the Bulgarian Academy of Sciences in Sofia. Fifty-three taxa of higher plants of the Bulgarian serpentine flora, collected mainly from the Eastern Rhodopi Mts, are grown on a rocky place of 25 m^2 and 2 m in height. The total number of individuals collected for transplantation is 103, belonging to 26 plant families distributed in the following categories: 1) endemics narrowly restricted to serpentine; 2) local indicator species showing high fidelity but not restricted to serpentine; 3) wide-ranging species that occur in a variety of habitats underlain by both normal (zonal) and ultrabasic soils, 4) medicinal plants. A comparison of the flowering periods *in-situ* and *ex-situ* for a part of transplanted taxons was made. The plants showed good adaptation capabilities. The recently described endemics *Onosma pavlovae* Petrova & Kit Tan[1] and *Aethionema rhodopaeum* D. Pavlova[2] from serpentine terrains are thriving well. The same conclusion for the group of medicinal plants and the Ni-hyperaccumulators can be made. The Ni-level, in *ex-situ* grown medicinal plants was measured.

[1]Pavlova, D. 2009. *Onosma bulgarica* sp. nov. (*Boraginaceae–Lithospermeae*) found on serpentine in Bulgaria. – Nordic J Bot., 27 (3): 216–221.
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PP-51

BACTERIAL SPECIES ISOLATED FROM SIX SPECIES OF MEDICINAL PLANTS COLLECTED FROM SOUTH AFRICA

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Interior tissues of *Sanseviera hyacinthoides*, *Aloe arborensces*, *A. chabaudii*, *A. aculeate*, *Monsonia burkeana* and *Athrixia phylicoides* were excised and from these tissues bacteria were isolated under sterile conditions. For each plant species four plants were collected and twenty plants were collected for *A. arborensces*. The bacteria were identified using MALDI-TOF. *Bacillus cereus*, *B. pumilus*,*B. weihemstephonensis*,*Staphylococcus pasteuri*, *S. epidermidis*and *Arthrobacter sulfomivoraus* were the only bacterial species identified from *S. hyacinthoides*. *Staphylococcus warseri*, *Accinetobactera genimofrecies*, *Kocuriarosea* and an *Anaerococcus* spp. were the only species identified from *A. arborensces*. *Arthrobacteria arddeyemis* was the only bacterial species isolated from *A. chabaudii*. No bacterial species were identified from *A. aculeate*. *Bulkmotediraseminolis* was the only species identified from *A. phylicoides*, *Bacillus pumilus*, *B.simplex*, *B. muralis*, *B. cereus*, *B. neihemstephanensis*, *B. subtilis*, *B. staphyloecens*, *B. huciferensis*,*Lysimibacillus fusiformis*, *Anaerococcus* spp., *Acichiphihesi* spp., *Streptomyces griseus*, *Microbacterium leticum*, *Anaericoccus streptomyces*, *Anaerococcus bacillus*, *Pseudomonas* spp., *Thonera phenycocertia*, *Streptomyces* spp., *Viridibacillus seidi*, *Lactobacillus* spp., *Clostridium* spp., *Enterobacter* spp., *Paemi bacillus lantus*, *Kocuria polaris*, *Microbacterium saperdue* were the only species identified from *M. burkeana*. Further work will include additional surveys of endophytic bacteria from the same plant species growing in different localities in different seasons. Additionally, this will confirm the identity of the isolated bacteria using sequence analysis of the 16S rRNA gene.

PP-52

THE YIELD AND QUALITY CHARACTERISTICS OF SOME THYME (*THYMBRA SPICATA* L.) POPULATIONS

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Thymbra spicata L. belonging to the Lamiaceae family, which contains a variety of aromatic compounds, is a thyme-like plant widely grown in Turkey. The aim of this study was to research yield and quality characters, with a special emphasis of cultivation of the populations of the *Thymbra spicata* L. which were collected from three locations of Kazdaglari in Turkey. Yield characteristics of plant height, the rations of fresh herb, drug herb and drug leaf and quality characteristics of the ratio of essential oil and essential oil composition have been examined in Aydın ecological conditions. The results of the research showed that the observed plant height ranged from 29.8 cm to 31.7 cm. The highest values have been obtained for fresh herb yield as 58 g/plant, for drug herb yield as 23 g/plant, and for the ratio of essential oil as 5.62 %. The main component of the essential oil was carvacrol (80.77%).

PP-53

THE IMPORTANCE MEDICINAL AND FOOD IN *AMARANTHUS RETROFLEXUSE*

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Amaranthus retroflexuse, belonging to the family Amaranthaceae, is an annual or perennial herb, probably of America origin and found throughout India in roadsides, waste place and fields.The plant possess many medicinal properties including inflammation, emollient vermifuge, febrifuge, diuretic, antidiabetic, galactagogue, used as remedy for snake bite and scorpion sting. It is commonly known as red-root amaranth, red-root pegweed and common tumbleweed. In this study we examine different soils compound for growing, like light (sandy), medium (loamy), heavy (clay), neutral and basic (alkaline) soils. It cannot grow in the shade and requires moist soil, we implant the plants in loamy (20%), heavy (20%), and sandy (20%), leaves soil (40%). When they are grown on nitrogen-rich soils they are known to concentrate nitrates in the leaves. We Analysis of the leafy vegetable compound and measurement some factor in percent like Moisture: 79.6%, Protein: 4.8%, Fibre: 7.2%, and Vitamin C: 167mg , Calcium: 45 mg and we analysis some amino acids like Arginine: 3.64,Histidine: 2.1, Lysine: 3.68, Methionine: 1.2 , Phenylalanine: 3.94.1,2

[1]Castetter,E.; Opler, M.The Ethnobiology of the Chiricahua and Mescalero Apache. A. The Use of Plants for Foods, Beverages, and Narcotics. Ethnobiological Studies in the American Southwest.2002, Vol III, 245-253.
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PP-54

EFFECT OF BIOLOGICALFERTILIZERAPPLICATIONS ON THE GROWTH AND MACRO- AND MICRO-NUTRIENT CONCENTRATIONS OF TEA (*CAMELLIA SINENSIS* L.)

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The objective of this study was to evaluate possible effects of mineral fertilizer (NPK), and seven N_2-fixing and/or P-solubilizing andsiderophore-producing microorganism based bio-fertilizers (BFI: *Bacillus subtilis* RC63+*Bacillus megaterium* RC07+*Pseudomonas fluorescens* RC77; BFII: *Paenibacillus polymyxa* 28/3+*Chryseobacterium indologenes* 21/5+*Burkholderia pyrrocinia* 64/4, BFIII: *Pseudomonas putida* RC535+*Stenotrophomonas acidaminiphila* RC47+*Rhodococcus rhodochrous* RC669; BFIV: *Pseudomonas fluorescens* RC481+ *Paenibacillus polymyxa* RC283+*Paenibacillus azotofixans* RC662; BFV:*Bacillus subtilis* RC521+*Bacillus megaterium* RC07+*Pseudomonas fluorescens* RC77; BFVI: *Lysobacter enzymogenes* 12/5+*Bacillus subtilis* 2/8+*Pseudomonas putida* RC06, BFVII: *Bacillus subtilis* RC11+*Bacillus megaterium* RC07+*Pseudomonas putida* RC06) growth andnutrient contents of tea. Field experiments were conducted in a completely randomized block design with four replicates (each having twelve sapling).Liquid bio-fertilizers were applied to the tea seedlings by injecting methods[1]. Bio-fertilizers application significantly increased macro- and micro-nutrient concentrations in tea leaves.On average, application of NPK, BFI, BFII, BFIII, BFIV, BFV, BFVI and BFVII gave increases over control respectively of by 21.0, 19.6, 1.8, 17.1, 16.4, 18.2, 7.2 and 6.2% in trunk diameter, by 36.9, 33.8, 8.5, 8.7, 32.8, 33.6, 25.2 and 16.8% in shoot+leaf weight and by 34.0, 35.5, 7.6, 9.4, 24.8, 39.7, 13.5 and 14.1% in fresh leaf weight. Tested bio-fertilizers had a potential to be used in sustainable and organic tea production.

[1]R. Çakmakçı, M.F. Dönmez, Y. Ertürk, M. Erat, A. Haznedar, R. Sekban: Diversity and metabolic potential of culturable bacteria from the rhizosphere of Turkish tea grown in acidic soils. Plant and Soil, 332, 299-318, 2010.

PP-55

VARIATION OF ESSENTIAL OIL YIELD AND COMPOSITION OF *SATUREJA SPICIGERA* (C. KOCH) BOISS. AERIAL PARTS DURING DIFFERENT STAGES OF PLANT GROWTH

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Water-distilled essential oils from air-dried aerial parts of *Satureja spicigera* (C. Koch) Boiss were evaluated in response at seven different phenologicalphases (vegetative, budding, beginning of flowering, 40–60% flowering, full flowering, beginning of seed formation and advance fruit maturation). The oil was analyzed by a combination of GC and GC/MS[1]. Thirty-two compounds representing 96.21-99.99% of oils were characterized. The yield of oil ranged from 1.1% to 2.1%; the major components were thymol (6.11 to 36.70%) and carvacrol (7.53 to 38.26), followed by the biogenetic precursors p-cymene (3.61 to 17.75%). Carvacrol methyl ether (8.86 to 16.16%), γ-terpinene (0.11 to 34.88%), α-thujene (0.20 to 7.74%), α-terpinene (0.19 to 8.44%), caryophyllene oxide (0.0 to 4.25%), β-caryophyllene (0.16 to 4.17%), β-myrcene (0.06 to 3.35%), α-pinene (0.0 to 3.34%), and (E)- β-ocimene (0.0 to 2.93%) were identified as other main constituents. In conclusion, the oil yield and thymol content from *Satureja spicigera* was lowest at the vegetative stand period, increasing during initial flowering until it reached its maximum value at the full flowering period, after which it progressively decreased. The best time for harvesting is the full flowering period, if the objective is a high content in thymol and yield in essential oil.

[1]R.P. Adams: Identification of Essential Oil Components by Gas Chromatography/Mass Spectrometry, Allured Publishing Corporation: Carol Stream, 4th Edition, Illinois, USA, 2007.

PP-56

GENETIC DIVERSITY OF TURKISH ACCESSIONS OF *VITEX AGNUS-CASTUS* BASED ON RAPD MARKERS

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Vitex agnus-castus L. (Verbenaceae) is commonly named chaste tree, monk's pepper or vitex. It is a small tree or shrub, grown widely in Asia, Europe, especially in the Mediterranean regionsand in North America. Vitex is a medicinal plant especially used in treatment of pre-menstrual syndrome (PMS), menstrual cycle irregularitiesand insufficient lactation. In Anatolian folk medicine, *Vitexagnus-castus* is used as diuretic, digestive, antifungal and also against anxiety, early birth and stomachache. In additionchaste tree is a kind of dye and ornamental plant and used in basket making and also as a source of honey. Genetic diversity can play a key role especially in natural plant populations. In this study, we obtained the first data on genetic diversity and structure in*Vitexagnus-castus*accessions by using of random amplified polymorphic DNA (RAPD) markers to detect genetic polymorphism from 12 *Vitex agnus-castus* accession. Plant materials were collected from geographic region of Yunt Mountain, Turkey in August 2012. The 20 random primers were used and 9 of them were detected a total of 70scorablebands, of which 31(44%) were polymorphic. The vitex accessions were divided into two main groups by clustering on the basis of RAPD markers. Jaccard's similarity indices based on RAPD profiles were subjected to UPGMA cluster analysis. Genetic similarity values among the vitex accessions ranged between 0.75 and 0.93 which was show of a low level of genetic variation. This indicates the need for detailed studies on the populations of different regions.

PP-57

THE ESSENTIAL OIL COMPONENTS OF *CYCLOTRICHIUM ORIGANIFOLIUM* (LABILL.) MANDEN. ET SCHENG. (LAMIACEAE) CULTIVATED UNDER ANKARA ECOLOGICAL CONDITIONS

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Cyclotrichium is represented by the following 6 species in the Flora of Turkey[1-3]. *Cyclotrichium origanifolium* (Labill.) Manden. et Scheng. (Lamiaceae) is anendemic species in Turkey[4]. Plants, received from Ankara University, Agronomy Department were reproduced and planted at complete randomized block design with four replications during 2011 and 2012. Two cuttings a year were takenfortwo successive years. The essential oils obtained by hydrodistillation from *Cyclotrichium origanifolium* were analyzed by gas chromatography (GC) and gas chromatography-mass spectrometry (GC-MS). The mainoil components from four cuttings wereas follows: *trans*-piperitone oxide 27.8-33.7 %, piperitone oxide 23.6-34.0 %, limonene 13.6-19.5% and terpinene-4-ol 3.0-5.8%.

[1]Leblebici E., *Cyclotrichium* (Boiss.) Manden. et Scheng. In: P.H. Davis (Ed.) Flora of Turkey and East Aegean Islands, Vol. 7, 346-349, Edinburgh University Press, Edinburgh(1982).
[2]Davis, P.H., Mill, R.R., Tan, K., eds. Flora of Turkey and The East Aegean Islands, University Press, Edinburgh 10: 208-209 (1988).
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[4]Başer, K.H.C., Kırımer, N., Kürkçüoğlu, M., Özek, T. ve G. Tümen, "The Essential Oil of *Cyclotrichium origanifolium* (Labill.) Manden. et Scheng. from Turkey", *J.Essent.Oil Res.*, 8, 569-570 (1996).

PP-58

DETERMINING OF AGRONOMIC AND QUALITY CHARACTERISTICS OF SAGE (*SALVIA* SPP.) SPECIES IN THE FLORA OF ANTALYA

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The objectives of this study were to determine some agronomic and quality traits of Sage (*Salvia* spp.) species collected from the flora of Antalya. The present study was conducted at the experiment field of Batı Akdeniz Research Institute in Antalya with three replicates randomized complete plot design. Essential oil components were determined before inflorescences, during inflorescences and after inflorescences of species grown in wild and field conditions. They were analyzed using Gas Chromotagraphy (GC). In *Salvia* species, the highest mean values of plant height (95.2 cm) at *Salvia tomentosa* (2), branch number (22.3) at *Salvia dichroantha*, 1763.3 kg/da green herbage yield, 676 kg/da dry herbage yield and 9.9 l/da essential oil yield were obtained from *Salvia sclerea*, highest essential oil rate in wild 1.6% at *Salvia virgata* and field experiment 2.7% at *Salvia fruticosa* at flores stage were obtained. Essential oil and components showed great variations within the species as well.

PP-59

EFFECT OF NITROGEN AND BENZYL ADENINE ON PHYSICAL AND CHEMICAL CHARACTERISTICS OF *ALOE BARBADENSIS*

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Aloe vera **(***Aloe barbadensis* Miller**)** one of most important medicinal plants cultivation in recent years has been considered. In order to study of nitrogen and benzyl adenine purine effect on physical and chemical characteristics of Aloe Vera**,** factorial experimental based on randomized complete block design carry out in greenhouse of Agriculture Faculty of Tarbiat Modares University with 4 replications. Results showed that nitrogen level had significant effect on gel PH, leaf firmness, Total dissolved solids (TDS), and solid to liquid phase.Increasing of N levels in 1000 mg, resulted in significantly higher ratio gel pH and total dissolved solids and decreased the leaf firmness and solid to liquid phaseof ratio. The benzyl adenine purine was significant effect on Total dissolved solids compounds. The application benzyl adenine purine levels increased these compounds. Interaction effect between nitrogen and purine adenine was significant on gel pH, powder yield, Total dissolved solids and solid to liquid phaseof ratio. Application nitrogen and benzyl adenine purine together showed that the highest of gel pH, total dissolved solids and gel powder yield and solids and decreased the liquid phaseof ratio.

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PP-60

TAXONOMIC AND PHARMACOLOGICAL EVALUATION OF SOME HERBAL DRUGS OF PUNJAB, PAKISTAN

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The present study was conducted with the aim to provide a comprehensive account on the herbal drug authentication by using classical taxonomic parameters as well as pharmacognostic approach. In the utilization of herbal medicine, the key issue is their assurance of quality, purity and effectiveness. However, these herbal drugs face the complication in identification, taxonomic characterization and their authentication. In the present work, the taxonomic characterization was done by morphological, anatomical, palynological, organoleptic, ultraviolet and infrared analysis. The pharmacognostic evaluation was carried out by using microscopic, macroscopic and phytochemical analysis. A great diversity in anatomical features was perceived among these herbal species, as multi-celled trichomes were located in *Cassia angustifolia* and *Cassia occidentalis* while absent in *Calendula officinalis.* Palynological examination had revealed the highest pollen fertility in *Parthenium integrifolium* whereas lowest value was observed in *Calendula officinalis*. Moreover UV, IR, organoleptic and chemical studies proved to be vital taxonomic parameter which facilitates in recognition and authentication of various medicinal plant species native to Punjab. Remarkable achievement of this study is the addition of four new species in flora of Pakistan 1990, as these taxa are not mentioned there. These include *Calendula officinalis, Parthenium integrifolium*and *Silybum eburneum* and *Dalbergia obovata,* although all these selected species arecommon plants in Pakistan but the present work gave a comprehensive account on these species with multiple parameters, which is not in the published form already.

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PP-61

EFFECT OF DRYING AND RAW MATERIALS SIZE OF *MENTHA PIPERITAE* AND *MENTHA ARVENSIS* HERBS ON YIELD OF ESSENTIAL OIL

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The volatile oil content and its quantitative and qualitative composition depend on the origin of the drug, the climate and ontogenic stage of the plant, the time of harvest, the storage conditions of the leaf drug as well as the methods of processing. The aim of this study was to examine the effects of method of drying and raw material size of *Mentha piperitae* and *Mentha arvensis* herbs on essential oil yield. The hydro-distillation method, according to the Pharmacopoeia Eur. 6, was used. The period of drying was 0 to 7 days. One part of the herbs was dried in the shade, while the second part in the sun. Every day for 7 days, the % moisture and % of oil were measured. Whole herbs and chopped herbs were used for hydro-distillation. The results showed that the drying of herbs in shade yields a higher content than drying in sun. The yield of essential oil in both types of herbs was higher in shade-dried herbs. The yield of essential oil in chopped herbs was higher than in whole herbs. On average, *Mentha piperitae* contains 3%, and *Mentha arvensis* 1% essential oil. The method of drying and raw material size of herbs showed an impact on the yield of essential oil.

PP-62

THE MORPHOLOGICAL AND ANATOMICAL PROPERTIES OF PHYTOESTROGEN PLANT *TRIFOLIUM PRATENSE* L. (FABACEAE)

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Trifolium pretense L. (Fabaceae) is represented with 101 species and 130taxon in Turkey. *T. pratense i*s named as''çayır üçgülü, kırmızı üçgül'' in Anatolia. This species is used as medicinal and nectarius plant. *T. pratense* shows high phytoestrogen activities. Several studies have shown that phytoestrogens, depending on their chemical structure, have estrogenic / antiestrogenic, antioxidant, antiproliferative, anticarcinogenic, antianjiogenetic features. These subtances have a protective effect againstsome diseases as menopause related symptoms, coronary heart diseases and some cancers[1]. Anatomical and morphological structures should be known better for the evaluation of medicinal plants.In the present work, we have aimed to investigate morphological and anatomical properties of *T. pratense*growing in Turkey.Samples for anatomical studies were fixed in 70% alcohol. Cross and surface sections were prepared from the stored plant materials. Cross and surface sections of root, stem and leaves were excised by hand and they were covered with glycerin-gelatin. In conclusion, the anatomical properties of root, stem and leaf were determined.

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PP-63

THE MICROMORPHOLOGICAL PROPERTIES OF PHYTOESTROGEN PLANT *TRIFOLIUM PRATENSE* L. (FABACEAE)

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Trifolium pratense L. (Fabaceae) is represented with 101 species and 130 taxa in Turkey. *T. pratense*is named as''çayır üçgülü, kırmızı üçgül'' in Anatolia. This species is used as medicinal and nectarius plant. *T. pratense* shows high phytoestrogen activities. Phytoestrogens have been used to treat many diseases as menopause related symptoms, coronary heart and vascular diseases, osteoporosis and some cancers[1]. The scanning electron microscope (SEM) is an ideal instrument for examining the surfaces. In this study, we have aimed to investigate adaxial and abaxial surfaces of *T. pratense* by SEM.For SEM, dried leaf, seed and fruit samples were mounted on stubs using double-sided adhesive tape. Samples were coated with 12.5-15 nm of gold. Coated samples were examined and photographed with a JMS-6060LV Scanning Electron Microscope. In conclusion, the micromorphological properties of leaves, seed and fruit surfaces were determined.

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PP-64

USE OF PLANT ESSENTIAL OIL TO CONTROL BLUE MOLD DECAY IN *CITRUS*

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To control of postharvest decay, chemical fungicides are applied on the surface of the fruits. However the upsurges in public concern regarding contamination of perishables with fungicidal residues and the resistance in the pathogenic population are creating problems[1]. Overall various assays have confirmed potential of the tested essential oils for their antifungal activities that varied with type and concentration of the oils used. The objective of this study was to evaluate (*in vitro* and *in vivo*) antifungal activities of the essential oils obtained from cumin seeds, clove buds and cinnamon bark against *Penicillium italicum* Whemer, causal agent of blue mold disease in citrus fruit. Selected essential oils were checked in concentrations of 3, 6, 12, 24 and 48µl/ml for their ability to inhibit the mycelial growth of the test fungi. The *in vitro* study revealed that the essential oils of cumin and clove have the potential to inhibit mycelial growth of test fungi completely at concentrations of 12 and 48µl/ml, respectively. Essential oil of cinnamon, however failed to completely inhibit the mycelial growth even at maximum used concentration of 48µl/ml. *In vivo* assays also support these results. The studies were also extended for the chemical analyses of these essential oils.

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PP-65

DETERMINATION OF GENOTYPES WIND PRICKLY PEAR (*OPUNTIA FICUS-INDICA*) GROWN IN MERSIN

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Prickly pear (*Opuntia ficus-indica* (L.) Mill) growing is no cultural in Turkey. Prickly pear specially grows in the Mediterranean region. Prickly pears are used in folk medicine and as a border plant. This study was conducted to select promising prickly pear genotypes at Mersin (Mediterranean region). 34 amount prickly pear genotypes were selected form between 2000 amount genotypes on 20-30 August 2011. Selected types, evaluated and mean values of first year, fruit weight was between 109.00 to 167.06 g, fruit length 63.27 to 91.23 mm, fruit width 54.15 to 62.01 mm, total soluble solids % (TSS) 4.2 to 8.9. In the end of the study, 7 genotypes were selected and promising.

PP-66

BIODIVERSITY IN IRANIAN POMEGRANATE: CYTOLOGICAL AND MOLECULAR ANALYSES

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Pomegranate (*Punica granatum* L.) is one of oldest fruit trees known to human (4000 and 3000 BC). Pomegranate has been known with health-beneficial effects with derived products rich in polyphenols and organic acids, used also as ornamental tree and fruit tree with ecological, economical, and sociological benefits. The present study considers cytology, RAPD, ISSR and SSR markers analyses of 36 pomegranate cultivars of the country. Cytological results showed that pomegranate cultivars had $2n=2x=16$ chromosome number and formed mainly bivalents in metaphase of meiosis I. Four cultivars produced unreduced pollen grains. Combined data of three markers studied showed higher genetic diversity than two ISSR and RAPD markers and less than SSR loci. UPGMA analysis with RAPD, ISSR and SSR pooled data (total 235 amplicons) could discriminate pomegranate genotypes studied. PCA ordination based on two first components confirmed cluster analysis using combined molecular data. Meanwhile homonymous, synonymous and/or mislabeling genotypes were identified using three molecular markers. In total using different DNA markers with different nature could help to differentiation of pomegranate genotypes and evaluate their genetic variations. Combined molecular data can bring more information and clear discrimination of genotypes.

PP-67

IN VITRO ANTIFUNGAL ACTIVITY OF THREE SAUDI PLANT EXTRACTS AGAINST SOME PHYTOPATHOGENIC FUNGI

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Pea (*Pisum sativum*) is one of the most important leguminous crops in many countries including Saudi Arabia. Root rot is a major soil borne disease of pea and is often considered to be the major limiting factor in production of this plant[1]. The objective of the performed research work was to investigate the antifungal activity of ethanol-water extracts of cinnamon (*Cinnamomum verum*)**,** anise (*Pimpinella anisum*), black seed (*Nigella sativa***)** and clove (*Syzygium aromaticum*) *in vitro* on growth of *R. solani* as well as evaluate the protective effects of the most effective one against the fungal invasion of pea seeds and seedlings under greenhouse conditions.The antifungal activities of ethanolic extracts of three Saudi plants; camel thorn (*Alhagi maurorum* Medic.), caper (*Capparis spinosa* L.), and pomegranate (*Punica granatum* L.) were investigated *in vitro* against *Alternaria alternata, Fusarium oxysporum, Phoma destructiva, Rhizoctonia solani,* and *Sclerotium rolfsii* at concentrations of 0, 3, 6, and 9% (v/v). All tested plant extracts; seeds, roots, and rinds had different degrees of antifungal activity against the tested fungi. When compared with the control, the highest antifungal activity was recorded for camel thorn seeds extract at a concentration of 9%, while, pomegranate rinds extract at 9% came in second. Camel thorn rinds extract came in last even when used at a high concentration. The ethanolic extract of camel thorn seeds may be recommended as a potent bio-fungicide. Extensive studies should be undertaken for the ethanolic extract of camel thorn seeds as a strong antifungal agent against fungal plant diseases.

[1]Grünwald N.J., Chen W., Larsen R.C. 2004. Pea diseases and their management. p. 301–331. In: "Disease Diagnosis and Management of Fruits and Vegetables" (S.A.M.H Naqvi, K.G. Mukerji, eds.). Kluwer Academic Publishers, Dordrecht, The Netherlands, 704 pp.

PP-68

IN VITRO ANTIMICROBIAL AND ANTIOXIDANT POTENTIAL OF VARIOUS EXTRACTS OF *HYOSCYAMUS ALBUS* L. (SOLANACEAE) AND *UMBILICUS RUPESTRIS* L. (CRASSULACEAE) LEAVES

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Our objectives were to investigate the antioxidant activity by the means of two methods: the β-carotene bleaching method and DPPH assay, wich The DPPH free radical method is easy, fast and significant to examine the antioxydant activity of a specific compound or extracts[1]. As well as testing the antibacterial activity by the Agar-well diffusion method and the microdilution method with liquid medium of the polar extracts of the leaves of *H. albus* and *U. rupestris*, respectively. The quantitative analysis are showed that the heighst content of total phenolic was concentrated in the butanolic extract (EBut) of *H. albus* and in the second level the methanolic extract (EMe) of *U. rupestris*. The content of flavonoids showed the presence of these compounds in the all extracts from the two plants. In the β-carotene bleaching test, the EBut of *H. albus* displayed highest antioxidant activity (76.00 %) and the EMe extract with a radical-scavenging activity (72.97%). On the other hand, the quantitative evaluation of the antiradical activity towards DPPH showed that the EMe of *U. rupestris* is the most active (IC50 = 35.33 ± 0.136 µg/ml) followed by the EBut (IC_{50} = 75.19 ± 0.211 µg/ml) of *H. albus*.These extracts showed theantimicrobial activities different and the CMI were determined starting from the most active extracts in gelose medium.

[1]A .Doss, M.Pugalenth, D Rajendrakumaran, V. Vadivel: Phenols, flavonoids and antioxidant activity of underutilized legume seeds. *Asian Journal of Experimental Biological Sciences*.3, 700-705, 2010.

PP-69

PHYTOCHEMICAL SCREENING AND ANTIMICROBIAL ACTIVITIES OF ESSENTIAL OIL AND CRUDE EXTRACTS FROM *ARTEMISIA HERBA-ALBA* ASOO GROWING WILD IN BECHAR, SOUTH WEST OF ALGERIA

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The crude extracts (aqueous, ethanolic) and hydrodistilled essential oil from the aerial parts of *Artemisia herba-alba Asoo* were investigated for their antimicrobial activities against six strains of bacteria and three strains of fungi. The antimicrobial activity of the extracts and essential oil was determined by disc diffusion method and the minimum inhibitory concentration (MIC) determination methods. Phytochemical screening of the plants showed the presence of flavonoids, terpenoids, saponins, tannins and reducing sugars. *A. herba-alba Asoo* did not contain cardiac glycosides and alkaloids. Essential oil and extracts showed varied levels of antimicrobial activity against one or more test bacteria and fungi. The essential oil of *A. herba-alba Asoo* has an antimicrobial activity against all the investigated strains except *Bacillus cereus* and *Listeria monocytogenes*. The diameters of growth inhibition zone ranging from 11mm - 20 mm for bacteria (including the diameter of the disc-6 mm) and from 13.5 mm to 26 mm for fungi. The highest inhibition zone values observed against *Aspergillus niger* (26 mm) and *Staphylococcus aureus* (20 mm). The aqueous and ethanolic extracts have greater antibacterial activity, but they did not show any activity against fungi. The MIC ranges from 0.35 - 3.5 mg/ml.

PP-70

CHEMICAL COMPOSITION, ANTIMICROBIAL AND ANTIOXIDANT ACTIVITIES OF THE ESSENTIAL OIL OF *SANTOLINA CHAMAECYPARISSUS* L. FROM ALGERIA

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The aim of this study was to investigate at first time the chemical composition of essential oil of *Santolina chamaecyparissus* L. cultivated in Algeria. The chemical composition of hydrodistilled essential oil in a yield of 1.67% from flowering aerial parts has been analyzed by GC and GC/MS techniques[1]. Thirty-six components accounting more than 82% of the total oil were identified. Oxygenated monoterpenes was the main fraction (54.66%) and was represented by artemisia ketone (40.33%) as major component of this oil. The other major constituents were *Z*-thujone (9.82%), (2*Z*,6*E*)-farnesol (7.30%) and limonene (6.87%). , the antioxidant activities conducted by DPPH test and B-carotene bleaching test showed for DPPH (IC_{50}) of 43.01±8.04 and 47.00±3.13 at 120'. Furthermore, this oil exhibited *in vitro* growth inhibition activity by disc diffusion methods[2] against five gram positive strains, four negative gram strains and four moistures this activity was ranging from10 mm to 24 mm with the lowest MIC value between 0.12% and 0.007%. However, there is some of this microorganism mostly resistant Ex: *Pseudomonas aeruginosa* and *Aspergilus flavus*. The results provided evidence that the studied plant might indeed be potential sources of natural antioxidant and antimicrobial agents.

[1]Adams RP (1995): Identification of Essential Oil Components by Gas Chromatography/Mass Spectroscopy. Carol Stream, IL, Allured Publishing Corporation.
[2]European Pharmacopoeia, 8th edit, Council of Europe, Strasbourg 2006, pp. 93–99.

PP-71

ESSENTIAL OIL YIELD AND COMPOSITION OF *STEVIA REBAUDIANA* BERTONI

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Native Americans in Paraguay have safely used *Steviarebaudiana* for hundreds of years, valuing the herbal sweetener not only for its delicious taste but also for its medicinal healing properties. Dried form of Stevia leaves is 10-15 times sweeter than sugar. Processed powdered *Stevia* is 200-300 times sweeter than sugar and also non-calorie *Stevia* plant does not raise blood sugar levels. Some studies showing that *Stevia* has insulin sensitivity and secretion-enhancing effects of the presence and these results lend support to the use in the treatment of diabetes.
In this study, we use two varieties (*Stevia rebaudiana* and *Stevia rebaudiana* Candy) belonging to the species of *Stevia*.This two introduction varieties cultivated in plain conditions of Antalya and plants are one year old. We used 30g dried bulk leaves, essential oil was obtained by using Clavenger steam-distillation method and its chemmical composition was analyzed by GC-MS. The yield of essential oil obtained from *S. rebaudiana* was %0.033 and *S. rebaudiana* Candy was %0.067. We identified 17 compounds from *S. rebaudiana* and 20 compounds from *S. rebaudiana* Candy ($\geq$ %0.3). In both varieties13-epi manool oxide is the main component with %60.71 and %53.93 respectively.

PP-72

PHENOLIC COMPOUNDS, ANTIOXIDANT ACTIVITY AND *IN VITRO* INHIBITORY POTENTIAL AGAINST α-GLUCOSIDASE OF *SALSOLA BARYOSMA* EXTRACTS

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One of the therapeutic approaches for Type 2 diabetes is to reduce the postprandial hyperglycemia[1]. Inhibition of α-glucosidase limits postprandial glucose levels by delaying the process of carbohydrate hydrolysis and absorption**.** The plant based α-glucosidase inhibitor offers a prospective therapeutic approach for the management of postprandial hyperglycemia[2].The aim of the present study was to evaluate the antioxidant capacity and to establish the potential α-glucosidase inhibitory activity of different *Salsola baryosma* extracts.The amount of total phenolics, measured by Folin-Ciocalteu method, varied widely in herb materials and ranged between 2.591 and 0.752 mg Gallic acid equivalent / g of dry matter. While the content of flavonoids expressed in catechin equivalent has been varied between 0.462 and 0185 mg/g. Antioxidant activity was determined by the ability of each extract to scavenge the free radical $ABTS^{\bullet+}$. The obtained results revealed that the phenolic extracts have a suitable antioxidant power compared to the antioxidant references. The founded EC_{50} values are rangedfrom 9.4 to 32.4 mg / l.The inhibitory effect of different plant extracts on α-glucosidase activity was investigated in vitro. The results of the kinetics of enzymatic reactions show that the ethyl acetate extracts have inhibitory effects on α-glucosidase with inhibition percentages of 25.64 to 60.36%. While the butanolic fractions showed percentages less than 20%. In conclusion, we found that leaves of *Salsola baryosma* could be used as a potential preventive intervention for free radical-mediated diseases and diabetes, due to its natural origin and potent free-radical scavenging ability and inhibitory activity.

[1]Cheng A. Y. Y. et Josse R. G., 2004, Les inhibiteurs de l'absorption intestinale dans la prévention et le traitement du diabète de type 2, Endocrinologie-Conférences Scientifiques, Vol. 4, No.7.

[2]Apostolidis E., Kwon Y. I. et Shetty K., 2007, Inhibitory potential of herb, fruit, and fungal-enriched cheese against key enzymes linked to type 2 diabetes and hypertension, Innovative Food Science and Emerging Technologies, Vol. 8 : 46–54.

PP-73

DETECTION OF AFLATOXINS AND OCHRATOXIN A IN COFFEE BEANS (GREEN AND ROASTED) TRADED IN THE TOWN OF BECHAR-ALGERIA

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The aim of this work is to characterize the fungal flora of coffee traded in the town of Bechar to investigate the potential toxigenic strains producing of aflatoxin- and ochratoxin A and study quantitative of these toxic compounds in the raw material. The physico-chemical analyzes of our samples revealed a humidity that ranged from [2.88% -8.33%] interval to place samples in the category of slightly hydrated. The pH values collected showed that our samples are acid [5.08 to 5.73]. The study mycological carried out Potato Dextrose Agar (PDAac) revealed the dominance of species of *Aspergillus* and *Penicillium* on the majority of our samples. Examination of fungal procession characterizing oursamples shows a very high index of distribution of *Aspergillus* section *Flavi*. Thus, the presence of *Aspergillus ochraceus.* Participation of *Aspergillus* section *nigri* was reported in unroasted greenbeans. Include the participation of mucorales.Test productivity O TA isolates of *Aspergillus ochraceus* selected revealed that 80% of the strains producing OTA and all strains of *Aspergillusflavus* are producing aflatoxins. Presumption of toxicity of different coffee samples was positive on TLC. The ELISA test confirmed the presence of OTA in our samples, the analysis of the results shows that the majority of OTA rates taken from our samples are analyzed in the European standard these rates ranged between [1 0.01 to 1, 17] except for a sample of green coffee beans (unroasted) had a rate lower than the OTA detection limit (1 ppb). The results for the presence of aflatoxins B ranged between [4.93 ppb- > 40ppb]. The assay results show that our AFT samples showed levels below the limit of quantification (<2 ppb).

PP-74

BIOLOGICAL CONTROL AGAINST THE WHITE SCALE OF PALM DATE AND THE VARIABILITY OF THE BIOCIDAL EFFECT OF SOME EXTRACTS OF COLOCYNTH

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During the early nineties, at the Algerian southwestern, the most of oasis are suffered a great plague of locusts, which conduce the authorities to use different pesticides; including some dangerous one. Absolutely, the locusts eradicated, but with heavy damages to the ecosystem, such as the disappearance of some natural enemies of white scale. Naturally the populations of white scale are limited by a certain number of parasites and predators such as *Cybocephaluspalmarum* W.Simirnoff[1]. In the absence of biocontrol, the populations of white scale intensify the reproduction up to four generations *per* year; the situation becomes worse after the renewing of attacks and the invasion widen more.The white scale *(Parlatoriablanchardi)* may consider as the most important pest in the region and even at the international level, because it occasions a very important damages. For this reasons it is classified among the major economic importance pest.

The purpose of this study is to evaluate the biocidal activity of colocynth *(Citrulluscolocynthis)* extracts, on the white scale, in order to realize an integrated biological control. The results showed excel of the ethanolic extracts compared with the aqueous,which was given high mortality percentage which 79.57% and 72.80% respectively.Finally, the extracts of colocynths are biodegradable, safe and harmless who does not represent any danger to the environment, contrary to some chemical pesticides such as malathion.

[1]W. Simirnoff, La cochenille du palmier dattier *Parlatoriablanchardi Targ*. En Afrique du nord comportement, importance économique, prédateurs et lutte biologique. Entomophaga , 1-99 (1957).

PP-75

CHANGES IN FATTY ACID COMPOSITION AND ANTIOXIDANT ACTIVITIES OF *OLEA EUROPAEA* L. UNDER DIFFERENT ECOLOGICAL AND TOPOGRAPHICAL CONDITIONS IN SOUTHERN PARTS OF TURKEY

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This study was designed to determine *in vitro* antioxidant activities and compositions of fatty oil of *Olea europea* L. growing under different conditions. The oil extracts were screened for their possible antioxidant activity by DPPH, ABTS free radical scavenging and reducing power assays. Worked antioxidant methods showed different results for all regions. They had different antioxidant activities but the differences were not important statistically. Moreover, oil compositions were characterized by GC-MS. According to the gas chromatography analysis, ten components were identified in the oil samples. Oleic (68.20-73.34 %), palmitic (11.15-13.14 %), linoleic (7.44-13.27 %) and stearic (4.05-4.99 %) acids were the major compounds, respectively. Various amounts of oleic and linoleic acid were determined in all samples to be associated with the altitude.

PP-76

ANTIVIRAL ACTIVITY OF *ACACIA NILOTICA* (L.) DELILE SUBSP. *TOMENTOSA* (BENTH.) BRENAN EXTRACTS AGAINST NEWCASTLE DISEASE VIRUS VACCINE

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In this study, the cloroform, methanol and water extracts of *Acacia nilotica* subsp. *tomentosa* (synonym of Vachellia nilotica (L.) P. J. H. Hurter & Mabb. subsp. *tomentosa*) were tested *in vitro* for their potential antiviral activity against the Komarov vaccine strain of Newcastle disease virus (NDV) which causes a significant cytopathiceffect (CPE) when culturing in Vero cell culture. Observing changes in CPE, Sub culturing the treated samples and heamagglutination (HA) test were used to evaluate the reduction of viability in the viral growth in presence and absence of the effective extract. The non-cytotoxic concentration of each extract also was determined by the absence of CPE where the cells were healthy and alive. The methanol extract of Acacia niloticaon Vero cells showed non-cytotoxic concentration of ≥ 40µg/ml. The methanol extract showed a significant inhibitory effect against the tested virus at the concentration of 40 µg/ml. None of the other two extracts showed any inhibitory activity. Sub culturing of the treated samples of the methanol extract showed no CPE compared to the control. The HA test showed zero titer of the tested samples against 2 log 6 to the control.The tannin percentage of the methanol extract was higher (1.6%) than the water extract percentage (1.2%), it has been measured by Prussian blue assay[1].

[1]Price, ML.and Butler, L: Rapid visual estimation and spectrophotometric determination of tannin content of *Sorghum* grain. Journal of Agric. Food Chem., 25, 1268-1273, 1977.

PP-77

PHYTOCHEMICHAL INVESTIGATION OF MAIN COMPONENTS FROM *PIMPINELLA DEVERROIDES* (BOISS.) BOISS.

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The genus *Pimpinella* is a yearling or perennial herbaceous plants witch belongs to the Apiaceae family. 23 species of genus *Pimpinella* exist in Iran. *Pimpinella deverroides* (Boiss.) Boiss. is an endemic one that grows in Iran and Touran Regions.[1] This plant was collected from Kordestan province and been dried at an appropriate condition. The aerial parts of this plant (1500 g) were crushed and extracted with *n*-hexane and ethyl acetate by percolation at room temperature to obtain *n*-hexane extract (28 g) and ethyl acetate extract (10 g). The extracts were subjected to silica gel column chromatography (CC) and the fractions were detected by thin layer chromatography (TLC) and the isolated compounds were purified. The purified compounds were identified by their GC-MS and NMR spectral data. Altogether five compounds were purified and identified. They are three sesquiterpenoids, one triterpenoid, and one sterol.

[1]F. Askari, Sh. ahmadi, S. Meshkizadeh, M. Naderi Haji Bagher Kandiand A. Bahmanzadegan Jahromi: Chemical composition of *Pimpinella deverroides* (Boiss.) Boiss. essential oil at different stages of growth. Iranian Journal of Medicinal and Aromatic Plants, 26 (1), 64-73, 2010.

PP-78

PHYTOCHEMICHAL INVESTIGATION OF MAIN COMPONENTS FROM *GEUM HETEROCARPUM* BOISS.

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The genus *Geum* is a perennial rhizomatous herb witch belongs to the Rosaceae family. Five species of genus *Geum* exist in Iran. *Geum heterocarpum* Boiss. is an endemic one that grows in north, northeast, northwest and west of Iran. This plant was collected from Rouin village in Khorasan-e-Shomali province and been dried at an appropriate condition. The air-dried roots (2 kg) were crushed and extracted with ethyl acetate by percolation at room temperature to obtain the ethyl acetate extract (25 g). The extract was subjected to silica gel column chromatography (CC) and the fractions were detected by thin layer chromatography (TLC) and the isolated compounds were purified. The purified compounds were identified by their NMR, EI-MS, and IR spectral data. Altogether eight compounds were purified and identified. They are four triterpenoids, three sterols, and one aldehyde.

PP-79

PHYTOCHEMICAL STUDY AND ASSESSMENT OF ANTIFUNGAL AND ANTIOXIDANT ACTIVITIES OF ALGERIAN *CONVOLVULUS ARVENSIS* L. LEAVES

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The present work aims to achieve a phytochemical study of a plant called *Convolvulus arvensis L.* (EL louay) and to evaluate its antioxydant activity by DPPH method and its antifungal activity against four strains known toxigenic, including: Aspergillus *flavus*, *Aspergillus ochraceus*, *Penicillium expansum* and *Fusarium oxysporum* by measuring, both radial growth and fungal biomass. A phytochemical screening allowed knowing the phytoconsituants of the leaves of *Convolvulus arevensis L.* and targeting by a selective extraction two family metabolites, including saponins whose yield was significant (7%), and tannins based on their biological activity described in the literature[1]. Reading mean diameters of the radial growth of the four strains under the effect of different concentrations of the aqueous extract showed that it exercised a retarding effect on mycelial growth of the four strains tested including *Aspergillus ochraceus*, *Aspergillus flavus*, *Fusarium oxysporum*, and *Penicillium expansum* with an inhibition rate of 33.33%, 46.65%, 37.17%, 29.55% obtained for the aqueous extract, and 31.16%, 41.29% obtained for the saponins extract on *Aspergillus flavus* and *Penicillium expansum* respectively. The study of fungal biomass revealed that the aqueous crude extract exercised a significant antifungal power on Fusarium oxysporum, *Penicillium expansum and Aspergillus flavus* with an inhibition rate of 82.22%, 73.69% and 63.46% respectively. On testing the antioxidant activity of the methanolic crude extract and tannins extract by HPLTC, the result was positive by the appearance of yellow spots in both TLC plates sprayed with DPPH. The antioxydant activity of both extracts by a spectrophotometric quantification of DPPH showed an IC_{50} = 0.917 mg/ml for the methanolic crude extract and a IC_{50}= 0.0719 mg/ml for tannins. These results are encouraging for further studies. These obtained results show that plants are an important reservoir of bioactive molecules[2].

[1]Elzaawely A.A.; Tawata S.Antioxydant activity of phenolic rich fraction obtained from *Convolvulus arvensis.L* leaves grown in Egypt. (AJOCS) *Asian Journal Of Crop Science*, (2012).Vol 4(1): 32-40.
[2]Kaur M ; Kalia.A N. *International Journal of Pharmacy and Pharmaceutical Sciences*, *Convolvulus arvensis* (A usefull- weed), ISSN- 0975-1491, Vol 4, Issue 1 (2012).

PP-80

INHIBITORY EFFECT OF METHANOLIC EXTRACT *OF PISTACIA LENTISCUS* L. AGAINST PORCINE PANCREATIC AMYLASE AND RAT INTESTINAL SUCRASE

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Several mechanisms have been proposed for the hypoglycemic effect of phytochemicals, such as inhibition of carbohydrate metabolizing enzymes, manipulation of glucose transporters, beta cell regeneration and enhancing insulin releasing activity[1]. The present study evaluated the effect of leaves extract of *Pistacia lentiscus* L., a medicinal plant commonly used in Algeria in the treatment of diabetes, on alpha amylase, sucrase and glucose uptake by yeast cells *in vitro*.
Pistacia lentiscus L. leaves extract exhibited appreciable alpha amylase and alpha sucrase inhibitory effects at different doses. In addition, all the samples significantly increased glucose uptake in yeast cells in a dose dependent manner and the rate of glucose transport across the yeast cell membrane was a function of external glucose concentration as well as sample concentration. These observations support the use of *Pistacia lentiscus* L. in Algerian traditional medicine for the management of diabetes.

[1]Tiwari A.K., Rao J.M., Diabetes mellitus and multiple therapeutic approaches of phytochemicals: Present status and future prospects. Curr Sci., 2002, 23(1), 30-33.

PP-81

IN VITRO ANTIOXIDANT AND ANTIBACTERIAL ACTIVITIES OF THE EXTRACTS OF BUDS, FLOWERS AND IMMATURE FRUITS OF*CAPPARIS SPINOSA* L.

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Capparis spinosa L. (family of Capparidaceae) is a perennial little shrub; it has a wide distribution in the Mediterranean countries. All the parts of this plant were largely used in traditional medicine.The goal of this study is to evaluate antioxidant and antimicrobial activities of rough extracts of buds, flowers and immature fruits of *C. spinosa*.Four rough extracts were prepared, by successive maceration (petroleum ether extract "Ep", dichloromethane extract "DCM", methanol extract "MeOH") andaqueous maceration(aqueous extract "Aq"). The extractswere subjected to phytochemicalexamination (chemical method, TLC and RP-HPLC), it revealed presenceof flavonoids and alkaloids and absence of tannins.The amount of polyphenols was measured withFolinCiocalteureagen.The highest content was revealed in polar extracts:MeOH for polyphenols (29.01 ± 0.84) and Aq for flavonoids (11.82 ± 0.38).Evaluation of antioxidant activity by DPPH test[1] revealed a great antioxidant capacity of polar extracts, correlated with polyphenol contents.MeOH was the most active withrelative antioxidant activity of 78.34%. For antibacterial activity[2],the non-polar extracts were active on *S. aureus* with inhibition zonesof 12.38mm and 11.83mm for Ep and DCM respectively and a concentration of 1g/ml. The DCM showed an activity anti-*E coli*.

[1]E. Velazquez, H.A. Tournier, P.M. De Buschiazzo, G. Saavedra, G.R. Schinella, Antioxidant activity of Paraguayan plant extracts, Fitoterapia 74 (2003) 91 – 97.
[2]A.S. Treki, R. Merghem, L. Dehimat, Etude phytochimiqueet évaluation de l'activité antibactérienne d'une Labiée: *Thymus hirtus*, Sciences & Technologie 29 (2009) 25-29.

PP-82

ANTIOXIDANT AND ANTIINFLAMMATORY EFFECT OF *ROBUS FRUTUCOSIS* LEAVES

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Rubus frutucosis is an aromatic plant belonging to the family of Rosaceae, it has been used traditionally to treat dysentery, hemorrhoids, cystitis, wounds, scratches, gum inflammations, ulcers and sore throat. The present study aimed to investigate the antioxidant and the anti-inflammatory effects of methanolic extract (ME) of *Rubus frutucosis* leaves.

Results showed a strong scavenging activity towards DPPH free radical with IC_{50} value of 12.53µg/ml and high ferric reducing ability in FRAP assay (3.39 mM $FeSO_4$ /mg extract). In the ABTS assay, the activity was 1.58 mM trolox-E/mg extract. On the other hand, the anti-inflammatory activity was evaluated using xylene induced ear edema test in mice[1]. The obtained results showed that the oral administration of 400 mg/kg of ME exerted 70% of inhibition. This effect was statistically similar to that obtained by indomethacin, used as a standard anti-inflammatory drug. Moreover, the topical application of 2 mg/ear of ME inhibited significantly the croton oil induced ear oedema. This inhibition (75.72%) was higher than that of indomethacin. The antioxidant and the anti-inflammatory activities of methanolic extract of *Rubus frutucosis* leaves are probably attributed to it high polyphenolic content (227.15 µg GAE/mg extract estimated by Folin-Ciocalteu assay). However, further studies are required to isolate the active constituents of this plant and to clarify their mode of action.

[1]A.E. Rotelli, T.Guardia, A.O. Juárez, N.E. de la Rocha, L.E.Pelzer: Comparative study of flavonoids in experimental models of inflammation. *Pharmacological Research,*48, 601-606, 2003.

PP-83

HISTOLOGY AND QUANTIFICATION OF SOME POLYPHENOLS OF TWO SPECIES: *PHLOMIS CRINITA* CAV. AND *SALVIA OFFICINALIS* L.

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Phlomis crinita Cav. and *Salvia officinalis* L. are from Lamiaceae used in traditional medicine andpharmacopeia[1].Initially, the histology of leafs were studied. They made it possible to identify various fabricsforming these bodies, of which secreting and protective trichomes known like a true seat for the synthesis of several secondary metabolites.For the valorization of these species we first of all carried out colorimetric quantitativeproportioning by a spectrophotometer UV-Screw of total phenols, the flavonoids and a quantificationof the condensed and hydrolysable tannins.The quantification of the compounds polyphenolic revealed that *Salvia officinalis* is richer intotal phenols and hydrolysable tannins (42.708 ± 2.945 mg EAG/g, 0.194 ± 0.013 %) bycontribution with *Phlomis crinita* which presents one low content (23.124 ± 1.170 mg EAG/g,0.139 ± 0.010 %)For the rate of the flavonoids and the condensed tannins, by comparing the results of the twospecies, we notice that *Phlomis crinita* and *Salvia officinalis* present almost the same quantity. Therate of the condensed tannins varies from 0.828 to 0.845 % and the rate of the flavonoidsvaries from 8.93 to 11.15 mg EC/g of extract.

[1]Teuscher E., Anton R., et Lobstein A. 2005. Les plantes médicinales : épices, aromates, condiments et huilesessentielles. Editions TEC & DOC. Lavoisier. Paris,p. 522.

PP-84

CHANGES IN VARIOUS HEMATOLOGICAL PARAMETERS ON ACCOUNT OF TOBACCO USAGE

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The aim of this study was to examine the impact of cigarette smoking on the number of erythrocytes (RBC) and leukocytes (WBC) in human blood. The analyses were examined in 1000 Bosnian people, using the Cell-dyn blood counter. The study participants, who were between the ages of 20-60, were selected and divided into smokers (n=521) and non-smokers (n=479), who were then divided on the basis of gender. The results for smokers were compared with those of nonsmokers. The data were analysed using t-test. This analysis showed a statistically significant increase in RBC and WBC count in smokers (5.40±0.66 RBC, and 10.53±0.37 WBC) in comparison to nonsmokers (5.02±0.49 RBC, and 6.99±0.61 WBC) ($p<0.001$). Also, RBC and WBC counts were higher in smokers than in nonsmokers in both genders. In females, the RBC count increases with age. The WBC count was higher in older subjects in both sexes. The observed differences in RBC and WBC counts in female and male subjects confirm the influence of smoking on these parameters. The increase in the number of RBC and WBC in smokers is caused by hypoxia due to the introduction of cigarette smoke in the body and can be interpreted as a compensatory effect.

PP-85

CHANGES OF SERUM GLUCOSE, CHOLESTEROL, AND TRIGLYCERIDES ON ACCOUNT OF TOBACCO USAGE

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The aim of this study was to examine the effect of smoking on the content of serum cholesterol, triglycerides and glucose in 1000 people in the Sarajevo Canton, Bosnia and Herzegovina. In the study were included people of both sexes aged 20-60 years divided into two groups: smokers (n=521) and non-smokers (n=479). The analysis was performed using the Siemens-Dimension Xpand Plus Integrated Chemistry System. The data is presented as mean ± SD and was statistically analysed by using a t-test. The results of the biochemical analysis showed a statistically significant increase in serum biochemical parameters in smokers ($p<0.001$) in both sexes. Cholesterol concentration in smokers' serum (5.50±0.64 mmol/L) was higher compared with nonsmokers (4.38±0.56 mmol/L). The triglyceride concentration in smokers' serum (1.87±0.49 mmol/L) was higher compared with nonsmokers (1.16±0.33 mmol/L). The glucose concentration in smokers' serum (5.28±0.56 mmol/L) was higher compared with nonsmokers (4.93±0.61 mmol/L). Cholesterol and glucose concentration in male-smokers were higher than in female-smokers. Smoking increases cholesterol, triglycerides and glucose concentration in blood serum. Nicotine and other unhealthy ingredients of cigarette smoke affect the etiopathogenesis of cardiovascular disease and diabetes.

PP-86

ESSENTIAL OIL CONTENT OF *VITEX AGNUS-CASTUS* (CHASTE TREE) FROM TURKEY

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The genus *Vitex* (Verbenaceae) is represented by two species in the flora of Turkey and is used not only as a diuretic, digestive, antifungal agent but against anxiety, early birth and stomachache in Anatolia. In this study, it was aimed to determine essential oil content of *Vitex agnus-catus* leaves and mixture of fruit and flower were collected from part of Yunt Mountain, Manisa, in August 2012. Twelve genotypes were used as plant material. Essential oil contents were obtained by hydro distillation method. Essential oil contents ranged between 0.43 and 1.06% for genotypes. As a result; different parts of the plant, genotypes and their interactions were statistically significant ($p<0.01$) for essential oil content. The highest content was obtained from mixture of fruit and flower (0.82%) than leaves (0.68%). In terms of genotypes, number of 11 and 4 had the highest content with percentage of 1.06 and 1.05%, respectively. When the interactions were examined, the highest essential content of mixture of fruit and flower was provided from genotype 10 and 11 with percentage of 1.42 and 1.35, respectively and in terms of leaves; genotype 4 was provided the highest content (1.15%). In conclusion, it was determined that the species had higher essential content in mixture of fruit and flower than leaves.

[1]A. Kuruuzum-Uz, Z. Guvenalp, K. Stroch, L.O. Demirezer, A. Zeeck: Antioxidant potency of flavonoids from *Vitex agnus-castus* L. growing in Turkey. *FABAD J. Pharm. Sci.*, 33, 11–16, 2008.

PP-87

ESSENTIAL OIL COMPOSITION OF SOME MEDICINAL AND AROMATIC PLANTS FROM TURKEY

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Lots of medicinal and aromatic plant species are grown naturally in our country, nevertheless some of these are cultivated. Nowadays, many species are still collected from nature due to the cultivation of these plants are not widespread. There are also commonly used species such as cinnamon, cannot be cultivated because of ecological conditions. Cinnamon is often used as a tea for colds and also as a flavoring. *Origanum acutidens* is an endemic plant, commonly located in Eastern Anatolia but not have cultivation. *Eucalyptus camaldulensis* is widely distributed in the Aegean and Mediterranean coastal zone. Lavender species is also cultivated in Isparta province and is mainly used in cosmetic industries. *Melissa officinalis* is grown naturally in our flora and is also cultivated. Among the mentioned species *O. acutidens* was provided from Erzincan, *E. camaldulensis* from Denizli, *Lavandula hybrida, L. angustifolia* and *M. officinalis* from trial area of Atabey Vocational School and samples of *Cinnamomum* sp. from seller of medicinal herbs. Essential oils were obtained by hydrodistillation from the air dried plant materials and constituents were analyzed by GC-MS. According to results, the main constituents of *O. acutidens* and *M. officinalis* essential oils were identified as carvacrol (79.39and 33.32%). Linalool L was determined as the main constituent of *L. hybrida* and *L. angustioflia* (36.45 and 41.12%). The main constituent of *E. camaldulensis* essential oils was (-)-spathulenol (48.89%). Cinnamaldehyde, (E)- was determined as main constituent of *Cinnamomum* sp. essential oil (88.80%).

PP-88

EXTRACTION, ANALYSIS AND ANTIBACTERIAL ACTIVITY OF THE ESSENTIAL OIL AND SECONDARY METABOLITES FROM *GLOBULARIA ALYPUM*

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Globularia alypum L. is used in folk medicine.Its leaves are traditionally used as a hypoglycemic agent, laxative, cholagogue, stomachic, purgative, and sudorific. Inthe present study we report on the qualitative and quantitative analysis of secondary metabolites extracted from the medicinalplant *G. alypum*, which has been the subject of several chemical and pharmacological investigations. This medicinal plant was selected on the basis of its traditional use for the treatment of GI disorders. The aerial parts of *Globularia alypum* L. were collected during the flowering season in eastern Algeria (April 2010) and its essential oil was extracted by hydrodistillation. The distillate was successively extracted with different solvents (trichloromethane, petroleum ether, ethanol and methanol). The result shows a high yield of extracts of petroleum ether which indicates that the purity has been confirmed by recrystallization and TLC. By cons, we obtained a low yield of chloroform extracts. Preparative TLC on silica gel 60 F254 was using for the analysis and the purification of the essential oil and the extracts. The determination of composition of essential oil and secondary metabolites isolated was performed by using physicochemical and spectroscopic techniques including ultraviolet spectroscopy (UV), mass spectrometry (MS) and magnetic resonance spectroscopy (NMR). They were screened for potential antibacterial activity against 20 gram negative bacteria (*Escherichia coli, Klebsiella pneumoniae, Klebsiella oxytoca, Klebsiella ornithinolytica, Shigella sonnei, Serratia marcescens, Serratia odorifera, Acinetobacter baumannii, Citrobacter freundii, Citrobacter koseri, Enterobacter aerogenes, Enterobacter cloacae, Enterobacter intermidius, Enterobacter spervinia, Enterobacter amnigenus, Proteus mirabilis, Proteus morganii, Morganella morganii, Yersinia kristensenii, and Salmonella*sp.). The treatment with the essential oil and the plant extracts at their MIC and MBC reduced the viability and resulted in complete inhibition of the strains. The antimicrobial activity of the essential oil and the organic solvent extracts on the various test were investigated using agar well diffusion technique. All different extracts showed relatively an antibacterial activity.

PP-89

AN *IN VITRO* INVESTIGATION OF ANTIMICROBIAL AND PREBIOTIC EFFECT OF METHANOLIC EXTRACT OF *THYMUS FONTANESII*

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Polyphenols are a group of organic molecule ubiquitously distributed in plant kingdom; several potential health benefits have been associated with increased consumption of these molecules. These effects are, generally, attributed to their property antioxidant; their antimicrobial and prebiotic effects have been associated with enhanced gut health. The aim of this study was to evaluate the effect of natural polyphenols of *Thymus fontanesii* on the growth and adhesion of probiotic (*Lactobacillus bulgaricus* and *Streptococcus thermophillus*) and pathogenic bacteria (*S. aureus* (ATCC: 6538), *E. coli* (ATCC:25923), *P. aeruginosa* (ATCC: 27853), *B. ceriusn* (ATCC : 11798), *B. subtilis* (ATCC : 3633) and *C. albicans*).The antimicrobialtests was performedusing the method ofaromatogramin a solid medium(Dz and Ic) and liquid (MIC,MBC, IC_{50}), the effectof the extract onthe adhesion isperformed bydecantation*in vitro* (aggregation). The extract was exhibited an antibacterial effect through the inhibition of growth and adhesion of pathogenic bacteriatested; In contrast, a notable stimulatory effect on adhesion of probiotic bacteria used was recorded. In conclusion these molecules can be used as alternative agents to improve the probiotic bacteria activity and to prevent the pathogenic bacteria colonization.

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PP-90

EFFECT OF METHANOLIC EXTRACT OF *ANACYCLUS VALENTINES* ON GROWTH AND AGGREGATION OF PROBIOTIC AND PATHOGENIC BACTERIA

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Polyphenols are a group of natural molecules. As is typical for phenolic compounds of plants, they can act as potent antioxidants and metal chelators. They also appear to be effective at influencing the risk of pathologic diseases such as nosocomial infection; several of these flavonoids appear to be effective antimicrobial agents[1]. The purpose of this study was to evaluate the effect of the methanolic extract of *Anacyclus valentines* on growth and aggregation of probiotic (*Lactobacillus rhamnosus* and *Streptococcus thermophillus*) and pathogenic bacteria. (*Staphylococcus aureus* and *Escherichia coli*). The effects on bacterial growth were evaluated using the method of microplales. The effect on the adhesion is performed by decantation *in vitro.* The extract exhibited an antibacterial effect and prebiotic activity; the most significant activity against *S. aureus* as antibacterial agents (particulary P_4) and *L. rhamnosus* as prebiotic substances was detected; aggregation tests showed the stimulatory effect of the methanolic extract on probiotic aggregation and on pathogenic- probiotic co-aggregation.These results suggest that the polyphenolic extract may be required to improve and maintain the intestinal microflora équilbreim proving probiotic activity of probiotic bacteria.

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PP-91

ANTIOXIDANT CAPACITY OF SELECTED PLANT EXTRACTS USING THE ORAC ASSAY

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Reactive oxygen species (ROS) play an essential role in the pathophysiology of inflammation and degenerative diseases. Antioxidants, which counteract ROS-induced reactions, are used as feed additives in monogastric animals and ruminants to influence the balance between antioxidants and radicals in stress situations and to protect animals against cell breakdown and inflammatory processes. The antioxidant capacities of silymarin (a mixture of flavonolignans from *Silybum marianum*), extracts of grape pomace *(Vitis vinifera)*, chestnut wood (*Castanea sativa)* and oak wood (*Quercus* sp.) were assessed using the ORAC assay. The oxidation of fluorescein sodium is triggered by an artificial radical generator (AAPH) and a time-dependent decrease of the fluorescence signal is observed. Oxidation is inhibited by the presence of antioxidants, resulting in a retarded loss of fluorescence intensity. The results were expressed as Trolox equivalents (1 TE = 1 g Trolox/g dry extract). Silymarin showed the highest antioxidant capacity among the samples (2.81 (± 0.94) TE). Chestnut (0.68 (± 0.04) TE) and oak extract (0.55 (± 0.02) TE) exhibited similar results. The lowest value was determined for grape pomace extract with 0.18 (± 0.00) TE. The antioxidant capacity of *Silybum marianum* extract supports its use as feed additive for the prevention of oxidative damage.

PP-92

DETERMINATION OF ACTIVE PHYTOCHEMICAL COMPONENTS OF *PISTACIA VERA* METHANOL AND HEXANE EXTRACTS

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Pistachio (*Pistacia vera* L.) is a member of the Anacardiaceae. It is referred to as the ‘‘green gold tree’’. *Pistacia vera* L. is mainly cropped in Mediterranean European regions. Recent studies showed that pistachio endocarp and seed have a strong antioxidant, cardiac protective and antimicrobial activity[1]. We collected the plant samples in Pistachio gardens in Campus of Gaziantep University between September-October in 2012. The endocarp and seed of plant were extracted with methanol and hexane solvent. For the phytochemical characterization of *P. vera* L. methanol and hexane extracts were performed as previously method[2]. An Agilent 6890 GC ported to a 5973 MS detector and MS libraries was used. Phytochemical components were identified by GC-MS. *P.vera* endocarp hexane extract has 9, methanol extract has 5 major peaks and *P.vera* seed hexane extract has 5, methanol extract has 2 major peaks. The major component which we identified in all extracts of *P. vera* endocarp and seed is stearic acid. The recent studies have reported that stearic acid is one of the active components which have showed antitumor activity. In our further investigations, we aimed to determine the molecular pathway in apoptosis of *P. vera* L. seed and endocarp extracts *in vitro*.

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PP-93

SUPERCRITICAL CARBON DIOXIDE EXTRACTION OF SAGE (*SALVIA OFFICINALIS*) OLEORESIN: CURVE MODELING AND EXTRACT COMPOSITION

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Dry sage leaves were extracted with dense carbon dioxide under the following conditions: pressure, 18 MPa; temperature 50°C; sagefeed, 10 g; particle size, 437.5 µm; carbon dioxide flow rate, 5 g/min. The experimental data were correlated using three models based on differential mass balance equations: (1) the logistic model presented by Martiınez et al. (2) the desorption model proposed by Tan and Liou and (3) the uniform extraction presented by Reverchon et al.All models fitted well the experimental dataand the lowest deviation between experimental and correlated data was obtained with the logistic model.The major compounds found in the extracts were epimanol (34.94%), camphor (21.53%), 1,8-cineole (13.51%), α–thujone(12.53%), viridiflorol (6.82%), and the caryophyllene (3.73%).

PP-94

AN INVESTIGATION ON ANTIOXIDANT ACTIVITY OF METHANOL EXTRACT OF THREE *HYPERICUM* L. TAXA FLOWERS NATURALLY DISTRUBUTED ON IDA (ÇANAKKALE-TURKEY) MOUNTAIN

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Plants of the *Hypericum* spp., well known for their use in traditional medicine, contain hypericin, pseudohypericin, flavonoids, phloroglucinol and hyperforin. There are 69 species of *Hypericum* in Turkey 43 of which are endemic.On Ida Mountain, 8 species are distributed, and one of them is endemic[1]. These species have been used in traditional medicine for the treatment of external wound and gastric ulcer, and they have also been benefited as antidepressant, antiseptic, and antispasmodic. In this study, the antioxidant activities of methanol extract obtained from flowers of *Hypericum perforatum* L., *Hypericum triquetrifolium*Turra., *Hypericum perfoliatum* L. taxa which are distributed in Ida (Canakkale-Turkey) mountain have been investigated through DPPH (2,2-diphenyl-1-picrylhydrazyl) method. According to the results, it has been found out that antioxidant activities of the taxa that have been analyzed differ in terms of dose from which extracts have been gained. It has also been identified that *H. perforatum* L. taxon hasa higher value than other taxa. Flower extract rate of *Hypericum perforatum* L.is higher than*Hypericum triquetrifolium* Turra whereas *Hypericum perfoliatum* L. extract value is less than other taxa.

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PP-95

AN INVESTIGATION ON ANTIOXIDANT ACTIVITIY AND CYTOTOXIC EFFECT OF DIFFERENT AERIAL PARTS OF ST. JOHN'S WORT (*HYPERICUM PERFORATUM* L.) NATURALLY DISTRUBUTED ON IDA (ÇANAKKALE-TURKEY) MOUNTAIN

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Hypericum perforatum L. is a medicinal plant distributed in Europe, Asia and North Africa, America and Mediterranean which has been used sinceancient times by many civilizations for medicinal purposes. In this study, antioxidant activities of methanol extracts that have been obtained from different aerial parts (leaves, flowers, stems) of *Hypericum perforatum* L. naturally distributed on Ida mountain have been investigated through DPPH (2,2-diphenyl-1-picrylhydrazyl) method, and their cytotoxic effect have been determined by means of WST-1 (colorometric) in L929 mouse fibroblast cell line ages. According to the results, it has been found out that antioxidant activities of different aerial parts that have been analyzed differ in terms of dose from which extract have been gained. According to data that have been obtained in relation with the type of tissue, methanol extract of the leaves has higher values than those of flowers and stems extract. According to the data that have been obtained in terms of cytotoxic effect, all data studied on L929 mouse fibroblast cells showed high cytotoxic effect at various dilutions.

PP-96

THE CHEMICAL COMPOSITIONS OF ESSENTIAL OIL AND ANTIBACTERIAL ACTIVITIES OF *SALVIA TOMENTOSA* L. GROWN IN TURKEY

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This research was carried out at Mudurnu Süreyya Astarcı Vocational Higher School, Abant Izzet Baysal Universitiy and the Department of Field Crops, Faculty of Agriculture, University of Ankara in 2009-2010. The plantation was established in 2009. At the first year, only one cutting was done. The plants were harvested at pre-flowering, 50% and full stages in first cutting of the second year. In second cutting, since the plants were not flowering, the cutting was only done at pre-flowering stage. Essential oils extracted by hydrodistillation from the aerial parts were analyzed by GC-MS. The amounts of essential oils obtained from pre-flowering, 50%, and full flowering stages in first cutting were 0.95%, 0.87%, and 0.65%, respectively. Also, the essential oil was recorded as 0.91% in second cutting. The essential oils investigated were characterized by the predominance of three components: beta-caryophyllene (20.15% to 25.92%), alpha-pinene 819.88% to 38.41%), and alpha-humulene (10.14% to 12.59%). Because of increasing pressure of consumers and legal authorities, the food industry has tended to reduce the use of chemical preservatives in their products to either completely nil or to adopt more natural alternatives for the maintenance or extension of product shelf life[1]. Therefore, the essential oils and ethanol and water extracts of plant materials were evaluated for their antimicrobial activity against ten bacteria by the disc diffusion assay. Generally, the essential oils and the plant extracts exhibited antibacterial activity against *S. aureus, S. epidermidis*, *S.pyogenes*, *P. vulgaris*, *K. Pneumonia*, and *E. cloacae.*

G.J.E. Nychas: Natural antimicrobials from plants. In new methods of food preservation; G.W. Gould, Ed.; Blackie Academic Professional: London, UK, 58-89, 1995.

PP-97

ACCUMULATION OF TOXICOLOGICAL IMPORTANT COMPONENTS IN MUSHROOMS FROM MACEDONIA

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The fact that mushrooms can accumulate toxic components induced the elemental content and pesticide investigation in the four mushroom species gathered in arable and agriculture land in Macedonia. Toxic heavy metals (Cd, Pb) were analyzed by ETAAS, and other elements were analyzed by FIMS (Hg) and FIAS (As) methods, respectively. Pesticides were analyzed by GC-RCD (organochlorine) or GC-NPD (organophosporus) methods. Results expressed on dry mass basis indicated on the presence of toxicological important components. The average values for heavy metals were higher than the maximum concentrations imposed by Macedonian regulation[1] in 25 % for Cd and 50 % for Pb of the investigated samples, but below the European Union tolerance limit value. Hg concentration ranged from 0.083 to 0.604 μg/g dry weight (dw) is far below the provisionally tolerable weekly intake (0.004 mg/kg body weight), reevaluated recently by WHO. *Volvariella gloiocephala* has the highest arsenic level of 4.94 μg/g while the other species' concentrations fell within the range of 0.152 to 1.97 μg/g dw. Organophosporus pesticides were not detected and not all tested organochlorine pesticides were present. Where organochlorine pesticides were found quantities were less than 0.001 μ/g dw. Higher concentrations were estimated for γHCH but lower than our permission.

[1]Pravilnik za opshti baranja za bezbednost na hrana, Sl. Vesnik RM 118/05.

PP-98

QUANTITATIVE ASSESMENT OF TOXIC TRACE ELEMENTS IN LOCAL BRANDS OF TEA IN MACEDONIA

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The effects from the accumulation of toxic trace elements are very complex and can influence the content of pharmacologically active compounds in plants. Thus significantly changes the quality, safety and efficiency of their natural plant products. We have noticed before that Macedonian companies have export of a good quality raw material to processing and import of final products with added value[1]. Because we are suspicious of pharmacological and toxicological point of view we decided on the research of 15 local brands of various teas which could be found in the markets in Macedonia. Toxic heavy metals (Cd, Pb) were analyzed by ETAAS, and other elements were analyzed by FIMS (Hg) and FIAS (As) methods, respectively. Results expressed on dry matter basis indicate that not all tested trace elements: lead, cadmium, mercury and arsenic are found in the analyzed samples. Under current legislation in Macedonia[1] there is a restriction on the maximum allowable concentration for lead to 0.1 mg/kg and for cadmium to 0.05 mg/kg expressed on fresh herbs and no limits for arsenic and mercury. Unfortunately, not all of the 15 local brands of various teas which could be found in the markets in Macedonia are safe to use.

[1]AGBIZ MARKET INFORMATION. (2009): „Wild gathered products" Newsletter, 2., 2-4.
[2]Pravilnik za opshti baranja za bezbednost na hrana, Sl. Vesnik RM 118/05.

PP-99

COMPARATIVE ANALYSIS OF VOLATILE COMPONENTS FROM *SCORZONERA UNDULATA* SSP. *DELICIOSA (*GUSS.*)* SPECIES GROWING IN MEDITERRANEAN

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The volatile components between aerial parts and roots of *Scorzonera undulata* ssp. *deliciosa (Guss.) Maire* were studied and analyzed by gas chromatography–mass spectrometry (GC–MS). The identification of the components was based on their mass spectra with those of WILEY275.L, NIST98.L (Massada 1976) and CNRS Libraries and those described by Adams[1] or with authentic compounds and confirmed by comparison of their retention indices either with those of authentic compounds or with data published in the literature. A total of 123 different compounds accounting for 94.2–97% were identified and significant qualitative and quantitative differences were observed among the samples. The major volatile components in essential oils from *Scorzonera undulata* were *n*-hexadecanoic acid, hexadecanoic acid methyl[2] ester, and 9-octadecenoic acid.

Adams, R. 2001. Identification of Essential Oil Components by Gas Chromatography /Mass Spectroscopy, Allured Publication,CarolStream,IL,
Christos, L., Hocine, L., Nacira, B., Olga, G., Ioanna, C. 2007. Chemical Composition and Antimicrobial Activity of the Essential Oil of Algerian *Phlomis bovei* De Noé subsp.

PP-100

CAN THE AQUEOUS ROOT EXTRACT OF *ANACYCLUS PYRETHRUM* L. BE USED AS AN ANTI-DIABETIC AGENT?

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The mounts of Tlemcen (west of Algeria) region is characterized by a rich floral diversity. Herbal medicine is still practised by the local population for the treatment of diabetes. It has been reported from a previous survey[1] in this region, that *Anacyclus pyrethrum* L. (Asteraceae), is used as antidiabetic agent in the folk medicinal practices. Despite the popular use of this specie, there is no scientific study about the antidiabetic effect of *Anacyclus pyrethrum* L.
The present study aimed to investigate the antidiabetic activity of of aqueous extract of roots of *Anacyclus pyrethrum* L. in normal and streptozotocin (STZ)-induced diabetic rats.A total of 20 rats including 10 diabetics and 10 normal rats were used. The anti-diabetic activity of aqueous extract of roots was evaluated by using normal and STZ induced diabetic rats at a dose of 250 mg/kg *p.o* daily for 21 days. Blood glucose levels were measured using GOD-POD. Per oral administration of the aqueous extract of the roots (250 mg/kg body weight) to streptozotocin-induced diabetic rats exhibited a significant antihyperglycemic activity in STZ-induced diabetic rats, whereas in normal rats no hypoglycemic activity was observed. In addition, phytochemical screening showed the presence of tannins, saponins, alkaloids, amino acids, steroids and terpenoids. Aqueous extract of roots exhibit attractive properties and can therefore, be considered a promising candidate for future application as alternative therapeutic agents, particularly in the development of anti-diabetic drugs.

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PP-101

EFFECTS OF *COTULA CINEREA* DEL. METHANOLIC EXTRACT ON ACUTE INFLAMMATION

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In this study, *Cotula cinerea* DEL. methanolic extract was evaluated for anti-inflammatory activity by using the model of carrageenan-induced rat paw oedema as described by Mbiantcha*et al.*[1]. Two doses of the methanolic extract (200 mg/kg and 400 mg/kg) were given orally by gavage technique, and then carrageenan was injected into the right hind paw of the rat. The extract, which was found rich in phenolic content (71.9± 0.6 mg GAE/ g E) and flavonoids (3.6± 0.1 mg RE/ g E), has shown a good inhibitory action in the fourth hour for the lower dose (58.85 %. **: $p < 0.05$) and a very good inhibitory action in the eighth hour (62,84 %. ***: $p < 0.01$). The effect of the higher dose was even better in the 4thhour (71±6.34 % **: $p < 0.05$) as well as in the 8th hour (74.50 %.***: $p < 0.01$). The same effect was observed macroscopically when the gastric ulcer was evaluated for both substances following the method described by Shuai*et al.*[2]. However, the tissue alterations of the stomach were different at the histological study.

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[2]Shuai W, Yong-rui B, Yun-Peng D, Xian-Sheng M, Ting-Guo K, (2011). "Evaluation of gastric ulcer model based on gray-scale image analysis."*African Journal of Microbiology Research*5(11): 1285-1290.

PP-102

ANTIHERPES ACTIVITIES OF *IN VITRO* AND *IN VIVO* EXTRACTS DERIVED FROM *LAMIUM ALBUM* L.

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In our *in vitro* study, were tested for antiviral activity chloroform extracts received by soxhlet extraction as well as methanol extracts obtained by thermostat extraction from *in vivo* and *in vitro* propagated plants. There was determent cytotoxicity effect towards MDBK cell line - maximal tolerance concentration (MTC) and the 50% cytotoxicity concentration (CC_{50}) were defined. The extracts inhibited the replication of HSV-1 in MDBK cells significantly. The 50% effective doses (EC_{50}) of the chloroform *in vitro* extract was 552 μg/ml. The EC_{50} of the chloroform *in vivo* extract was 668μg/ml. The viral replications were suppressed at 90% from both chloroform extracts applied in MTC. The methanol extracts inhibited viral replication in the same mode, but EC_{50} values were higher. The effect over viral replication kinetics of the methanol *in vivo* extract was determined. The *in vivo* extract applied in MTC inactivated the extra cellular HSV-1 above 90% (Δlog1.5). Both methanol extracts also have virucidal effect, with inactivation of extracellular HSV-1 in 99.99% for the *in vivo* extract. It showed activity against viral entry process. This research is funded by contract №DTK-02-29/2009 of MEYS.

PP-103

INVESTIGATION OF CHOLINESTERASE AND TYROSINASE INHIBITORY AND ANTIOXIDANT ACTIVITIES OF *VISCUM ALBUM* L. SAMPLES COLLECTED FROM DIFFERENT HOST PLANTS

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In Turkey, *Viscum* L. is represented by one species (*Viscum album* L.) and three subspecies; namely ssp. *album*, ssp. *abietis* (Wiesb.) Abromeit and ssp. *austriacum* (Wiesb.)Vollmann. *Viscum album* L. known with a local name of"Ökse otu"[1]is widely usedin folk medicine for a variety of purposes, mainly as diuretic, anticancer, sedativeas well as in the treatmentof epilepsy, diabetes and hypertensive diseases[2]. In this study, the aqueous, dichloromethane, and methanol extracts of twelve samples collected on different host plants were tested against acetylcholinesterase (AChE), butyrylcholinesterase (BChE), and tryosinase (TYRO) enzymes at 2000µg/mL by ELISA microtiter plate assays. Furthermore, antioxidant activity of the extracts was evaluated by six *in vitro* methods[2,2-diphenyl-1-picrylhydrazyl (DPPH), *N*,*N*-dimethyl-*p*-phenylendiamine (DMPD), and nitric oxide radical scavenging assays, metal-chelation capacity, ferric- (FRAP), and phosphomolibdenum-reducing antioxidant power (PRAP)].Total phenolic and flavonoid contents of the extracts were determined as using Folin-Ciocaltaeu's and $AlCl_3$ reagents, respectively. All the extracts did not show any significant inhibition against tyrosinase enzyme. The aqueous and methanol extracts displayedstrong antioxidant activity in DPPH, DMPD, FRAP assays and on metal chelation capacity. The aqueous and methanol extracts exerted low inhibition against AChE and BChE at 200 µg/mL.

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Faculty of Pharmacy No.40, Istanbul, p. 203.
[2]E.Yeşilada, D.Deliorman, F. Ergun, Y.Takaishi, Y. Ono: Effectsof the Turkish subspecies of *Viscum album*on macrophage derivedcytokines. *Journal of Ethnopharmacology* 61, 195-200,1998.

PP-104

EVALUATION OF THE ANTI-HYPERGLYCEMIC EFFECT OF *OPUNTIA FICUS INDICA* USED AS ANTIDIABETICS

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Diabetes has become a major health problem in Algeria in recent decades. To assess whether *Opuntia ficus indica* their crude preparations have hypoglycemic effects, 4 groups of 6 Wistar male diabetic rats received a diet containing different amounts of *Opuntia ficus indica* powder. Our results showed that after 15 days of treatment, the introduction of powder cladodes of this non-toxic plant in the diet has significantly decrease glucose in the blood, for a rate of 0.98 g /1 while fasting. Meanwhile our results showed that *Opuntia ficus indica* decreases during 15 days of treatment the amount of water consumed by rats and the collected urine. Symptoms of thirst and excessive urination known in diabetics disappear[1]. This study shows that the powder cladodes of *Opuntia ficus* indica regulate glucose levels in the blood of diabetics.

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PP-105

FUNCTIONAL PROPERTIES OF BLUEBERRY LEAVES

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Blueberry is a deciduous dwarf shrub, which grows widely in many parts of the world. Blueberry that has commercial importance in Nort America grows also wildly in the Black Sea Region (Giresun, Artvin, Rize, Trabzon, Ordu, Samsun, Sinop and Zonguldak) Turkey. In these regions, while the leaves are consumed as meal, fruits are appraised as Molasse and jam. Bluberry decoction obtained by boiled leaves has been used in the treatment of diabetes since ancient times. Leaves are rich in chlorogenic acid derivatives and other hydroxycinnamic acids, flavonol glycosides, catechins and proanthocyanidins total phenolic content and level of antioxidants but fruits are rich as of anthocyanins, vitamin C and E. Hydroxycinnamic acid derivatives were found to be the most predominant phenolic groups in extraction of leaves and hydroxycinnamic acid concentration is higher than fruits. At the other hand, leaves contain high amount of flavonols which have biological effects including antimutagenic, anticancer, anti-inflammatory, antiproliferative and antimicrobial activity. Its leaves are also considered to be resource of antioxidative and antidiabetic compounds such as chlorogenic acid, quercetin-3-O-galactoside, isoquercitrin, quercetin-3-O-glucuronide, aviculare, quercitrin, proanthocyanidins and anthocyanins. Despite many researches have been conducted about nutritional value of blueberry fruit, there are a few studies for blueberry leaves. In this review, it will be discussed the leaves content of blueberry in detailed and the using possibility in food industry as a food additive and medically.

PP-106

EVALUATION OF ANTIOXIDANT ACTIVITY OF FOUR PLANTS USED AS FOLK MEDICINE IN DUZCE (TURKEY)

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During our field studies in Düzce (Turkey), we have determined that many plants are used for the treatment of various ailments in folk medicine.The aim of this study is to investigate the in vitro antioxidant activity and the total phenols content in four of collected species (*Rumex scutatus* L., *Salvia tomentosa* Miller., *Sorbus domestica* L. and *Tamus communis* L. subsp. *communis*) from Düzce. For this purpose, methanol and water extracts were prepared from flower of *S.tomentosa*, root of *T. communis* subsp. *communis*, leaf of *S. domestica* and *Rumex scutatus*. The total phenolic compounds of the aqueous extracts were estimated using Folin-Ciocalteu method[1]. Antioxidant capacity off all extracts was measured using the DPPH free radical scavenging activity and cupric ion reducing antioxidant capacity (CUPRAC)[2,3]. *S. tomentosa* and *S. domestica* had significantly higher phenolic content and relatively higher antioxidant activity than *T. communis* subsp. *communis* and *R. scutatus*. The results of this study demostrate that there is a paralellism between antioxidant activity and the phenolic content of the species evaluated. *S. domestica* showed the greatest antioxidant activity, followed *S. tomentosa*, *T. communis* and *R. scutatus*.

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PP-107

MUTAGENICITY EVALUTION OF INFUSION OF *STACHYS RUPESTRIS*, AN ENDEMIC PLANT

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The present study was conducted on the *Stachysrupestris*MontbretEtAucher infusion which is the remaining portion after essential oil was removed from plant with hidrodestillation. It is known that herbal drugs have been used in traditional medicine all over the world. Especially, the plants belong to *Stachys*genus havebeen used in the treatment of many diseases. In our study, we presented a data about the mutagenic activity of *Stachysrupestris* which belongs to Lamiaceae family is endemic species from Mersin, Turkey. In this study, the mutagenicity of *Stachys rupestris* infusion by UMU test (*Salmonella thyphimurium* TA1535/pSK1002) which is short term bacterial test system was researched[1]. Concentrations of 1000, 500, 250, 120, 60 and 30 μg/mL of the infusion were prepared. By using S9 fractions, the biotransformation effects of the infusion in an organism at the presence of liver enzymes are also researched. At the end of the study, we determined no mutagenic effects with and without S9 at any concentration.

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PP-108

SPECTROPHOTOMETRIC DETERMINATION OF MALONDIALDEHYDE IN PHARMACEUTICAL OILS

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The aim of this study was to measure the malondialdehyde (MDA) as a marker of lipid peroxidation in pharmaceutical oils which were exposed to daylight.[1] Samples were fresh and rancid pharmaceutical oils: almond, hyperici, castor, fish and linseed oil. One part of each sample was exposed under the influence of daylight for 15, 42 and 65 days, which was a rancid sample. The other part of each sample left to stay at +4 ºC, protected from the light, was used as a control (C). The spectrophotometric method for the measurements of MDA based on reaction with N-methyl-2-phenylindole (NMFI) was used.[2] MDA content was expressed as mass MDA by weight of fresh sample (□g/g). The highest MDA content was found in almond oil exposed under the influence of daylight for 42 days (19.08 □g/g, 3.41 □g/g for C), and in fish oil in the same period of exposing of the influence of daylight (11.68 □g/g, 0.32 □g/g for C). It wasn't changes in MDA content in hyperici, castor and linseed oils exposed under the influence of daylight in all time of intervals. The results showed that the stability of pharmaceutical oils (hyperici, castor and linseed) to oxidation processes was quite good.

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PP-109

TOTAL PHENOLIC CONTENT AND DPPH-FREE RADICAL SCAVENGING ACTIVITY OF *HYPERICUM CAPITATUM* VAR. *CAPITATUM*

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This study was designed to determine *in vitro* antioxidant activities and total phenolic and flavonoid contents of different parts of *Hypericum capitatum* var. *capitatum* growing wild in Kilis, Turkey. Free radical scavenging activity was evaluated using 1,1-diphenyl-2-picrylhydrazyl (DPPH) with different concentrations of ethanol and aqueous extracts of plants. The total phenolic and flavonoid contents widely varied depending on solvents. Ethanol extraction of the plant material showed better performances with respect to the both phenolic and flavonoid contents. Highest contents of phenolic and flavonoid contents for ethanol extracts were determined in flowers. Flower phenolic content was 165.093 mg/g GAE and106.627 mg/g GAE for ethanol and aqueous extracts, respectively. The highest flavonoid contentwas determined in the leaves inaqueous extract (35.67 mg/g QE). The highest free radical scavenging capacity was found in stem ethanol extract (94.84 %), and it was followed by the leaves (89.10 %) and flowers extracts (68.78 %). The lower anti-radical activity (18.42- 30.47 %) was ascertained inthe aqueous extracts once compared with ethanolic ones.These results show that ethanol extracts of the plants parts could be considered as a naturalalternative source for food and medicine sectors.

PP-110

DEVELOPMENT AND *IN VITRO* EVALUATION OF HYDROXYETHYLCELLULOSE CAPSAICIN GEL

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Capsaicin, *trans*-8-methyl-N-N-vanillyl-6-nonenamide, is the main capsaicinoid in chilli peppers, followed by dihydrocapsaicin (90% of the total pungency of pepper fruits). Capsaicin is known to be effectively absorbed topically from the skin. Topical creams of capsaicin are used for therapeutic purposes to treat pain peripherally in diseases such as rheumatoid arthritis, diabetic neuropathy, osteoarthritis, muscle pain, shingles, etc. The aim of this study was to developand evaluate the topical gel of capsaicin 0.025%. In the presented work we follow the preparation of a hydrophilic capsaicin gel of hydroxyethylcellulose (HEC). Permeation experiments were performed on abdominal pig skin using vertical diffusion cell. The *in vitro* drug release from this formulation, into water medium at 37ºC, was determined by using High Performance Thin Layer Chromatography (HPTLC)[1,2]. From the study was concluded that gel showed good homogeneity, spreadability, viscosity and pH value within the limits allowed fordermatological preparations. HEC Capsaicin gel exhibited significant amountof drug release.

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PP-111

ANTI-INFLAMMATORY AND ANTIOXIDANT ACTIVITIES OF ELLAGITANNINS FROM BLACKBERRY AND RASPBERRY FRUITS

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Ellagitannins have shown anti-inflammatory and anti-*Helicobacter pylori* properties; however their anti-inflammatory activity at gastric level was not previously investigated. This study shows the anti-inflammatory and antioxidant activity of ellagitannins enriched extracts (ETs) from blackberry (BB) and raspberry (RB) fruits at gastric level. ETs were prepared from *Rubusfruticosus* L. and *Rubusidaeus* L.by acetone/water (70/30 v/v) extraction, followed by purification and quantification by HPLC-DAD. The antioxidant activity of the extracts in gastric mucosa was measuredby ORAC assay, SOD and CAT activity, whereas the anti-inflammatory activity was assessed measuring CINC-1 content, the IL-8 homologous in rat. To test the *in vivo* anti-inflammatory and antioxidant activity, BB andRBwere tested on ethanol-induced gastric lesions in rats. Rats were treated orally for ten days with 20 mg/kg/day, and ethanol was given one hour beforethe sacrifice.ETs reduced the Ulcer Index by -88.2% and -75.3% for BB and RB, respectively. Both the extracts reduced ethanol-induced oxidation in gastric mucosa, and inhibited CINC-1 released following ethanol administration. The effect of BB was higher than RB in all the parameters tested. This study suggests that ETs from BB and RB could be useful to prevent gastric inflammation.

PP-112

CORRELATION BETWEEN CATECHIN CONTENT AND NF-κB INHIBITION BY GREEN AND BLACK TEA INFUSIONS

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This study investigates whether infusions of green and black tea inhibit the NF-κB driven transcription in human epithelial gastric AGS cells. Water extracts were prepared from different brands of green and black tea available on the Italian market. Teas with or without caffeine were studied. An industrially prepared freeze-dried water extract of green tea was also tested. Catechin and caffeine contents were measured by HPLC analysis. The decrease in phenol and catechin content 3 months after the expiry date was also investigated. The NF-κB driven transcription and the free radical scavenger activity were inhibited, and this effect was related to catechin levels. The potency of epigallocatechin 3-gallate (EGCg) in inhibiting NF-κB driven transcription was so great that tea extracts low in EGCg was still highly active. In one decaffeinated sample of green tea, the phenol and catechin content was very low, probably as a consequence of caffeine removal. The decrease in catechin levels after 3 months did not reduce the inhibition of NF-κB driven transcription by tea extracts. This is the first paper reporting the inhibitory effect of NF-κB of commercial green and black infusions at the gastric level, evaluating their short-term stability as well.

PP-113

ENCAPSULATION OF *SATUREJA MONTANA* ESSENTIAL OIL IN β-CYCLODEXTRINE

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The antibacterial and antimycotic properties of *Satureja montana* essential oils are confirmed in our previous research work[1]. The aim of this study is to see the optimal ratio of mixture between *Satureja montana* essential oils and β-cyclodextrin. Complexes were prepared by co-precipitation method with the four reports oil: β-cyclodextrin as follows; 10:90, 15:85, 20:80, and 25:75 (w/w) in order to determine the effect of the ratio on the inclusion efficiency of β-cyclodextrin for encapsulating oil. The characterization of the complex involved the analysis of the total extracted oils with hexane and its GC/FID results obtained. The method applied by Gas/Fid analyses is the one we have standartised in our previous research. The retention of essential oil reached a maximum of 96.51% at the oil to β-cyclodextrin ratio of 15:85. Though, the maximum inclusion efficiency of β-cyclodextrin was achieved at the ratio of 20:80. The qualitative and quantitative composition of the volatiles in the total oil extracts was similar to the starting oil which means that essential will still have the antibacterial and antimycotic properties after encapsulation to β-cyclodextrin.

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PP-114

PRECLINICAL RESEARCHES ON *ANTHEMIS WIEDEMANNIANA* FISCH. & MEY. AND ITS FATTY ACID COMPOSITION

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Anthemis species have been used for the treatment of gastrointestinal disorders, stomachache and inflammatory diseases in Turkish folk medicine. *Anthemis wiedemanniana* Fisch.&Mey. is an endemic plant used as painkiller, antispasmodic, sedative and for the treatment of urinary inflammations. In this context, the aim of this study is to evaluate the anti-inflamatory activity of *A. wiedemanniana* by using *in vivo* methods. Carrageenan-, PGE_2- and serotonin-induced hind paw edema, 12-*O*-tetradecanoyl-13-acetate (TPA)-induced mouse ear edema and acetic acid-induced increase in capillary permeabilitymodels were used for the activity assessment. Moreover, the fatty acid composition of *A. wiedemanniana* was investigated by gas chromatography (GC).*n*-Hexane, diethyl ether and total sesquiterpene lactone extracts exhibited significant inhibition in carrageenan-induced hind paw edema and acetic acid-induced increase in capillary permeability model. *n*-Hexane and total sesquiterperne lactone extracts showed anti-inflammatory activity inPGE_2- and serotonin-induced hind paw edema model. However none of the extracts displayed significant activity in TPA-induced ear edema model in mice. Buthyric acid, arachidic acid and palmitoleic acid were found to be the major fatty acids in these species. Saturated fatty acids (SFA) were found in higher amounts than monounsaturated and polyunsaturated fatty acids. This study confirms the traditional usage of *A. wiedemanniana* for inflammatory diseases.

PP-115

ANTIBACTERIAL ACTIVITY OF*ARTEMISIA HERBA ALBA* ASSO ESSENTIAL OIL AGAINST METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS*

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The aims of this work is tostudy antimicrobial activity of the essential oil of the Algerian medicinal plant, *Artemisia herba alba* Asso. Against resistant strains of bacteria, *Staphylococcus aureus* ATCC 25923, *MRSA* ATCC 43300 and *MRSA 19* isolated from infected patients[1,2.]Essential oils (E.O) obtained byhydrodistillation andthe fresh oil was tested for it antibacterial activity. The disk diffusion method with 10 µl essential oiland broth micro-dilution method for Minimal Inhibitory Concentration (MIC), ranging from 0. 3 to 300 µl/ml, was usedfor antibacterial screening[3,4]. The essential oil of *Artemisia herbaalba*showed activity against the three of strains *S. aureus*withdiameters of inhibition zones respectively:20 mm, 19 mm, 13 mm. The lowers Minimal Inhibitory Concentrations (MIC) of *Artemisia herbaalba* essential oil of 1.17µl/ml, 4.68µl/ml and 1.17µl/ml were recorded towards *Staphylococcus aureus* ATCC 25923, *MRSA* ATCC 43300 and *MRSA 19*.Essential oil (E.O) obtained was investigated by gas chromatography/mass spectrometry (GCMS). The main components werecamphor, *cis*-verbenol and α-thujone.Antibacterial treatment constitutes a major worldwide problem which might be resolved with the help of traditional medicine. Due to increasing microbial resistance of pathogenic microorganisms against antibiotics particularly methicillin-resistant *Staphyloccocusaureus*strains and the limitation of the use of antibiotics usage[5], natural substances like essential oils are interesting sources for looking for novel antimicrobial compounds.

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PP-116

THE THERAPEUTIC ROLE OF' ARGAN OIL AND ITS USE IN ALGERIA

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The Tindouf hamada (North Western Algerian Sahara) contains a wealth of important medicinal plants. In fact, it is a formation of argan trees, with an estimated area of nearly 40 000 hectares, which provides various goods and services for agriculture (oil of argan fruits is well known for its physico-chemical composition and food properties); pasture and forest. Endemic of Algeria, the *Argania spinosa* (L.) species, contains active compounds that play an important role in traditional medicine, particularly its oil, used by people not only for food but also in cosmetic field due to its high virtues. Its almond and hazelnut's taste (due to a slight roasting, and which provide a darker color), enhance the flavor of different meals. Currently, local people extract this oil in a traditional manner and use it against rheumatism, dry skin and many other infections. In addition to the medicinal use of this tree, it is also used for feeding animals, especially goats. Furthermore, it is used for fixing and improving soil. Argan tree is used as a shelter to prevent human and animals against the sun rays. From the Sapotaceae family, *Argania spinosa* (L.) is a high resistance tree from which the name "iron tree" is derived. Moreover, the Sapotaceae family is eurytropicale one and is represented by only two taxa most northerly: *Argania spinosa* endemic of Algeria and Morocco, and *Sideroxylon marmulano* distributed in Canary Islands (Madeira and Green Cape).

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ANTIMICROBIAL AND ANTIFUNGAL ACTIVITY OF *THYMUS NUMIDICUS* ESSENTIAL OIL FROM ALGERIA

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During the last years, the interest in use of medicinal plants, as well as their essential oil, knows a huge development1.Essential oil of medicinal plants is a very complex mixture of organic compounds possessing structures and various chemical functions. They are widely used for their antibacterial, antifungal properties and insecticidal activities. At present, approximately 300 essential oilsare marketed for the pharmaceutical, agronomic, food, cosmetic industry, etc[2]. Our study concerned Numidian Thyme (*Thymus numidicus*), which is an Algerian-Tunisian endemic species. GCMS analysis of its essential oil obtained by hydrodistilation allowed to identify more than 70 compounds and to find that it is of thymol chemotype. This essential oil has a pH of 6-7, a density of 0,891, a refractive index of 1,488, an acid index of 4.52 and 56 of peroxide index. The study of antimicrobial and antifungal activity of the essential oil of *Thymus numidicus* was led on three bacteria (*Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa*) and one mushroom (*Candida albicans*).The results showed that the latter has a wide spectrum of antimicrobial activity on Gram- and Gram+ bacteria and an antifungal activity on *Candida*.
A formulation with mixture (glycerin / water / gelatin) and essential oil of *Thymus numidicus* showed an antifungal activity on *Candida albicans* comparable at that of both commercial Polygynax® and Gynovasol® forms. Results of this study look promising for the valuation of medicinal plants with the aim of promoting the Algerian pharmaceutical industry.

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PP-118

CHEMICAL PROPERTIES AND MEDICINAL IMPORTANCE OF SAFFLOWER (*CARTHAMUS TINCTORIUS* L.) FLOWERS

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Safflower (*Carthamus tinctorius* L.), a member of *Compositae* or *Asteraceae* family, is one of the important annual aromatic and medicinal plants. The stem, leaves, seeds, and flowers are used for different purposes. It is cultivated mainly for its seeds (35-45 % oil content), which yield edible oil. Traditionally, the crop was grown for its flowers, used for coloring and flavoring foods and making dyes. Safflower flowers contain two pigments viz. red (0.83 % carthamin) which is insoluble in water and yellow (30 % carthamidin) which is soluble in water and mainly used as a material for dye and its currently being used as a natural food colorant. Many Chinese medicines are prepared by using dried flowers and extract of flowers. Nowadays the medicinal uses of flowers in China have become known to the rest of the world. The extract of florets containing pigments are used in treatment of many illnesses such as menstrual problem, cardio vascular diseases pain and swelling associated with trauma[1]. More than 200 compounds were isolated from *C. tinctorius* where flavonoids are the main compounds in the water extract. These natural pigments have achieved industrial significance in many fields. They are used in food, pharmaceutics, cosmetics and various other commodity preparations[2]. The aim of this study is to introduce the general characteristics of safflower flowers and to review the literature on its chemical properties and medicinal importance.

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PP-119

AN EVALUATION ON ANTIMICROBIAL POTENTIAL OF *STEVIA REBAUDIANA* (BERTONI) LEAF EXTRACT

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Recently, there has been a great interest in exploring the use of natural antimicrobial compounds of plant origin for treating common infectious diseases since drug resistance is increasing in pathogens. Most of the drugs today are obtained from natural sources or semi synthetic derivatives of natural products and used in the traditional systems of medicine. The use of plant extracts and phytochemicals, both with known antimicrobial properties, can be of great significance in therapeutic treatments. Antimicrobial compounds of plant origin may be found in plant stems, roots, leaves, bark, flowers, or fruits. *Stevia rebaudiana* Bertoni is a perennial herb of significant economic value due to its high content of natural, dietetically valuable sweeteners in its leaves[1]. More than 100 compounds have been identified in *Stevia rebaudiana*, the best known of which are the steviol glycosides, particularly stevioside and rebaudioside A, being the most abundant[2]. The leave extracts of *stevia*, 300 times the sweetness of sugar has documented of anti-bacterial, anti-fungal, anti-inflammatory, anti-microbial, anti-viral, anti-yeast, cardio-tonic, diuretic, hypoglycemic, hypotensive and as a vasodilator[1]. In recent years, the antimicrobial activity of *Stevia rebaudiana* Bertoni leaf extracts against a large number of microorganisms has been investigated. The aim of the present study has been evaluated the antimicrobial potential of *Stevia rebaudiana* Bertoni leaf extracts in consideration of the scientific literature.

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PP-120

IMMUNOMODULATION PROPERTIES OF *PROSOPIS CHILENSIS* EXTRACTS IN CORRELATION TO THEIR ANTIFUNGAL ACTIVITY

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Naturally occurring metabolites are used therapeutically to be effective to kill or inhibit the growth microorganisms. These metabolites agents can be used to modulate the host natural defense mechanism and restores impaired immune function[1]. *Prosopis chilensis* extracts from leaves, bark and root parts were tested in-vitro for their fungicidal action as well as their effect on reactive oxygen species (ROS), neutrophils chemotaxis and T-cell proliferation. The extracts from the leaves and bark of *Prosopischilensis* showed remarkable fungicidal activity. Leaves and the bark methanol crude extract exhibit antifungal activity against *M. mycetomatis* at concentration range from 1 mg - 0.02 mg/ml in compare with the control with 1 mg/ml ketoconazole. The methanol extract from leaves *P. chilensis* exhibited high inhibition % of 110.4±6.6% and 116.6±5% in concentration 200µg and 100 µg respectively. The bark methanolic extract showed high inhibition% 80.4±3.3 at 200µg and a moderate inhibition% 52.9±1 at 100µg. Lymphocyte proliferation based on their ability to interact with cells of both the innate and adaptive immune response. The methanol extract of the leave is most active with inhibition 99.8 ± 0.1 at 12.5 µg/ml while the bark and root show high activity at 100µg/ml.

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PP-121

FATTY ACID PATTERNS OF SOME APIACEAE SEED OILS FROM TURKEY

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In the present work, seeds of some *Heracleum*, *Pimpinella*, *Ferulago*, *Ferula*, *Malabaila*, *Zosima*, *Trigonasciadium*, *Myrrhoides*, *Hippomarathrum*, *Trinia*, *Szovitsia*, *Grammosciadium*, *Prangos*, *Bunium*, *Olymposciadium* and *Cnidium* taxa from Apiaceae family were evaluated for their fatty acid composition by GC-MS. The seed oil content ranged from 7.1 % in *Szovitsia callicarpa* Fish. & C.A. Mey. to 29.3 % *Ferula haussknechtii* H. Wollf. The fatty acid composition of the studied taxa was uniform. The Apiaceae family is characterized by the presence of an unusual fatty acid, petroselinic acid (18:1n6). The results also showed that the seed oils of the species studied contained high amounts of petroselinic acid followed by significant amounts of linoleic (18:2n6) and oleic (18:1n9) acid. The highest petroselinic acid content was found to be 72.2 % in *Hippomarathrum cristatum* Boiss. seed oil. The presence of high content petroselinic acid in the seed oil in Apiaceae is of chemotaxonomic importance. There is very little literature related to fatty acid composition of this family. This is the first report about this petroselinic acid an unusual fatty acid in these Apiaceae taxa growing in Turkey.

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CHOLINESTERASE INHIBITORY AND ANTIOXIDANT ACTIVITY OF VARIOUS *TANACETUM* TAXA AND THEIR PARTHENOLIDE CONTENTS

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The genus *Tanacetum* L. (Emend. Briq.) (Asteraceae) usually known as "tansy", consists of approximately 160 species in the world and is represented by 45 species in the flora of Turkey[1]. *Tanacetum* species have been known for their various pharmacological effects such as insecticidal, pesticidal, antiprotozoal, and anti-migraine. On the other hand, *T. parthenium* (fewerfew) has been popular lately due to its efficacy against migraine. In fact, biological effects of feverfew in central nervous system (CNS) have been mostly attributed to its parthenolide content. In the current study, the extracts obtained from the different parts of various *Tanacetum* taxa growing in Turkey were investigated for their inhibitory activity against acetylcholinesterase (AChE) and butyrylcholinesterase (BChE), the key enzymes in pathogenesis of Alzheimer's disease, at 100 □g mL^{-1} using microplate assay. Antioxidant activity of the extracts was tested using DPPH radical scavenging activity and ferrous ion-chelating capacity assays. Most of the extracts displayed a remarkable AChE inhibition where the leaf of *T. argenteum* subsp. *flabellifolium* had the highest inhibition (96.68 ± 0.35%). The extracts had moderate inhibition towards BChE, in which the stem of *T. argyrophyllum* var. *argyrophyllum* exerted the best inhibition (63.81 ± 3.64%). On the other hand, low level of DPPH scavenging activity was caused by the extracts, whereas most of them showed significant ferric ion-chelating capacity. Total flavonoid content of the extracts was determined spectrophotometrically. Parthenolide, a sesquiterpene lactone, was quantified in these taxa by LC-MS and the leaf of *T. argenteum* subsp. *argenteum* possessed the richest parthenolide amount (2.261 ± 0.002%).

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PP-123

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.It is 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[1] 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 radicals DPPH and ABTS. It had a strong activity. On the other side, tests kinetic of growth and respiratory metabolites donot 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 ^{1} H NMR. In conclusion, this plant opens promising avenues for depth research.

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PP-124

OLIVE OILS FROM ALGERIA: PHENOLIC COMPOUNDS COMPOSITION AND ANTIOXIDANT ACTIVITY

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Phenolic compounds present in olive oil have received much attention in recent years due to their beneficial functional and nutritionaleffects. In addition to extending the shelf life of foods by inhibition of lipid peroxydation, the phenolic act in the scavenging of free radicals and can protect the human body against damage caused by them[1].Phenolic composition and antioxidant activity of phenolic extracts of olive oil varieties from Algeria were investigated. The analysis of polyphenols was performed byFolin-ciocalteu colorimetric method HPLC. The antioxidant activity was assessed by the scavenging effect on the DPPH and $ABTS^{\cdot+}$ radicals. The results showed many phenolic compounds were identified and quantified by using HPLC.Derivatives of oleuropein and ligstroside, hydroxytyrosol, tyrosol, flavonoids, and lignansreporting unique and characteristic phenolic profile. These phenolic fractions also differentiate the total antioxidant activity. The total phenol was significatively ($p< 0.05$) correlated with DPPH ($r= 0.72$) and $ABTS^{\cdot+}$ radicals ($r= 0.76$). The results obtained denote that Algerian olive oils may constitute a good source of healthy compounds, phenolics compounds, in the diet, suggesting that their consumption could be useful in the prevention of diseases in which free radicals are implicated.

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PP-125

ANTIOXIDANT AND ANTIMICROBIAL ACTIVITIES OF FLOWERS PHENOLIC EXTRACTS FROM ALGERIAN *RHANTERIUM ADPRESSUM*

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Since recent times, there is a growing interest in natural products from plant materials for their usefulness to humankind, and this continues to the present day. Phenolic compounds are bioactive molecules exhibiting a lot of scientific attention due to their multiple biological activities. In the present study we are interested in phenolic extracts of *Rhanteriumadpressum* flowers and in vitro study of their antioxidant and antimicrobial activities. The antioxidant activity of ethyl acetate and butanol extracts was measured using three different *in vitro* assays; including the 1,1-diphenyl-2-picrylhydrazyl (DPPH) radical scavenging activity, ABTS 2, 2-azinobis-(3-ethylbenzothiazoline-6-sulfonic acid) power reducing method and phosphosmolybdenum assay[1,2]. The antimicrobial activity of our extracts was evaluated on the basis of the inhibition zones (IZ) using agar hole diffusion method[3]. Screening analysis of extracts to their total phenolics, flavonoïds content using Folin-ciocalteu and Lamaison and Carnat methods[4,5], suggested that these biologically active components are responsible to the antioxidant and antimicrobial activities.

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PP-126

EVALUATION OF POLYPHENOLS EFFECT ON EXOPOLYSACHHARIDES PRODUCTION BY *S.THERMOPHILUS AND L.BULGARICUS*

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There is growing interest in exopolysaccharides (EPS) of bacterial origin, in particular those produced by lactic acid bacteria (GRAS food grade). It has been suggested that these biopolymers could contribute to human health as prebiotics, anti-ulcer, immunomodulator or anti-cholesterolemic. The low production yield of EPS with thickening unstable character represents a major disadvantage to use these molecules in food industry. This increases the need for the development of alternative strategies to improve synthesis of these molecules; on the other hand, the use of polyphenols in food preparationspresents a profit until today for human health. In the present work, we have aimed to evaluate the effect of polyphenols from *Thymus fontanesii* on *S. thermophilus* and *L.bulgaricus* on EPS production which was evaluated after optimization of different parameters (pH, temperature, medium….).
In conclusion, addition of polyphenols to growth medium affect differently the EPS yield, it was found that in presence of 100µL of polyphenols production by *S. thermophilus* increased from 218 mg/L to 826 mg/L, but no significant effect was detected with *L.bulgaricus*. It has been suggested thatphenolic compounds can behave as activators or inhibitors of bacterial growth depending on their chemical structure and concentration[1].

[1]C.Reguant, A. Bordons, L. Arola, N. Roze`s: Influence of phenolic compounds on the physiology of Oenococcusoeni from wine. *Journal of Applied Microbiology*, 88, 1065–1071, 2000.

PP-127

PREVENTIVE AND CURATIVE EFFECT OF *SALVIA OFFICINALIS* EXTRACT AGAINST HIGH-FRUCTOSE DIET-INDUCED FOR HYPERTRIGLYCERIDEMIA AND HYPERURICEMIA IN MICE

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The increasing incidence of obesity and the metabolic syndrome over the past two decades has coincided with a marked increase in total fructose intake. The fructose causes increased of serum uric acid a level which is a potential risk factor for developing diabetes. *Salvia officinalis* is traditionally used to treat diabetes. We therefore tested the preventive and curative effects of the aqueous extract of *Salvia officinalis* in a mice model of diabetes induced by a high-fructose diet. After 12 weeks of the experiment, the triglyceride, LDL cholesterol and uric acid concentrations of mouse fed a high-fructose diet supplemented with *Salvia officinalis* were significantly lower than that of a high-fructose diet group. Fructose consumption does not lead to hyperglycemia and glucose intolerance. In conclusion, the *Salvia officinalis* extract has a beneficial effect on plasma triglyceride and uric acid and gives a promising perspective for hypertriglyceridemia and hyperuricemia treatment.

PP-128

DETERMINATION OF AFLATOXINE CONTENT IN COMMONLY CONSUMED SPICES AND NUTS

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The present study deals with the aflatoxine contents of commonly consumed spices and nuts as human food in Turkey. Aflatoxine contamination or content determination directly ensures the nutritional quality and safety of foods. The total aflatoxine concentrations which were determined in the edible parts of red pepper flakes, pistachio (*Pistacia vera*), peanut (*Arachis hypogaea*) and nuts (*Corylus sp.*) samples collected from Gaziantep and surrounding counties were compared to the upper limits of Turkish Standards Institute for various foods. The methods recommended by the TSE (AOAC 999.07) were applied for the procedures of sample preparations, and aflatoxine analyses were carried out by HPLC-fluorescence method. The aflatoxine concentrations of red pepper flakes (38), pistachio (15), nuts (11) were ascertained to be 0.2-46.8 (5.5), 0.4-11.0 (3.0) and 0.6-4.2 (1.7) µg/kg (ppb) within the ranges and averages in parenthesis, respectively. The aflatoxine concentrations were determined within different levels ranging in food samples. Of analyzed samples, the ranges were <0.3 ppb in some samples whereas they were over the value 10 ppb which was established as upper limit by Turkish Standards Institute. Accordingly, it can be concluded that there is no serious dangerous with respect to the aflatoxine concentration in the analyzed samples.

PP-129

EVALUATION OF ANTIFUNGAL ACTIVITY OF METABOLITES EXTRACTS FROM *PUNICA GRANATUM* PEELS ON FUNGAL STRAINS PRODUCING MYCOTOXINS

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The worldwide contamination of foods and feeds with mycotoxins poses a significant health problem. Mycotoxins can cause acute or chronic intoxication and damage to humans and animals after ingestion of contaminated food and feed.Considering these as a first step the objective of our work is to evaluate the antifungal activity of some extracts from *Punicagranatum* peels on some fungal strains producing mycotoxins. Pomegranate is an ancient fruit and a known rich source of bioactive compounds. It is only recently that modern scientists have systematically evaluated the fruit for its various medicinally useful properties.In the present work four extracts obtained by an ethanol, methanol extraction and maceration from *Punicagranatum* peels were testedfor their antifungal potential against three species of *Aspergillus*such as *A. flavus*, *A. niger*, *A. ochraceus*, and one species of *Penicillium* such as *P. expansum*. The assessment of antifungal activity is assayed by radial growth technique on solid medium content selected volumes of peel *Punicagranatum* extracts. The assessment of mycotoxinogenesisisreleasedon Y.E.S medium mix with selected volumes of peel *Punicagranatum* extracts. The results of our work indicate that all the four extracts prevent totally the mycilial growth in solid and liquid medium with a percentage of 100% of all the fungal strains in selected concentration. Moreover the methanol extract was the more effective one and the fungal strain *A. ochraceus* was the most sensible one for all the extracts.
In conclusion, the results indicate that all the extracts which have been obtained from *Punicagranatum* peels got an antifungal activity against the four fungal strains.

PP-130

ANALYSIS OF PHENOLIC COMPOUNDS FROM ARGAN FRUIT AND EVALUATION OF THEIR ANTIOXIDANT CAPACITY

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Polyphenol composition of the shell, pulp, roasted, and unroasted kernels of the argan fruit was qualitatively and quantitatively determined by HPLC coupled with electrospray negative ionization ion trap mass spectrometry (HPLC-ESI-MS). Unroasted kernels and shell contained various polyphenols but the pulp was characterized by a very high amount of total polyphenols (75.78 mg of gallic acid equivalent/g). The radical scavenging (DPPH• method) and antioxidant activity (ABTS method) of each fruit part was also determined. Argan fruit pulp showed the highest radical scavenging activity (0.17 ± 0.005 μM Trolox equivalent/mg) and antioxidant activity (0.375 ± 0.07 μM Trolox equivalent/mg). Therefore, argan fruit polyphenols are good candidates to be exploited as health supplements and nutraceuticals.

PP-131

POLYPHENOLS CONTENT AND *IN VITRO* ANTIOXIDAND ACTIVITY OF METHANOLIC EXTRACT OF *MALVA SYLVESTRIS*

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Recent developments in biomedical science emphasise the involvement of free radicals in many diseases. There is increasing evidence to suggest that many degenerative diseases could be the result of cellular damage caused by free radicals and that antioxidants may play an important role in disease prevention. Phenolic compounds are known to exhibit a range of biological activities, including anticancer, antibacterial, anti-inflammatory and antioxidant properties. In this study, methanol extract from *Malva sylvestris* was evaluated for its phenols content using Folin-Ciocalteau reagent[1]and antioxidant activity using different methods: 1,1- diphenyl 2- picryl-hidrazyl (DPPH) radical scavenging activity[2], reducing activity of H_2O_2[2], and ferric reducing power assay. Total phenolic content was determined as gallic acid (GAE) equivalent. Flavonoid and flavonol contents were determined as quercetin (QE) equivalents. Preliminary screening based on specific tests concluded in the presence of substances with large therapeutic values. The total phenolic content based on gallic acid equivalents confirmed the presence of total soluble phenolics in the extract and showed strong association with antioxidant activity. An important content of flavonoids and flavonols was also detected. The results of the antioxidant activities obtained indicate that, about of measurement method, *Malva sylvestris* records a high capacity.

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PP-132

AROMATIC COMPOUNDS OF GRAPE *(VITIS VINIFERA)* SEEDS

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Grape (*Vitis vinifera*) seeds are fruit crops that have diverse health benefits including antioxidant, antimicrobial, anti-inflammatory, and anti-carcinogenic properties. Considering the volatile compounds, grape seed include a great number of compounds, among whichterpenes, alcohols, esters and carbonyls are found[1]. Concentrations of the volatile components are different depending on the grape variety, cultural practiques, and climatic or biological factors. Greater importance is being given to the study of aroma composition of fruit's seed. In this study, we have aimed to investigate volatile compounds of five grape seeds locally named as "Kalecik Karası", "Kabarnet", "Öküz Gözü", "Senso" and"Gamay" in Turkey. These five different samples analyzed by gas chromatography-mass spectrometry (GC-MS)[2].

In conclusion, a large number of substances such as esters, acids, alcohols, aldehydes and terpenes were detected in grape seeds. The most abundant volatile component is isoamyl acetate in grape seeds, with the highest amount in Senso with the level of 37% and the least amount in ÖküzGözüwith the level of %15. The other major components are ethyl heptanoate, nonanal, octanal, phenethyl acetate, phenethyl alcohol.

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PP-133

EXTRACTION OF CAROTENOIDS AS NATURAL DYES FROM THE *DAUCUS CAROTA* LINN. (CARROT) USING ULTURASOUND IN KINGDOUM OF SAUDI ARABIA

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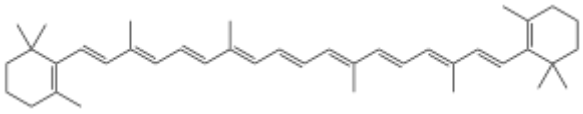
Dyes derived from natural sources have emerged as an important alternative to synthetic dyes. Therefore, there is a need for developing better solid-liquid extraction techniques for leaching natural colorants from plant materials for applications in plant research concerned on boiling and solvent extraction. Water, methanol and acidified methanol were used as solvent to extractCarotenoids as the natural dyes from plant, as well as dyeing industries. The influence of ultrasound on natural colorant extraction from different potential dye yielding plant materials has been studied in comparison with magnetic stirring process as control. The color yielding plant materials used in the present study include *Daucuscarota* Linn. (carrot). Analytical studies such as UV-VIS spectrophotometry and gravimetric analysis were performed on the extract. The dyes produced were dyed on silk fabric and tested for their colour fastness to washing properties. Several mordants were also used for fixing the colour on the fabrics. Moreover, the dyes obtained from the plant may also be alternative sources to synthetic dyes for the dyeing of natural silk fibre. Therefore, this methodology could be employed for extracting coloring materials from plant materials in a faster and effective manner.



PP-134

ESSENTIAL OIL CONTENT AND COMPOSITION OF ENDEMIC *ORIGANUM MICRANTHUM* VOGEL COLLECTED FROM EASTERN MEDITERRANEAN OF TURKEY

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Origanum species which belongs to Labiatae family is represented by 31 taxa in Turkey[1]. Sixteen numbers of total *Origanum* species which founded in Turkey are endemic; they are under threats according to IUCN categories[2]. One of them, *Origanum micranthum* which collected from the nature was widely used as herbal tea in Cukurova region. This study attempts to determine essential oil content and composition of *Origanum micranthum* Vogel which collected from wild flora. In 2011, *Origanum micranthum* were collected from four different locations at Eastern Mediterranean of Turkey (Hopur castle-Tarsus, Inkoy-Tarsus, Topak ardic-Tarsus and Akoluk-Feke). The essential oils of collected samples were analyzed by GC-MS for its composition. Essential oil content varied between 0.08% -2.22%. Composition of essential oil was varied with different locations; the main component of essential oil was changed according to collecting places.

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PP-135

SWEET HERB: *STEVIA REBAUDIANA* L.

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Stevia rebaudiana L. is a plant with a broad area of cultivation. It is also a plant whose main content is the sweet diterpene glycoside in its leaves. According to the data coming from World Health Organization (WHO), there are 347 millions of people around the world who are suffering from diabetes. This significant reality draws upon attention to *Stevia rebaudiana* L. which doesn't have any effect on making the level of blood glucose rise. The things that give *Stevia rebaudiana* L. the taste of sugar are the glycosides called stevioside and rebaudioside which are derived from its leaves with zero-calorie. The plant can be used in a mixed-form with powder, liquid, fresh leaf, dry leaf and the other plants. It can grow 1 meter or more in length. It has a broad root system. The leaves are stemless, serrated and in the shape of spear. There are small and white blooms on it. It prefers these types of earth which is humid, sandy, hardpan, and which has a high level of organic substance. Apart from these, it is also prefers the earth with enough drainage. It is tolerant to the pH range of the earth. It performs well in half-shadow areas in terms of agronomic features. The seeds of the plant cultivated in February or March are gathered at the end of the summer (54-104 days). It has been consumed as a nutrient additive in such countries as Japan, China, and South America for many years because of its helping effects on digestion and weight loss. The cultivation of it has also been done in many countries such as Paraguay, Mexico, Central America, Japan, China, Malaysia, South America, Spain, Belgium, and United Kingdom. There have not been enough researches which have been made about *Stevia rebaudiana* L. in our country. In this research, it is aimed to make an emphasis on the importance of the plant.

PP-136

ANTIOXIDANT ACTIVITY OF FOUR SEAWEEDS FROM LEBANESE MEDITERRANEAN COAST

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It has been reported that seaweeds serve as an important source of bioactive natural substances[1]. The aim of our investigation was to evaluate the antioxidant activities and the phenolic content of extracts from two brown algae *Padina pavonica, Sargassum vulgare* and two green algae *Ulva lactuca,Ulva linza* from the Lebanese coast. Two different extraction methods with methanol, followed by fractionation (petroleum ether, ethyl acetate, butanol, and aqueous) were carried out. Antioxidant activities were evaluated using the DPPH method. The total phenolic content was determined with the Folin–Ciocalteau method. The ethyl acetate fraction of the algae *Padina pavonica*s howed the antioxidant activity (42.5%); those activities may be due to phenolic compounds present in significant amounts in this fraction (8.98 GAE/g). Also, on the other hand, the petroleum ether fraction of the algae *Sargassum vulgare* had the antioxidant activity (40.6%), which seems to be due to lipids because the phenolic content in this fraction is lower (6.10 GAE/g). The extraction with (CH_2Cl_2 / CH_3OH) of fresh *S. vulgare* showed the highest antioxidant activity (91 %). The petroleum ether fractionof the algae *U. linza* had the antioxidant activity (84.6%), while the extract of *U. lactuca* had the antioxidant activity (82%).

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PP-137

ANTIOXIDANT AND ANTI-INFLAMMATORY EFFECT OF *QUERCUS ROBUR* ROOT BARK

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Quercus robur is a medicinal plant belonging to the family of fagaceae. It has been used in folk medicine as an astringent for hemorrhoids and for treatment of inflammation, jaundice, swollen glands, inflamed gums and loose teeth.
The present study attempts to investigate antioxidant and anti-inflammatory effect of the methanolic extract (ME) prepared from *Quercus robur* roots bark. Folin-Ciocalteau assay showed a high polyphenolic content (490.81 µg GAE/mg extract).In the DPPH assay, this extract exertedhigh radical scavenging activity with IC_{50} value 5.69µg/ml.In the same way, ME showed ahigh ferric reducing ability in FRAP assay (8.55 mM $FeSO_4$ /mg extract).On the other hand, the anti-inflammatory activity was evaluated using xylene induced ear oedema model in mice[1]. The obtained results showed that the oral administration of 400 mg/kg of ME exerted 44.31% of inhibition in oedema thickness. Moreover, the topical application of 2 mg/ear of ME inhibited significantly (41.74%) the croton oil induced ear oedema. Taken together, we can conclude that *Quercus robur* root extract possesses an important antioxidant and anti inflammatory effects which make it promising medicinal plant for further studies.

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PP-138

EVALUATION OF TOXICOLOGICAL, HEPATOPROTECTIVE & ANTIDIABETIC EFFECTS OF *CLEOME DROSERIFOLIA* HERB USED IN FOLK MEDICINE

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The present study was aimed to investigate hepato protective & antidiabetic effect of *cleome droserifolia* herb used in folk medicine. In acute toxicity studies, LD_{50} of 70% alcoholic extract of *cleome droserifolia* was 217.5 $mg.kg^{-1}$ b.wt., symptoms of toxicity were characterized by tremors, convulsions , arched back, sweating, rapid and shallow respiration, coma followed by death. Post mortum examination revealed pitcheal haemorrhage in liver, congestion in parenchymatous organs. Pretreatmed with oral administrant of 217.5 $mg.kg^{-1}$ b.wt., of cleome droserifolia showed a highly efficient hepatoprotective effect in rats when given prior to $CC1_4$ as proved by significant decrease in AST , ALT & ALP activities from those of intoxicated control group and arrest of necrosis with only slight hydropic and fatty changes in histopathological examination. Moreover, oral administration in a dose of 217.5 $mg.kg^{-1}$ b.wt. showed hypoglycemic effect in hyperglycemic diabetic rats 2, 3 hours post administration.

PP-139

VALORISATION OF A MEDICINAL PLANT OF LEBANON, *CAPPARIS SPINOSA*

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The use of medicinal plants is constantly growing since phytotherapy is effective and non-toxic, therefore plants will be included in the national pharmacopoeia according to their assessed interest.In the context of the valuation of Lebanese medicinal plants, we conducted a preliminary study on *Capparisspinosa*, a species belonging to the family of Capparidaceae, and known for its important ethnopharmacological properties.This plant is widely used in the Lebanese traditional medicine because of its anti-inflammatory activities and for the treatment of herniated discs. The previous studies of the species of *Capparis* kind showed the presence of alkaloid compounds, known for their vast pharmacological interests.

Therefore,we prepared the crude extracts of different parts (leaves, stems, flowers, and barks) of this plant in different solvents with increasing polarity (methanol, dichloromethane and water). All extracts were subsequently analyzed byt hin layer chromatography to have an idea on the chemical composition of each extract and to also reveal the presence of alkaloids. The TLC of MeOH crude extracts of leaves, stems and barks,showed an orange spot, after their revelation with Dragendorff reagent, which implies the presence of alkaloids in these extracts.So from these extracts,we prepared the crude alkaloidal extracts by acid-base treatment. During the acid-base treatment, in order to prepare the alkaloidal crude extract of leaves, a precipitate was formed in the aqueous phase of leaves. TLC and HPLC Analysis, prove that this productis pure.Also, the first purification essay of the crude alkaloidal extracts of leaves and bark were performed by HPLC.All the crude extracts of the different parts of the plant, the alkaloidal crude extracts and the precipitate, were biologically evaluated *in vitro* for their antioxidant, antibacterial and antifungal activities. The methanolic and alkaloidal crude extracts showed a minor antibacterial activity on *Staphylococcus aureus* and *Salmonella ssp*, a significant antifungal effect for *Candida albicans*, in addition to an important antioxidant effect, enoughto deserve to be noted, by counteracting the free radicals DPPH•.The precipitate formed in the aqueous phase of leaves after the alkaloidal extraction, manifests significant antifungal and anti-radical activities.The structure of this compound remains to be determined.

PP-140

PHYTOCHEMICAL AND BIOLOGICAL PROPERTIES OF A MEDICINAL PLANT OF LEBANON, *ALCEA SETOSA*

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The effective strategy of drug discovery is related to natural products isolated from medicinal plants, an important source of biologically active substances, either in their native form or as templates for the synthesis of new molecules. As part of the value of medicinal plants in Lebanon, we conducted the preliminary study on the *Alcea setosa*, a species belonging to the family of Malvaceae, and known for its important ethnopharmacological properties. The evaluation of biological activities (antibacterial, antifungal and antioxidant) *in vitro* of the different crude extracts prepared in this species shows that the methanol extract of leaves has a significant antioxidant activity measured by its ability to capture free radical, DPPH (2,2-diphényl-1-picrylhydrazyle). Fractionation by column chromatography of this extract resulted in 15 fractions of which five, F1 to F3, F13 and F14, found to exhibit an interesting antioxidant activity.In the first fractions F1 to F3, this activity is due to the presence of carotenoid compounds known for their antioxidant power. TLC analysis of fractions F13 and F14 shows a chemical composition similar in both fractions. The first attempts of purification by LC-MS for the F13 fraction were performed.

Acknowledgements
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PP-141

HEPATOPROTECTIVE EFFECTS OF *THYMUS* AND *SALVIA* ESSENTIAL OILS ON PARACETAMOL-INDUCED TOXICITY IN RATS

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Medicinal plants have been used traditionally worldwide for the prevention and treatment of liver disease. *Thymus capitatus* and *Salvia officinalis* are used frequently as spices. The present investigation aimed to investigate the possible potential protective effect of *Thymus* and *Salvia* essential oils against paracetamol-induced hepatotoxicity. Administration of paracetamol (500 mg/kg.b.wt) resulted in liver damage as manifested by significant increase in serum and hepatic lactate dehydrogenase (LDH) activity with a significant decrease in blood and hepatic glutathione (GSH) levels, as well as blood and hepatic superoxide dismutase (SOD), and glutathione peroxidase (GPx) activities. Rats pretreated orally with essential oil of *Thymus capitatus* and *Salvia officinalis* (50 mg/kg b. wt. daily) for 15 days then intoxicated with paracetamol showed a significant protection against-induced increase in serum and hepatic LDH activities and inhibit reduce GSH levels and enhance increase SOD and GPx activities in blood and liver.
These data indicate that essential oils of *Thymus* and *Salvia* possessed a hepatoprotective activity against hepatotoxicity induced by paracetamol model due to their antioxidant activity.

PP-142

EXTRACTION AND DETERMINATION OF ESSENTIAL OILS FROM CELERY USING MODERN TECHNIQUES

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The study was carried out to determine the essential oils from celery (*Apium graveolens* L.) extracts obtained by different extraction techniques. The essential oils containing extracts were obtained by three different techniques (maceration, ultrasound and microwave-assisted solvent extractions) using the following solvents and solvent mixtures: diethyl ether - ethanol (1:1, v/v), ethanol, hexane, diethyl ether, diethyl ether - hexane (1:1, v/v). Analysis of essential oils was performed by TLC and GC-FID.

TLC separation was performed in a normal chromatographic chamber on silica gel 60 plates with petroleum ether – dichloromethane (30:70, v/v) as mobile phase. Photodensitometric evaluation of the plates was performed after spraying with vanillin reagent.

GC analysis was performed with a Shimadzu GC-2010 gas chromatograph with flame- ionization detector (FID). Capillary column used was a type of AT-5 (30m), and analyses were performed in helium at a rate of 4 ml/min. Chromatograms registration started at 50^0C for 2 min, continuing with a heating rate of 8^0C/min to 250^0C which was maintained 15 min. Injection temperature was 250^0C.

The most efficient extraction technique was maceration, followed by ultrasound extraction with diethyl ether – hexane (1:1, v/v) solvents mixture. Volatile oils identified from celery extracts were: limonene, β-myrcene**,** trans-β-ocimene**,** myristicin, γ-terpinen, α-terpinolene.

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PP-143

PHENOLIC CONTENTS, *IN VITRO* ANTIOXIDANT AND CYTOTOXIC ACTIVITIES OF *SALVIA AETHIOPIS* L. (LAMIACEAE)

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The study was designed to examine the phenolic composition and *in-vitro* antioxidant and cytotoxicity capacities of methanol(MeOH) and ethyl acetate (EtOAC) extracts obtained from *Salvia aethiopis* L.(Lamiaceae).The extracts' total phenolic contents were measured by the Folin–Ciocalteau assay and phenolic acids were determined by reversed phase-HPLC-DAD[1]. Antioxidant activities of the extracts were also examined by 2,2-diphenyl-1-picrylhydrazyl (DPPH) free radical scavenging and β-Carotene–Linoleic acid methods.The cytotoxicity of the extracts was measured on 3T3NIH mouse fibroblast cells with MTT[2]. The total phenolic contents of the extracts were in the range of 94.36±1.36–290.62±1.51mg GAE/g extract, respectively.EtOAcextract was found to be rich as a source of phenolics. The main phenolic acid of the extracts identified by HPLC-DAD was rosmarinic acid (RA) (40.25and140.6 mg/100g plant). In the experimental studies, EtOAc extract was a distinctive antioxidant activity compare with the MeOH extract, depend on the most higher phenolic subtances and RA contents. Determined antioxidant activity on the system of β-Carotene/Linoleic acid was decreased, BHT>MeOH>EtOAC>RA, respectively. Toxicity study was measured by the MTT test each of the two extracts toxicity increased with time and concentration; EtOAC extract with high phenolic content was observed that more toxicity.

[1]N. Öztürk, M. Tunçel, NB Tunçel: Determination of phenolic acids by a modified HPLC: Its application to various plant materials. *Journal of Liquid Chromatography and Related Technologies*,30: 587–596, 2007.
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PP-144

ANTIOXIDANT AND ANTIRADICAL ACTIVITY OF SOME ORGANIC EXTRACTS OF THE ENDEMIC MEDICINAL PLANT *ANABASIS ARETIOIDES* COSS. & MOQ. FROM ALGERIAN SAHARA: VALORISATION OF LOCAL MEDICINAL PLANT

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Anabasis aretioides Coss. & Moq. is one of the endemic medicinal plants from Algerian Sahara. It is used for many traditional therapies of various diseases. In this study, we investigate the content of different organic solvents on phenolics and flavonoids, and also their antioxidant activities using two conventional methods: the DPPH and hydrogen peroxide scavenging activities. From the obtained results, we found that the ethanolic extract presented the highest level of phenolic and flavonoid contents (231.85 ± 20.59 mg GAE/g and 132.8 ± 24.58 mg CEQ/g). The EC_{50} of different extracts were arranged between 47.71 to 86.73 µg/mL. A highest hydrogen peroxide activity was observed in the ethyl acetate extract compared to used references (BHA and α-tocopherol).

PP-145

VERBASCUM LATISEPALUM HUB.-MOR.: INVESTIGATING ITS POSSIBLE ANTI-INFLAMMATORY AND ANTINOCICEPTIVE POTENTIAL

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The leaves and flowers of *Verbascum* species are mainly used as expectorant, mucolytic and demulcent and to treat haemorrhoids, rheumatic pain, superficial fungal infections, wounds and diarrhoea in Turkish traditional medicine. This study was designed to assess *in vivo* anti-inflammatory and antinociceptive activities of *Verbascum latisepalum* Hub.-Mor. For the anti-inflammatory activity evaluation carrageenan-induced hind paw edema model was used. *p*-Benzoquinone-induced abdominal constriction test was employed in mice for the evaluation of the antinociceptive activity. The experimental results revealed that *V. latisepalum* displayed significant inhibitory effect on carrageenan-induced hind paw edema model as well as on *p*-benzoquinone-induced abdominalconstriction test at 200 mg/kg dose.

PP-146

THE CONTENT OF PHENOLICS AND ANTIOXIDANT CAPACITY IN INFUSION OF VARIOUS TEAS

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The aim of this study was to determine the total phenolic content (TPC) and antioxidant capacity (AC) against peroxyl free radicals in the infusion of various teas. Twenty-two samples of tea were analyzed: sage, green and black tea, heather, uva ursi tea, peppermint, cranberry, chamomile, tea for gastritis, genomisic, rosemary, savory, comfrey, thyme, St. John's wort, Turkish Malva, artichoke, buckwheat, tarragon, and a mixture of buckwheat and tarragon. Some of these types of teas such as sage, heather, black tea and buckwheat were analyzed twice (manufactured by different vendors, or originating from different locations). All tea infusions were centrifuged, and TPC and AC were analyzed in duplicate in diluted supernatants. The TPC was determined using the spectrophotometric method, with gallic acid as a standard. AC against peroxyl free radicals was determined using the oxygen radical absorbance capacity (ORAC) assay, with trolox (T) as a standard. The mean TPC was expressed in gallic acid equivalent weight per volume tea's infusion (mg GAE/100 $mL_{inf.}$). The highest TPC and AC was found in the uva ursi tea (488.8 mg GAE/100 $ml_{inf.}$, and 4076.3 μmol TE/100 $ml_{inf.}$ respectively). Although the infused uva ursi tea showed the highest values for both parameters, such correlation was not obtained for the other samples.

PP-147

SPECTROPHOTOMETRIC DETERMINATION OF MALONDIALDEHYDE AS A MARKER OF EDIBLE SOLID FATS

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The aim of this study was to measure the malondialdehyde (MDA) as a marker of lipid peroxidation (LP) in edible solid fats exposed to daylight.[1] Samples were solid fats: cow butter, margarine, peanut butter, cow and sheep fat. One part of each sample was exposed under the influence of daylight and temperature for of 37, 58 and 77 days, which was a rancid sample. The other part of each sample left to stay at +4ºC, protected from the light, was used as a control (C). For the measurements, the spectrophotometric method was used. MDA content was expressed as mass MDA by weight of fresh sample (μg/g). The results showed tendency to an increase in LP in comparison to the C for a period of 58 days in the sheep fat (3.85 μg/g, 3.04 μg/g in C) and peanut butter (2.34 μg/g , 1.95 μg/g in C). The highest MDA content was found in cow butter, that was exposed under the influence of daylight for 77 days (18.52 μg/g, 2.35 μg/g in C), indicating that LP was strongly expressed. It can conclude that quantification of MDA is very useful for assessment of food quality.

[1]N. Porter: Chemistry of lipid peroxidation. *Methods Enzymol*, 105, 273-283, 1984.

PP-148

THE CONTENT OF TOTAL PHENOLICS AND TOTAL FLAVONOIDS IN NATIVE LEAF EXTRACTS OF HOUSELEEK, *SEMPERVIVUM TECTORUM* L., (CRASSULACEAE)

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The aim of this work is to give more information about the chemical composition of houseleek, *Sempervivum tectorum* L. Houseleek is a perennial, succulent plant and originates from Europe. Although therapy with preparations of houseleek can be traced back to Greek herbal medicine, its leaves or flowers have not yet been introduced in modern official medicinal practice. The juice of houseleek is a popular domestic remedy for wart removal and for ear pain. Houseleek is considered to be an astringent, diuretic and vulnerary. Externally, infusion of leaves, ointments and salves made from leaves of this plant mixed with *Glechoma hederacea* L., (Lamiaceae) are used for a variety of skin conditions. pH of native juice of houseleek was between 4.5 to 5.0. The content of total phenolics in the native juice of houseleek (eleven samples) was determined according to the Folin-Ciocalteau spectrophotometric method, using Gallic acid as the standard. The absorbance was measured at 765 nm. The total phenolic content was expressed as a Gallic acid equivalent, in mg/ml of juice, as the mean ± SD of eleven sample measurements (1.36±1.04 mg/ml). The total flavonoid content was determined using the aluminum chloride colorimetric method. Rutin was chosen as the standard. The total flavonoid content was expressed as milligram rutin equivalents per ml of juice, as the mean ± SD of eleven sample measurements (1.07±0.13 mg/ml). Thus, the study suggests that the native juice of houseleek is a potential source of various phenolics and flavonoids.

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SPECTROPHOTOMETRIC DETERMINATION OF MALONDIALDEHYDE AS A MARKER RANCIDITY OF OIL

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The aim of this study was to measure the malondialdehyde (MDA) as a marker of lipid peroxidation (LP) in edible oils exposed to daylight.[1] Samples were olive oil, soybean, sunflower, sesame and pumpkin oil. One part of each sample was exposed under daylight for 37, 58 and 77 days (rancid sample), and the other part of each sample left to stay at +4 ºC for all intervals, protected from the light (control, C). For the measurements, the spectrophotometric method was used. MDA was expressed as mass MDA by weight of fresh sample (g/g). The results showed that in sunflower and olive oil exposed to daylight for a period of 58, and 77 days, there is a tendency to an increase in LP in comparison to C: [1.39 μg/g in sunflower oil after 58 days on daylight (d.o.d.), 0.54 μg/g in C, 2.51 μg/g (77 d.o.d.), 0.94 μg/g in C; in olive oil: 1.41 μg/g (58 d.o.d.), 0.99 μg/g in C, 2.12 μg/g (77 d.o.d.), 0.87 μg/g in C]. Furthermore, in soybean oil exposed 77 d.o.d., the MDA (1.33 μg/g) was higher than in C (0.46 μg/g). It can conclude that quantification of MDA is useful for assessment of food quality.

[1]N. Porter: Chemistry of lipid peroxidation. *Methods Enzymol*, 105, 273-283, 1984.

PP-150

HERBAL EXTRACTS' EFFECTS ON THE INTESTINAL MICROFLORA OF POULTRY

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In poultry breeding, healthy digestive tract microflora plays a key role for improving feed efficiency. Medicinal and aromatic plants are used as feed additives for three purposes. The first is to prevent the reproduction of pathogenic microorganisms that cause diseases of the digestive system, the second is the animal's digestive tract microflora in favor of beneficial microorganisms and the third is to increase the activity of digestive enzymes. Medicinal and aromatic plants and extracts derived from these plants; come to the fore with antifungal, antibacterial, antiviral, antioxidant and antilipidemic features and also be regarded as a natural and safe ingredients. Because of these properties; ginger, thyme, mint, bay, rosemary, garlic, etc. were carried out *in vivo* digestive experiments by participating aromatic herbs and their extracts in broiler rations.[1, 2]
In these studies, the active compounds of medicinal and aromatic plants have positive effects on *B. megaterium, B. subtilis, B. brevis, E. coli, K. pneumoniae, E. aerogenes, P. aeruginosa, S. aureus, C. perfiringens* and *L. monocytogenes* which are important for poultry intestine and accordingly understanding of providing a positive contribution to the animal performance and on the immune system, can be used as feed additives.

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PP-151

MEDICINAL AND AROMATIC PLANTS IN ANIMAL NUTRITION

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It is known to be a close relationship between animals' immune system, vitality and the performance. At the beginning of the most important factors affecting the efficiency and profitability of the animals, they are resistant to the disease. For many years, antibiotics are widely used in both preventive and therapeutic purposes, but for some reasons such as the residue problem, decreased resistance to antibiotics, etc. is prohibited. Search for alternative feed additives in conjunction with the prohibition of antibiotics, has accelerated. Aromatic herbs and extracts such as thyme, sage, laurel, myrtle, origanum, fennel, citrus, rosemary and garlic are increase the appetite, stimulating the digestive system and antimicrobial, antifungal and antioxidant properties have been reported due to a positive effect on animal performance.[1, 2]

Normal feeding conditions or in the case of environmental factors that affects such as immune disease, improvement of dietary nutrient density or medicinal and aromatic plants that have proven special effects or their extracts are recommended for use as feed additives.

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[2]Tsinas, A.C., Giannakopoulas, C.G., Papasteriades, A., Alexopoilos, C., Mavromatis, J. and Kyriakis, S., Use of origanum oils as growth promoter in pigs. In Proceedings of the 15th IPVS Congress, July; Birmingham, UK. Vol 3, pp. 221, 1998.

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 vulagaris*), basil (*Ocimum basilicum*) and oregano (*Origanum vulgaris*) with various concentrations and were exposed to *Callosubruchus maculatus* adults in laboratory conditions[1]. The results showed that the treatements 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.

[1]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

NMR STUDY OF ANTI-ENZYMATIQUE AND FREE RADICAL SCAVENGING ACTIVITY OF *FRAXINUS ANGUSTIFOLIA* AND *PISTACIA LENTISCUS*CRUDE EXTRACTS

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Fraxinus angustifolia (Oleaceae) and *Pistacia lentiscus* (Anacardiaceae) widely used traditionally in Algeria against several inflammatory diseases such as arthritis and gout. This study aimed to investigate the XOR inhibitory potential and free radical scavenging effects of *F.angustifolia* and *P.lentiscus* leaves extracts, together with their phenolic contents. Selective extraction was performed on dried plant material as described by Chiang et al., 1994[1].Ten extracts were obtained and screened for anti-XOR[2] and anti-DPPH[3]activities. *P. lentiscus* aqueous fractions inhibited XO activity by 72.74±2.63% (IC_{50}=27.52 μg/ml) and 68.97±3.89% (IC_{50}=42.46 μg/ml), respectively, at 100 μg/ml, compared to allopurinol (98.18%, IC_{50}=6.34 μg/ml)[2]. *F.angustifolia* leaf extracts showed only moderate inhibition. DPPH scavenging results indicated that the aqueous fractionsshowed the strongest quenching activity (IC_{50}= 4.24 μg/ml)[3], accompanied with highest amounts of aromatic compounds observed in comparative crud extracts NMR spectra.[1]H-NMR profiles revealed that the most active extracts showed high signals in the aromatic region. *Fraxinus angustifolia* active extracts contain mainly phenylethanoids, secoiridoids and small amounts of flavonoids, whereas *P. lentiscus* contains high amounts of tannins and flavonoids.

Our results support the use of *F. angustifolia* and *P. lentiscus* in traditional folk medicine against inflammatory-related diseases and imply that their leaves might be a potential source of natural antioxidants.

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ANTIBACTERIAL ACTIVITY OF FOUR SPECIES OF ALGERIAN ALGAE

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Marine organisms, as algae, are a rich source of biologically active metabolites.The aim of this work is to highlight the antibacterialactivity of methanol extracts of four marine algae species: *Cystoseira tamariscifolia*, *Padina pavonica*, *Rhodomela confervoides* and *Ulva lactuca* of Bejaia's coast. Antibacterial activity was evaluated by agar diffusionmethod[1]. Tested microorganisms were obtained from applied microbiology laboratory. Six human pathogenic microorganisms, such as: *Bacillus subtilis* (ATCC6633), *Listeria innocua* (CLIP74915), *Staphylococcus aureus* (ATCC 6538), *Escherichia coli* (N.A.R), *Klebsiella pneumonia* (E47), *Pseudomonas aeruginosa* (ATCC27853) were used in the present study. Crude extracts of the four species of algae showed antibacterial activity. All the extracts showed activity against *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa* and *Listeria innocua*. The majority of algal extracts were active against four or five microorganisms.
In conclusion, the results obtained in this study suggest that algal extracts of Bejaia coast have a good antibacterial activity against pathogenic bacteria which makes them interesting for programs screening natural products. This ability is not restricted to one order or division within the macroalgae: all of them offer opportunities for producing new types of bioactive compounds.

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PP-155

ANALYSIS OF COMPOUNDS ISOLATED FROM FLOWERS OF *CIRSIUM CANUM* (L.) ALL. AND ANTIMICROBIAL ACTIVITY

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The aim of this study was the phytochemical investigation of flavonoids and phenolic acids from methanolic extract from *Cirsium canum* (L.) ALL. The *Cirsium* genus belongs to the Asteraceae family. According to literature, plants from the Cirsium family are rich in phenolic compounds1. Cirsium spp. are known to have various biological activities, especially antioxidant fungistatic, bacteriostatic, choleretic, potential sedative – hypnotic, antianxiety and anticolvulsant activity[2]. The flowers and herbs were extracted subsequently with MeOH. The combined extracts were concentrated under reduced pressure, treated with hot water and the resulted precipitate was filtred off. The filtrate was extracted with petroleum ether, ethyl acetate and n-buthanol. Phenolic acids were isolated by the classical way and then hydrolyzed using Schmidtlein and Herrmann method.
In this work, we show chromatographic separation of the methanolic extract of flowers and herbs followed by isolation and identification flavonoids and phenolic acids by TLC, employing different adsorbents (cellulose plates, polyamide and silica gel) and different mobile phases. Chromatograms were observed under UV light (λ = 366 nm) and light before and after derivatization. Phytochemical investigation of essential oils from *Cirsium canum* (L.) ALL flowers by GC-MS method was also performed.
Apigenin, apigenin-7-glucoside, luteolin-7-glucoside, linarin, kaempferol-3-glucoside and chlorogenic, ferulic acid were identified by TLC and HPLC by comparison with standards spectrum. The obtained methanol extracts proved to be very rich in flavonoids, some of which have not been identified. Therefore, more research is required. Compounds occurring in plant extracts also show antimicrobial activity against various microorganisms. In volatile oil of C. canum 62 compounds were analyzed. Lauric and hexadecanoic acid, thymol and p-cymen-8-ol are represented in inflorescences. Antimicrobial activity extracts from Cirsium canum (L.) ALL. and flavonoids, phenolic acids, and essential oil were qualitatively determined for the first time. They have not been studied before.

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PP-156

QUANTIFICATION OF A-TOCOPHEROL IN VARIOUS OILS USING HIGH PRESSURE LIQUID CHROMATOGRAPHY WITH ELECTROCHEMICAL DETECTION

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The aim of this work was to develop a suitable chromatographic method for the quantification of α-tocopherol. Eleven samples of oils were analyzed: wheat germ, linseed, maize germ, almond, peanut, pumpkin, nigella sativa seed, olive (3 different samples) and sunflower. Oil samples were purchased in a Sarajevo market. Used oils were obtained by cold extraction. The samples were first centrifuged (15 000 rpm, 20 °C, 20 min), and then supernatants were used for the analyses. All samples were analyzed by high pressure liquid chromatography with electrochemical detection (HPLC-ED). Chromatographic conditions: column 250 x 4.6 mm, Hypersil RP C18 (ODS), 5 μm; mobile phase methanol + lithiumperchlorate (5 g/L) + acetic acid (1 g/L); flow rate 1 mL/min; oven temperature 25 °C; working electrode glassy carbon; working potential 0.9 V; range 50 nA; ref. electrode AgCl/KCl. Calibration curves were obtained using pure α-tocopherol. A linear range was in the concentration interval of 1 ng/ml – $1 \cdot 10^4$ ng/ml. The highest content of α-tocopherol was found in wheat germ oil (23.28 mg/ml), then followed by: sunflower 2.87, peanut 1.69, olive oil (Italy) 1.60, almond 1.03, olive oil (Montenegro) 0.91, nigella sativa seed oil 0.80, maize germ 0.58, pumpkin 0.26, olive oil (Turkey) 0.23, and flaxseed 0.05 mg/ml. The utilized HPLC-ED method appears to be appropriate for the quantification of α-tocopherol in oils.

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THE TRADITIONAL USE OF SAHARIAN PLANT (*HALOXYLON*) BY ALGERIAN POPULATION AND THEIR ANTIBACTERIAL AFFECT AGAINST THE STRAINS RESPONSIBLE FOR URINARY TRACT INFECTION

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Natural extracts from plants contain a variety of therapeutic compounds, the survey focuses on the importance of *Haloxylon* (Chenopodiaceae*).* This plant is traditionally used by the Algerian population against several infections. The aim ofthis study is to know the mainmicrobial species responsible for urinary tract infection (UTI) in the South Algeria (Tamanrasset, Becharand Ain Salah); to adjust thetherapeutic and preventive attitudes to prevent the emergence of strains multi-resistant bacteria and monitor the effectiveness of traditional uses by identification of the active constituents of *Haloxylon*.We evaluated antibacterial activity of crude extracts, flavonoids and alkaloidsof selectedplant. Moreover, the highlighted separation methods by TLC[1], and GCof the active components (alkaloids, flavonoids and essential oils). All bacterial strains tested (*Proteus mirabilis, Escherichia coli, Pseudomonas aeruginosa, Staphylococcus aureus*) have revealed a resistance to alkaloids and interesting sensitivity to crude extracts and flavonoids. Preliminary tests of this plant have revealed the presence of tannins, flavonoids, glycosides, alkaloids and saponins whereas theabsence of anthraquinone derivatives and quinones.The crude extractof *Haloxylon*at (5-15and30) minutes have a remarkable effect to *Proteus mirabilis*, which givedifferent inhibitionzones of diameters (10-16 and 20) mm; The high effect is shown in presence of *Escherichia coli* and *Staphylococcus aureus* in30minthatgive the zones of 22 mm as diameter. The flavonoids tests confirm that *Haloxylon* has an important effect on S*taphylococcus aureus*, *Proteus mirabilis* and *Escherichia coli* by giving 21mm but a weak one on *Pseudomonas aeruginosa* with10mm.On the other hand, the alkaloids have no effect on the tested strains.The GC analysis of the *Haloxylo*n oils quantifies the seven components where three represent the majority which has the main percentages of 33.96%, 25.23% and 20.63%. The TLC analysis on a thin layer has allowed to highlight the distribution of major alkaloids. The *Haloxylon* containing isoquinoline alkaloid (β-Carolline) has agreement with our results.

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PP-158

CYTOTOXIC EFFECTS OF *PHYSALIS PERUVIANA* ETHANOL EXTRACTS ON HELA CELLS

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*Physalis*species have greathorticultural and economic importance because of their highnutritional value as they possess high vitamin content, minerals and antioxidants. These plants have also potential medicinal properties like anti-bacterial, anti-inflammatory, and anti-cancer effects. The aim of our study was to investigate the cytotoxic effects of both leaf and shoot *P. peruviana* extracts on HeLa cell line. For this purpose, 10, 25, 50,100, and 200 µg/ml concentrations of *Physalis peruviana* shoot and leaf ethanol extract were applied to HeLa cell cultures for 48 h. MTT (Tetrazolium blue) colorimetric assay was used to evaluate the viability of cell cultures in the presence of the extracts.
As a result of investigated parameters, the shoot and leaf extracts of *Physalis peruviana* found to possess cytotoxic effect on HeLa cell cultures when applied as 100 µg/ml concentration. The active components and mechanism(s) of action of *P. peruviana* leaf and shoot extracts should also be investigated for further studies in both *in vitro* and *in vivo* models.

PP-159

EVALUATION OF ALPHA-AMYLASE INHIBITION OF PHENOLIC EXTRACTS FROM VARIOUS ALGERIAN MEDICINAL PLANTS

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Since recent times, there is a growing interest in the food and pharmaceutical industry and in preventive health care for the development and evaluation of natural enzyme inhibitors from medicinal plant materials. In Algeria, the list of plants entering precisely in this domain is exhaustive and numerous among of them are considered traditionally as anti-diabetic.
In the current study, we have studied the inhibitory effects of aqueous and alcoholic extracts of six Algerian medicinal plants known by their virtues therapeutic against the diabetes on amylase of *Aspergillus oryzae*. There are no previous reports of any *in vitro*α-amylase inhibitory activity of these plant extracts.

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THE INHIBITORY EFFECT OF SOME ALGERIAN PLANTS PHENOLICS EXTRACTS ON THE ALPHA-GLUCOSIDASE AND ALPHA-AMYLASE ACTIVITIES AND THEIR ANTIOXIDANT ACTIVITY

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Our study is in keeping with the general pattern of bringing one's contribution to the development of the vegetable kingdom in the region of Laghouat as a source of natural bioactive substances. In this context we are interested in five local plants given the novelty of their study, their recovery is needed. The first step in this study 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 (α - amylase and α - glucosidase) responsible for the digestion of sugars. Finally, we assessed the potential antiradical of our extracts.The analysis results of phenolic extracts show clearly a low content of phenolic compounds in investigated plants.The results of the kinetic study of enzymatic reactions show that the phenolic extracts have inhibitory effects on both enzymes.

The antioxidant activity test shows that our phenolic extracts exhibit good antioxidant capacity comparatively to antioxidants taken as reference. There was a positive correlations between the inhibition and free radicals tests, which suggest that both inhibitory and antioxidant activities are largely due to the presence and the quantity of phenolic compounds. One of the most important results obtained is that our phenolic extracts partially reveal very interesting competitive inhibitory activities. This work provided new ethnopharmacological and phytochemicals knowledge about indigenous plants to the region of Laghouat and contributes to understanding the role of natural polyphenols in the regulation of oxidative stress and normalization of glycemic disorders.

PP-161

PEPPER NIGRUM AS A FIXATOR OF CURCUMIN IN A BIOLOGIC MEDIUM, ADMINISTRATED AGAINST ALUMINIUM NEUROTOXICITY AND ALZHEIMER'S DISEASE

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The objective of this study is to clarify the role of Pepper Nigrum with Curcumin as a protective and therapeutic agent against neurodegenerative diseases including Alzheimer's disease caused by aluminum chloride $AlCl_3$[1]. The mice were randomly divided into four groups; each group containing seven mice (for each experience: neurotoxicity, Alzheimer's model): control group, neurotoxicity and Alzheimer model, intoxicated/Alzheimer treated groups and the control treated groups. $AlCl_3$ was dissolved in distilled water administrated orally (100 mg/kg) for the intoxicated/Alzheimer's model groups, and intoxicated/Alzheimer's treated groups, with a D-Galactose IP[2] (200mg/kg) for the Alzheimer's model given for 11 weeks; in parallel of curcumin/pepper administration (45mg/15 orally-200/66mg/kg IP)[2] respectively, for the intoxicated treated group and Alzheimer disease animal model. The control treated groups received the same doses of curcumin/pepper (45/15-200/66mg/kg). Functional behavioral assessment is required as part of tested the nervous statue (manifest determinations). These guidelines apply to animals in special tests. The assessment of animal memory using different types of mazes has been Longley used in neurosciences[1]. Several models have been proposed recently, mainly trying to evaluate accuracy of choice between the alternatives presented in the same day of the session, instead of looking for the accumulated learning through successive days of training. Mice from both studies were sacrificed with an overdose of Chloral in order to realize histological study.Behavioral and memory tests show a remarkable difference between the intoxicated treated/Alzheimer treated and the intoxicated/Alzheimer groups estimated from the significant results of the test ($P \leq 0.05$). The results of the histological study show that there are typical neuropathological changes in almost of treated intoxicated mice's brains. In this investigation the effect of curcumin with over load of aluminum chloride to mice lead to reduction of neurotoxicity and Alzheimer's disease appeared as shrunken decreased of pyramidal cells, reduced effect of decreasing number of the pyramidal cells.After solving problem of the low bioavailability of curcumin with *Pepper nigrum* as a fixative of absorption, the preventive effect of curcumin was shown through differentsteps.In this research preventive effect of curcumin with a fixator of absorption was evaluated on chronic neurotoxicity of aluminum, as well as Alzheimer's disease induced (subacute / subchronic), and study through the use biological models of the behavioral, memory, biological analysis and histological status of nerves.

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PP-162

EVALUATION OF THE COMPOSITION OF ANTI-NUTRITIONAL FACTORSIN 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 reafforestation 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, andagainst the gastritis.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 tannins and hydrolysable tannins, 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-nutritionals factors with the percentages according to respectively: condensedtannins (0.04%-0.13%), hydrolysable tannins (0.32%-1.04%) and total phenols (0.18% - 0.31%).

PP-163

THE ANTIMICROBIAL ACTIVITY *LAWSONIA INERMIS* (HENNA) OF AGAINST SKIN MICROBES

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The Henna is a plant of the family of Lythraceae type *Lawsonia inermis*, used since thousands of years for the coloring of hair, in the art of bodily painting and against several skin diseases. The dry and fresh leaves of *Lawsonia inermis* taken from the region of Biskra in Ageria were used in our study to see the antimicrobial effect *in vitro* of *Lawsonia inermis* extract against microbial skin diseases. The natural extract resulting from *Lawsonia inermis* had an antimicrobial activities against microorganisms isolated from patients had skin infectious; four isolates were fungal strains *Epidermophyton floccosum, Trichophyton mentagrophytes, Trichophyton gourvilli* and *Trichophyton rubrum* and three bacterial strains were *E. coli, Pseudomonas aeruginosa, Staphylococcus aureus* and one yeast strain of *Candida albicans*. Various phenolic extracts of *Lawsonia inermis* (Henna) were identified by a qualitative and qualitative methods and the study of CMI showed an average between 10-1 and 10-3. It is necessary to mention further work is going to be done on the effect of raw extract of Henna on "Suisse mice" *in vivo*, infected by dermatophytosis.

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PP-164

PURIFICATION OF UMBELLIFERONE BY COUNTER CURRENT CHROMATOGRAPHY AND ITS ANTIEPILEPTIC ACTIVITY

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Countercurrent chromatography (CCC) is a form of liquid-liquid chromatography in which either a centrifugal or gravitational force is used to retain one liquid phase in a coil or train of chambers, while a second, immiscible phase is passed through as a stream making contact with the other phase. The method was applied for the successful separation of umbelliferone from methanolic extract from fruits of *Heracleum leskowii*. Different solvent systems: mixtures of *n*-heptane, ethyl acetate, methanol and water in reverse phase system were tested. Pure umbelliferone was analyzed by high-performance liquid chromatography with UV-DAD and LC-MS and the anticonvulsant effect of umbelliferone was evaluated in the mouse maximal electroshock seizure threshold test. The threshold for electroconvulsions was determined at 30 min after its systemic administration. Umbellifeone dose-dependently produces the anticonvulsant effect in mice. Additionally, the effects of umbelliferone (in a dose of 100 mg/kg) on the anticonvulsant activity of four classical antiepileptic drugs (carbamazepine, phenytoin, phenobarbital and valproate – sodium salt) were determined.

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PP-165

ANTICONVULSANT EFFECTS OF XANTHOTOXIN ISOLATED BY COUNTER-CURRENT CHROMATOGRAPHY IN THE MAXIMAL ELECTROSHOCK-INDUCED SEIZURES

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The aim of this study was to determine the anticonvulsant effects of xanthotoxin (8-methoxypsoralen) in the mouse maximal electroshock-induced seizure model. Counter-current chromatography was an effective tool for isolation xanthotoxin from fruits of *Heracleum leskowii*. Different solvent systems: mixtures of *n*-heptane, ethyl acetate, methanol and water in reverse phase system were tested and partition coefficients were calculated. A scale-up process from analytical to preparative in a very short time was developed. One minute fractions were collected and analyzed by HPLC method. Purified xanthotoxin was additionally identified by LC-MS method. The anticonvulsant effects were determined at 30 min after systemic (i.p.) administration of xanthotoxin in increasing doses of 50, 100 and 150 mg/kg. Xanthotoxin in a dose-dependent manner elevated the threshold for maximal electroconvulsions in mice and thus, possesses anticonvulsant properties in this seizure model. Additionally, the effects of xanthotoxin on the anticonvulsant activity of four classical antiepileptic drugs (carbamazepine, phenytoin, phenobarbital and valproate – sodium salt) were also determined.

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PP-166

THE ANTIFUNGAL EFFECT OF SOME *ANVILLEA RADIATA* METABOLITES

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Cultureof the date palm has continued to decrease in the Maghreb as a result of the attack by a lethal vascular wilt called "Bayoud" and caused by *Fusarium oxysporum f. sp. albedinis*. This disease appeared in Morocco before 1870, in the Draa Valley and during a century it has reached all Moroccan palm groves in destroying more than 12 million trees, then it increased in Algeria where it has invaded the palm of West and Centre by eradicating about 3 million trees the Bayoud continues to eradicate annually from 4.5 to 12% of palm groves. The idea of usingnatural productsagainst theplant pathogensis becomingincreasingly popularbecause theirside effectsare negligibleand oftenthe desired effectcan be achievedby them.With this in mind, we have tried to study the action of some plant extracts on the development of this agent *Fusarium*. Within this framework, flavonoids and polysaccharides were extracted from*Anvillea radiata* (a medicinal plant belonging to the Asteraceae family which is harvested in the region of Bechar south western Algeria) and were tested on germination, mycelial growth, sporulation and on soil population density of *Fusariumoxysporum*f.sp. *albedinis* under the laboratory conditions.The results showed that no inhibition was observed against germination;by contrast, an inhibitory effect was proven by the flavonoids. So, highly methylated pectinsand hemicellulosic extracts showed a suppression of sporogenesis, andadensity reductionof *Fusarium* in soil was observed in the presence of extracts compared with untreated, infested soil.
These results are encouraging, which suggest the *in vivo* application of these extracts that are good alternatives to chemical pesticides because they are readily biodegradable in nature.

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PHYTOCHEMICAL SCREENING AND ANTIBACTERIAL ACTIVITY OF *COTULA CINEREA*

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Since remote times, the mankind has learned to appreciate the soothing and analgesics virtues of plants. Therefore, all over centuries, the human traditions endeavoured to develop the knowledge and the right medicinal plant uses. Even if some folk medicine practices seem to be odd, some others appear to imply a few scientific fundamentals. Nevertheless, all the practices aim to cope with diseases and improve the mankind's health. Today, diseases treatments with natural product are more and more used because theefficiency of synthetic medicines decreases. Bacteria and viruses have learned to develop resistance towards many drugs that have been used over long periods. Our work has focused on the study of the phytochemistry and antibacterial activities of *Cotula cinerea*(member of the Asteraceae family), a plant used in the treatment of common ailments (in the region of Bechar south western Algeria).The phytochemical screening performed on the powder of the leaves and flowers hasto identify chemical groups that may justify the usetraditional plant. The aqueous extracts were prepared by decoction and maceration.
All extracts of both plant organs have tested positive antibacterial, but the aqueous decoction of the flowers showed the highest activity.

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MEDICINAL USES OF JERUSALEM ARTICHOKE (*HELIANTHUS TUBEROSOS* L.)

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Jerusalem artichoke is known as a useful food for diabetics because it contains inulin in its tubers. It also possesses prophylactic and medicinal properties for diseases of cardio-vascular system. Many researchers reported that extracts obtained from tubers indicated antimicrobial and antifungal activities[1]. Jerusalem artichoke has aperient, aphrodisiac, cholagogue, diuretic, spermatogenic, stomachic, tonic effects. Moreover, it is noted that heliangine, which is a germacrane sesquiterpene lactone isolated from the leaves of the plant, indicated significant activity *in vitro* against Ehrlich ascites carcinoma cells[2].

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PP-169

ANTIMICROBIAL EFFECT OF LEAVESEXTRACTSOF *MAERUA CRASSIFOLIA* (ATILA) OF SOUTH-WESTERN ALGERIA

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This work enhances the effects of the antimicrobial activity of the extracts (aqueous, hexane, dichloromethane and methanol) of *Maerua crassifolia* (Atila) the herb capparidacées rare plant in the Algerian Sahara. Phytochemical tests showed that *Maerua crassifolia* is rich in active compounds (saponins, tannins, alkaloids, fatty acids). Extraction return of leaves was 50.52% for the aqueous extract, 5% hexane, 2.5% to 17.29% for dichloromethane and methanol.The antimicrobial effect of these extracts was investigated on six (6) bacteria and four (4) fungs by direct contact and radial growth. The antifungal effect of *Fusarium oxysporum f* sp. *albedinis* and *Aspergillus flavus* sought on development of biomass in liquid medium.
The extracts were very active in the following species: *Escherichia coli, Enterococcus faecalis, Pseudomonas aerugenosa, Aspergillus niger, Fusarium oxysporum f.* sp. *albedinis, Aspergillus flavus*. No inhibitory effect of these extracts was observed on *Bacillus cereus* and *Listeria monocytogenese*. Mycotoxicologic results on CCM revealed that the hexane extract was highly active against strains of *Fusariumoxysporum f spalbedinis*and *Aspergillusflavus* in liquid medium.

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EVALUATION OF THE EFFICACY OF ESSENTIAL OILS OF THRE AROMATIC PLANTS IN COMBINATION WITH POVIDONE-IODINE AGAINST BIOFILM OF *STAPHYLOCOCCUS AUREUS*

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Currently several molecules of different chemical classes are known for their antimicrobial activities against some microorganisms. *Staphylococcus aureus*, one of the opportunistic species responsible for clinical and / or bacteriological infections, may react with inert or living surface area and forms the biofilm. In this form the bacteria become somewhat vulnerable to various physical and / or chemical antimicrobial agents. The penetration into bacterial biofilms of Antiseptic/Disinfectant solutions currently used is poor, such as povidone-iodine (Betadine®). The objective of this study is to investigate the efficacy of the essential oil (EO) of each of the thre aromatic plants (*Eucalyptus globulus, Schinus molle, Pinus halepensis*) and to study the effect of the combination between these oils and povidone iodine against biofilm of *Staphylococcus aureus*. The minimum inhibitory concentrations (MIC) and bactericidal (MBC) of different essential oils studied on the biofilm of *S. aureus* were determined by microbroth dilution. The synergistic, antagonistic or indifferent interactions between essential oils and povidone iodine are being studied. The results regarding the effect of the essential oils against S. aureus in both its forms planktonic and sessile were promising. Based on the present results we suggest the use of these essential oils as a natural remedy in combination with Povidone iodine-in anticipation of later results-in order to prevent and / or solve the problem of bacterial biofilm that threatens increasingly biomedical sector.

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EFFICACY OF THE ESSENTIAL OIL OF *ORIGANUM GLANDULOSUM* DESF. AGAINST SKIN INFECTIONS WITH PANTON-VALENTINE LEUKOCIDIN-PRODUCING STAPHYLOCOCCUS AUREUS STRAINS IN MICE

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Skin and soft tissue infections (SSTI) caused by staphylococcal toxins including PVL have increased these last years; treatment of these complicated infections is often difficult. The search for new methods and new antimicrobial substances is necessary. Natural products such as essential oils appear among the possible solutions. The objective of our work was to prove the effectiveness of treatment of these infections with the essential oils *in vivo* on Wistar rats; we chose the oil of *Origanum glandulosum* from Algeria to perform this treatment because of its antiseptic properties. The treatment was done on infections induced in Wistar rats using PVL producing *Staphylococcus aureus* strain isolated from Tlemcen Teaching Hospital. The results of our experiment showed a significant decrease in the numbers of colonies collected from rats treated by the concentrations of 1% and 5% of *Origanum glandulosum* essential oil. In conclusion, the treatment of skin infections especially wounds infections caused by PVL positive S. aureus is possible with the essential oil of *Origanum glandulosum* which seemed effective in eradicating the germ from infected wounds.

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EXTRACTION AND QUANTIFICATION OF PHENOLIC COMPOUNDS AND EVALUATION OF THEIR ANTIOXIDANT ACTIVITY

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Phenolic compounds are bioactive molecules exhibiting a lot of scientific attention due to their multiple biological activities. In this study we are interested in phenolic extracts of *Thymus algeriensis* and *in vitro* study of their antioxidant activity. The first part of this study concerns the extraction and quantification of phenolic compounds[1]and flavonoids[2] with different systems: Methanol / Eau ; Acétone /Eau. From the results, *Thymus algeriensis* is rich in total phenols (from 0.399±0.0029 mg/g to 0.675±0.107mg/g in dichloromethane fractions, varies from 3.022±0.31 mg/g to 5.52±0.352mg/g in ethyl acetate fractions and varies from 6.353±1.368 mg/g to 8.205± 0.844 mg/g in the butanol fractions of gallic acid equivalent) and they are also rich in flavonoids (from 0.021±0.011 mg/g to 0.08±0.0.043mg/g in dichloromethane fractions, varies from 0.258±0.129 mg/g to 0.395±0.197 mg/g in ethyl acetate fractions and varies from 1.05±0.52 mg/g to 1.213± 0.0.617mg/g in the butanol fractions of quercetine equivalent). In the second part, we studied antioxidant and radical scavenging activities using DPPH radical scavenging, and phosphomolybdenum. Results have shown that our extracts posses a potential antioxidant power in comparison with standards.

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PP-173

HYPOLIPIDEMIC EFFECT OF SULPHATED POLYSACCARIDES FROM THE GREEN *ALGA ULVA*

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Hypercholesterolemia contributes to 56% of coronary heart disease (CHD) cases worldwide resulting in plaquesand blockages in the arteries, alterations in the vascular wall andatherosclerosis or CHD, increasing the risk for heartattackand death[1]. Hypercholesterolemia is associated with oxidative stress, and release of inflammatory markers[2]. Statins effectively lower LDL levels although; they may not prevent the occurrence of adverse effects. There is an obvious need for efficacious alternative treatments. Marine fibers are composed of diverse polysaccharides that confer a hypocholesterolemic effect. In the present study, the hypolipidemic effect of sulphated polysaccharides from the green alga *Ulva fasciata* was evaluated. Rats were administered a high cholesterol diet and the lipid profile, inflammatory markers (IL-10, TNF-α, cell adhesion molecules, I-CAM and V-CAM), oxidative stress markers (NO, glutathione and lipid peroxides) were determined before and after treatment with *U. fasciata* and compared with fluvastatin. Aorta was examined for atherogenicplaques. The results showed that hypercholesterolemicmarkers significantly increased accompanied by the presence of obvious plaques in the aorta. Treatment with algal polysaccharides andfluvastatin effectively improved these parameters and diminished the formation of plaques. It could be concluded that the consumption of dietary fibers may decreasehypercholesterolemia and heart disease.

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PP-174

PHYTOCHEMICAL ANALYSIS AND EVALUATION OF HEALING ACTIVITY OF AN ALGERIAN PLANT *DELOSPERMA COOPERI* EXTRACT AND MICROENCAPSULATED

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Delosperma cooperi belongs to the kind of *Delosperma* which includes approximately 150 species of shrub and long- lived succulent, has foliage persisting or semi persistent, pushing in the plains broken of Africa. These plants are rich in water and mucilage and practically live on poor grounds and under a hot climate, in other words under constraints climatic. The plants subjected to these constraints synthesize many secondary metabolites which allow them to survive. In the present work, the investigation of the main composition of the plant in term of chemical families were performed using chemical screening tests that revealed the presence of two main active ingredients tannins and saponins. The crude tannin and saponin extracts were subjected to healing activity testing, the results showed a healing activity equivalent to that of a synthetic drug Madecassol. An optimized method of microencapsulated plant extract was subjected to healing activity and compared with both synthetic healing drug and the pure extract. Because healing activity extract must have antimicrobial activity, the pure and microencapsulated extracts were tested against *Staphylococcus aureus* and no activity was recorded opposite *Bacillus subtilis*, *Escherichia coli, Klebsiella pneumonia, Saccharomyces cerevisiae*, and *Candida albicans.*

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DETERMINATION OF ESSENTIAL OILS FROM *ANETHUM GRAVEOLENS* L. BY THIN LAYER CHROMATOGRAPHY

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Dill (*Anethum graveolens* L.*)* is a strong-flavored herb, spicy, used in various foods. This aromatic plant contains high quantity of aromatic oils and antioxidants. Volatile oils are determined by various chromatographic techniques such as gas chromatography coupled with mass spectrometry (GC-MS), thin layer chromatography (TLC) etc.The aim of this work was the determination of essential oils from dill extracts obtained by different extraction techniques, like: maceration, sonication and solvent extraction in microwave power field. Each extraction procedure was optimized taking into account the main factors (time, temperature, solvent). All extractions were performed at 30°C, using the following solvents and solvent mixtures: diethyl ether - ethanol (1:1, v/v), ethanol, hexane, diethyl ether, diethyl ether - hexane (1:1, v/v).Analysis of essential oils was performed by TLC. Silica gel was used as stationary phase and a mixture of petroleum ether-dichloromethane (30:70, v/v) as mobile phase. A vanillin solution in ethanol and sulphuric acid was used as visualizing agent.Maceration was the most efficient method for extraction of essential oils, followed by sonication. The best extractant proved the diethyl ether: hexane (1:1, v/v) mixture.Volatile oils identified from dill extracts wereα-phellandrene, limonene, α-pinene, β-pinene, myristicin.

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PP-176

DETERMINATION OF ESSENTIAL OILS FROM THREE ROMANIAN AROMATIC HERBS USING THIN LAYER CHROMATOGRAPHY

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The essential oils are aromatic, volatile liquids extracted from plant parts such as seeds, bushes, flowers, barks, roots, fruits, shrubs etc. The essential oils have multiple applications in medicine, perfume and cosmetic industry. The main objective of our investigations was a comparative evaluation of various extraction methods used to obtain the essential oils from three indigenous aromatic plants: parsley (*Petroselinum crispum*), dill (*Anethum graveolens*) and celery (*Apium graveolens*).The following extraction techniques were employed: maceration, sonication and solvent extraction in microwave power field. All extractions were performed at 30°C, using: ethanol, hexane, diethyl ether, diethyl ether - ethanol (1:1, v/v),diethyl ether - hexane (1:1, v/v).The extracts were analyzed by TLC, and the chromatograms of plant extracts were compared. Essential oilscomponents were identified with the use of corresponding standards.For TLC analysis silica gel was used as stationary phase, a mixture of petroleum ether: dichloromethane (30:70, v/v) as mobile phase, and vanillin as staining agent.
Based on the registered chromatograms it was concluded that maceration, followed by sonication, with diethyl ether: hexane (1:1, v/v) are the most efficient extraction techniques. The main essential oils identified in plant extracts were: α-phellandrene, myristicin, limonene, β-myrcene, α-pinene, β-pinene.

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PP-177

FORMULATION AND PHYSICOCHEMICAL STUDY OF ANALGESIC AND ANTI-INFLAMMATORY TOPICAL GEL OF NANOPARTICLES CONTAINING METHANOLIC EXTRACT OF *TRIGONELLA FOENUM-GRAECUM* L. SEEDS

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Fenugreek *(Trigonella foenum-graecum)* is probably indigenous to eastern Mediterranean, West Asia and India. It has been grown as a traditional minor pulse crop in the Mediterranean area, near and Middle East countries, India, NE Africa (Ethiopia), Arabia. It is grown in small scale in Europe, North America, Latin America and China[1]. There are several reports concerning the anti-inflammatory and antinociceptive effects of the plant *Trigonella foenum-graecum*[2]. The use of novel drug delivery systems for plant extracts have been reported which have different advantages such as increased stability, improved bioavailability, reduced toxicity, reduced drug degradation by tissue macrophages and appropriate release. The main aim of this study was to prepare a topical gel formulation containing solid lipid nanoparticles (SLN) of fenugreek extract as antinociceptive and anti inflammatory product. The methanolic extract of fenugreek seeds was prepared by using maceration method for 72 h, and concentrated under vacuum. Dried extract was standardized on the basis of trigonelline by spectrophotometry using calibration curve of trigonelline reference. SLN containing the extract was produced by high shear homogenization. SLN rich of the extract was incorporated to a gel base of Carbamer 940p. Physicochemical parameters like particle size and distribution, viscosity, pH, homogeneity, stability and *in vitro* drug release were tested. The yield of extraction was about 56%. The content of trigonelline was 0.18% in fenugreek extract. The mean particle size of SLNs was around 500 nm and encapsulation efficacy was 84.5%. Release study showed 46% of the content was delivered during 5 hours. pH of the formulation was close to skin pH 6.
It can be concluded the fenugreek extract was efficiently incorporated to SLNs with a slow release rate and probably long lasting effects.

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PP-178

PHYTOCHEMICAL COMPOSITION AND HEALTH BENEFITS OF BLACK CURRANT (*RIBES NIGRUM* L.)

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Black currant which belongs to family Grossulariaceae, is a temperate, medium sized berry shrub from genus *Ribes*. Native to Europe and northern Asia, *Ribesnigrum*is especially dignified for its relatively high vitamin C content and wide range of phytochemicals, as well as potassium, phosphorus, iron and vitamin B_5 content. Obvious of its deep coloration, fruit of black currant is rich in phenolics, especially anthocyanins among which delphinidin-3-O-glucoside, delphinidin-3-O-rutinoside, cyanidin-3-Oglucoside and cyanidin-3-O-rutinoside are the most abundant and other anthocyaninsin range ofpetunidin and malvidinglucosides. Anthocyanins, owing to its high antioxidant activities, have many beneficial medicinal effects, which make black currant very valuable. Seeds are rich in gamma linolenicfatty acid which helps to reduceinflammatory diseases, as well as heart attacks.*Ribesnigrum*, with numerous health benefits including alleviation of chronic oxidative stres related diseases, as well as immunomodulatory, antimicrobial and anti-iflammatory efficacies is one of the most valued among berries.The objective of this study was to introduce phytochemical composition of black currant and its potential benefits in human health and nourishment.

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PP-179

PLANT AND PHYTOCHEMICAL CHARACTERISTICS OF BILBERRY (*VACCINIUM MYRTILLUS* L.)

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European blueberry, with the common name bilberry is a member of family Ericaceae and genus *Vaccinium*. Bilberry (*Vaccinium myrtillus*) is a low-growing perennial shrub, indigenous to northern and central Europe as well as North America. Berries are mainly picked up from the wild plants spread on the forests and meadows of Finland, Sweden, Norway, Scotland, Alpine countries, Bulgaria, Poland and northern parts of Turkey and Russia.*Vaccinium myrtillus* is one of the most dignified berries because of appreciable levels of anthocyanins, stilbenoids, vitamins, sugar and pectins. The fruit of *Vaccinium myrtillus* ispurple in color and differs from other *Vaccinium* species with itsdeep colored flesh. Because of their high antioxidant activities anthocyanins have many health benefits. The berries are mild source of ascorbic acid, which also shows antioxidant properties. Bilberry, with its high phytochemical content is one of the most valued wild berries with various beneficial effects such as reducing risk of many age related and chronic diseases, as well as treating ocular disorders and inflammatory conditions of the joints. The purpose of the present study was to introduce plant and phytochemical characteristics of bilberry and its potential benefits on human health and nourishment.

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PP-180

DIURETIC ACTIVITY AND ORAL ACUTE TOXICITY OF ETHANOLIC LEAF EXTRACTS OF *FRAXINUS ANGUSTIFOLIA* AND *PISTACIA LENTISCUS*

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This study was conducted toevaluate the diuretic activity of *Fraxinus angustifolia* (Oleaceae) and *Pistacia lentiscus* (Anacardiaceae) leaf extracts, used in traditional folk medicine in North Africa, as a diuretic, *in vivo*. The diuretic effect was examined by treating different groups of rats with single (200 mg/kg) oral doses of leaf ethanol extracts. Furosemide and mannitol (20 mg/kg) were used as positive control. Cumulative urine volume, urinary pH, conductivity and electrolytes (Na^+ and K^+) concentrations were measured[1]. Moreover, the acute toxicity was evaluated, by using a unique dose of 2 g/kg of extracts. Urine output volume increased significatively (around 70%) in the first 8 h following pre-treatment with *Pistacia lentiscus* extract, similar to the effect of furosemide, and much better than mannitol. On the other hand, *Fraxinus angustifolia* extract exhibited a comparable effect to mannitol, but less than furosemide.Sodium and potassium excretion show clearly this diuretic effect. No death of rats was observed when 2 g/kg were orally administered. NMR measurements demonstrate the presence of mannitol and flavonoid compounds, in *Fraxinus angistifolia* and *Pistacia lentiscus* extracts, respectively which may contribute to this activity.In conclusion, these results validate the traditional use of these plants, as diuretic in North Africa.

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PP-181

FOREIGN TRADE OF MEDICINAL AND AROMATIC PLANTS IN TURKEY

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Medicinal and aromatic plants which contribute to Turkey's economy and have an important role of provide local people with the additional income in agricultural products. Turkey because of its ecological conditions has an abundance of plant species diversity and is one of the richest countries and the gene centre of a lot of these plants. Medicinal and natural aromatic plant's export market and domestic consumption grows. Our country's medicinal and aromatic plant export varies according to the years which is around 100-120 million dollars. Thyme, bay leaves and cumin are the most important of these plants. Medicinal plants imports are around 30 million dollars and the most important products are hop, carob, thyme, sage and black cumin.

PP-182

STEEL CORROSION INHIBITION BY *BUPLEURUM LANCIFOLIUM* (APIACEAE) EXTRACT IN ACID SOLUTION

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The ethyl acetate extract of the aerial parts of *Bupleurum lancifolium* (Apiaceae) is tested as corrosion inhibitor of API 5L Gr B steel in 1.0 M HCl and 0.5M H_2SO_4 solutions using weight loss measurement, electrochemical impedance spectroscopy (EIS) and potentiodynamic polarization techniques. The corrosion inhibition efficiency increases on increasing *Bupleurum lancifolium* extracts concentration. Potentiodynamic polarization curves indicated that the plants extract behaves as mixed-type inhibitor. The adsorption of inhibitor on carbon steel surface was found to follow Langmuir isotherm. The effect of temperature on the corrosion behavior of API 5L Gr B steel in both acid solutions with and without addition of plant extract was studied in the temperature range 293-333 K. Surface analyses via scanning electron microscope (SEM) shows a significant improvement on the surface morphology of the steel.

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DETERMINATION OF GALLIC ACID, CHLOROGENIC ACID, CAFFEIC ACID, RUTIN AND ROSMARINIC ACID IN SAGE HERB BY HIGH PERFORMANCE LIQUID CHROMATOGRAPHY WITH ELECTROCHEMICAL DETECTION

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Salvia officinalis L. (sage), a plant with numerous health-promoting biological activities, is known to be rich in phenolic compounds.Plant materials were collected in Bosnia and Herzegovina, Turkey and Croatia and analysed for these compounds: gallic acid (GA), chlorogenic acid (CGA), caffeic acid (CA), rutin and rosmarinic acid (RA). The HPLC-ED analyses were performed using supernatants of hot water sage extracts. The standard solutions for GA, CGA, CA, rutin and RA were prepared by dissolving pure substances in water. HPLC conditions for CGA determination: mobile phase EDTA-sodium acetate-acetic acid-methanol 50 %-water; column ODS Hypersil, potential + 0.75 V, flow rate 0.9 ml/min. HPLC conditions for GA, CA, rutin and RA were: mobile phase methanol-acetonitrile-water-acetic acid (20+20+70+10), potential +0.75 V, flow rate 1 ml/min. The highest GA and CGA concentration was found in sage herbfrom Croatia (0.45 mg/g and 4.54 mg/g, respectively), CA and rutin had the highest concentration in samples from Bosnia and Herzegovina (1 mg/g and 26.36 mg/g, respectively), whereas the highest RA concentration was present in plants collected in Turkey (11.82 mg/g). In conclusion, the analysed sage herb samples were particularly rich in rutin, RA and CGA.

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DETERMINATION OF RUTIN IN *ALLIUM SATIVUM* L., *ALLIUM CEPA* L. AND *ALLIUM URSINUM* L. BY HIGH PERFORMANCE LIQUID CHROMATOGRAPHY WITH ELECTROCHEMICAL DETECTION

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Numerous beneficial roles have been ascribed to rutin, a bioflavonoid commonly found in plants. While exhibiting antithrombotic and anti-inflammatory properties, rutin is also a strong antioxidant and helps strengthening the capillaries.In this study, a quantitative HPLC-ED analysis was performed to determine the rutin content in the bulb and leaf of garlic (*Allium sativum L.*), bulb and leaf of onion (*Allium cepa L.*) and in the wood garlic (*Allium ursinum L.*) root, members of the Alliaceae family. Diluted supernatants of hot water extracts were used as samples. Rutin trihydrate was dissolved in 2-propanole and used as a standard solution. HPLC conditions: mobile phase methanol - acetonitrile - water - acetic acid (20+10+70+10), column ODS Hypersil, potential +0.84 V, flow rate 1ml/min. The highest rutin concentration was in garlic leaves 0.10 mg/g, followed by 0.05 mg/g in the wood garlic roots, 0.037 mg/g in garlic bulbs, 0.012 mg/g in onion leaves and 0.009 mg/g in onion bulbs. In conclusion, due to the very low rutin content, the plants of interest should not be recommended as natural sources of this glycoside.

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ESSENTIAL OIL CONSTITUENTS OF *ORIGANUM VULGARE* L. FROM KOSOVO MOUNTAINS

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Origanum vulgare L. is among the most demanded species for export from Kosovo. It is used traditionally in folk medicine for respiratory tract inflammations, urinary tract infections, and as digestive[1]. To the best of our knowledge, there are no previous publications regarding chemical composition of *Origanum vulgare* L. from Kosovo. The aim of this study was chemical composition of the essential oil of *Origanum vulgare* L. growing wild in some mountain regions of Kosovo. The essential oil was extracted by water distillation method and it was further analyzed by gas chromatography-mass spectrometry[2]. The essential oil yield of samples varied from 0.4% to 0.7% of dried weight. For all samples, the number of total identified compounds was 66, and 71.29% to 96.05% of essential oil components were identified. Main identified compounds were: oxygenated monoterpenes (15.26% to 36.34%), monoterpenes (3.13% to 35.33%), sesquiterpenes (1.64% to 38.05%) and oxygenated sesquiterpenes (11.49% to 27.22%). Main constituents were: caryophyllene oxide (0.18%-38.05%), 1,8-cineole (1.31%-13.54%), *para*-cymene (1.4%-19.62%), α-terpineol (1.42% - 19.23%) and sabinene (1.81% - 10.23%).

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PP-186

CHARACTERIZATION OF THE ESSENTIAL OIL OF *THYMUS TOSEVII* VEL. FROM KOSOVO

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In Kosovo, *Thymus* spp. is categorized as a harvestable commercial wild herb found in large quantities. Traditionally, it is used as folk medicine to treat mainly respiratory tract inflammations[1]. To the best of our knowledge, this is the first publication regarding chemical composition of *Thymus* spp. from Kosovo. In present study the essential oil of *Thymus tosevii* Vel. originating from 7 different locations in Kosovo was analyzed. Essential oil was obtained with water distillation and the essential oil yield for each sample was recorded. The composition of volatile content was determined by gas chromatograph-mass spectrometer[2]. The essential oil yield of samples varied from 0.73% to 1.6% of dried weight. Gas chromatography-mass spectrometry analysis of essential oil resulted with 106 identified constituents representing 79.18% to 98.36% of the essential oil. Main identified compounds were: oxygenated monoterpenes (14.04% to 66.31%) and monoterpenes (16.22% to 50.26%). Main constituents of the essential oil were: thymol (0.1% - 21.53%), *para*-cymene (1.4% - 17.15%), β-caryophyllene (1.25%-8.99%) and γ-terpinene (11.92%-19.73%).

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ANTIFUNGAL ACTIVITY OF ACTINOMYCETES AGAINST *VERTICILLIUM DAHLIAE*. KLEB; CAUSING OLIVE WILT OF OLIVE TREES (*OLEA EUROPEA* L.)

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From the grounds rhizospheric of the orchards of olive-tree of the Algerian west and arid sols of the Algerian south we isolated 188 isolates from actinomyces showing different morphological characteristics. The tests of antagonistic activity of the isolates of actinomyces by various methods enabled us to select 05 isolates, named A48, B14, ST1, T4 and T6, presenting considerable antagonist activity with respect to *V. dahliae*. A traditional taxonomic study was first of all undertaken on the basis of morphological characters. This study made it possible to show that 04 isolate on the other hand produce chains characteristic of the *Streptomyces* kind the characteristics of A48 isolate made it possible to classify it with the *Nocardia* kind. The selected isolates were the subject of kinetics of growth and of production of antibiotics in two test and culture media were then carried out on *V. dahliae*. The results of this test showed an activity much more important of A48 isolate compared to the other isolates, with the maximum ones of production of antibiotics to the 8 and the 15th day of incubation. The best solvent of extraction is the ethyl acetate or N-butanol. The CCM of the rough extract of filtrate of culture of A48 isolate on liquid ISP2 showed the presence of one 05 bands. We supposed that these antibiotics can be attached to the group of aromatic glycosylés. The application *in vivo* as of these isolate showed an important degree of protection of the tomato screw plants - with - verticilliose, of which the percentages vary between (42.16% and 61.44%).

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ANTIMICROBIAL EFFECT OF THE EXTRACTS OF *ALLIUM SATIVUM* AND *LAVANDULA OFFICINALIS ON BACILLUS CEREUS AND PSEUDOMONAS AERUGINOSA IN VITRO*

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Therapeutic properties of essential oil and extracts against bacterial and non bacterial diseases are known since ancient times and many studies on different plant species and their essential oil or extracts effect on microorganisms are done. In this study, the effect of hydro alcoholic extract of *Allium Sativum* and *Lavandula officinalis* on *Bacillus cereus and Pseudomonas aeruginosa* was tested in laboratory conditions. The hydro alcoholic extracts (70%) were prepared by Maceration method and were examined in different concentrations on *Bacillus cereus and Pseudomonas aeruginosa* on Mueller Hinton agar medium. The hydro alcoholic extracts of *Allium Sativum* had no effect on *Pseudomonas aeruginosa* and *Haemophilus influenza* but *Lavandula officinalis* had significant effect on both bacteria ($p<0.001$); So that the zone diameter of no growing for *Pseudomonas aeruginosa* (0 mm) was lower than *Bacillus cereus* (12.4 mm) at lower concentration of leaf extract (500 mg/1ml Solvent). The average of zone diameter of no growing for *Pseudomonas aeruginosa* (10.4 mm) and *Bacillus cereus* (21.4 mm) by extract of *Lavandula officinalis* (3000 mg/1ml Solvent) was obtained lower than *Erythromycin*, *Ofloxacin* (20.4 and 28.4 mm, respectively), and *Gentamicin* (26.4 and 32.4 mm, respectively)[1,2].
Results showed that *Lavandula officinalis* has fairly antimicrobial effects on *Pseudomonas aeruginosa* and *Bacillus cereus* and can be substitute for some common antibiotics and has less chemical effects.

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PP-189

THE CHEMICAL PROFILE AND BIOLOGICAL ACTIVITY OF THREE BASIL SPECIES CULTIVATED IN ROMANIA

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Basil (*Ocimum basilicum L.)* is intensively used as culinary item for its flavoring qualities and also it is a well-known principle in Romanian traditional medicine. On the other hand, Tulsi (*Ocimum sanctum L.*) is an ayurvedic principle recommended mainly for the treatment of respiratory disorders.The analyses were performed on the essential oils and the hidroalcoholic (50 %) extracts from *O. basilicum* (Ob), *O. basilicum var. rubrum* (Obr) *and O. sanctum* (Os), included in biocultures from Romania. The volatile fractions isolated by steam distillation were analyzed using GS/MS. The polyphenols were determined using Folin-Ciocalteu method and HPLC/MS technique. In addition, the antioxidant capacity was investigated using DPPH radicals and pherozine [1,2]. The GS/MS analysis showed qualitative differences between the three volatile oils, linalool varing between 19.25%-Os and 66.72%-Obr. Camphor, β-elemene, β-caryophyllene, l-α-bergamotene were found in all samples. The phenolic HPLC profile included rosmarinic, caffeic and chlorogenic acids. Also, rutoside, apigenin-7-glucoside, luteoline and apigenine were identified in all the samples. The antioxidant test results were correlated to the chemical composition. The best scavenger activity was noted for Obr sample (IC_{50} 0.8 mg/mL). All in all, the ethanolic extracts of *O. basilicum* var. *rubrum* cultivated in Romania could succesfully be used as antioxidant.

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PP-190

ANTIMICROBIAL EFFECT OF ESSENTIAL OIL OF *ANETHUM GRAVEOLENS* L. OF SOUTH-WESTERN ALGERIA

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This work is part of the valuation of plant resources in arid areas (south-western Algeria). Our choice is focused on a plant used in traditional medicine to test the antimicrobial activity of essential oil *in vitro*. The seeds of *Anethum graveolens* L. have performed in HE by steam distillation of about (2.09%). The antimicrobial activity was tested on seven bacterial strains: *Staphylococcus aureus* (ATCC 25923), *Enterococcus faecalis* (ATCC 29212), *Listeria monocytogenes* (ATCC 19115), *Bacillus cereus* (ATCC 11778), *Escherichia coli* (ATCC 25922), and *Pseudomonas aeruginosa* (a, b) (ATCC 27853) and two molds; *Aspergillus flavus* and *Aspergillus ochraceus*. The results allowed us to say that HE has an inhibitory power *vis-à-vis* all the tested microorganisms. Moulds were more vulnerable than bacteria, also shows the minimum inhibitory concentration value of (8µl/ml) for mold and (22.2 µl/ml) for bacteria.

PP-191

EVALUATION OF ANTIMICROBIAL AND ANTIOXIDANT ACTIVITIES OF TERPENE AND ALKALOID EXTRACTS OF *EUPHORBIA GRANULATA* LEAVES

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Treatment of diseases with natural remedies is become more and more popular because of fewer side effects.Euphorbia granulata, toxic herb species, one of the flowering plants in Euphorbiaceae family[1]. In order to evaluate the antioxidant and antibacterial activities, we have done a specific extraction of terpenes and alkaloids form the leaves of Euphorbia granulata. The terpene extract was give the highest yield 59.72%compared with alkaloids extract (12.07%, 3.64%) for neutral and basic alkaloids respectively. The disc diffusion method was used to determine the antibacterial activity against different bacterial strains: Escherichia coli (ATCC29522), Pseudomonas aeruginosa (ATCC27853)and Staphylococcus aureus (ATCC25923). All extracts have showed inhibition of growth bacteria. The different zones of inhibition have varied from (7- 10 mm) according to the concentrations of extract used.Testing the antiradical activity on DPPH with TLC (thin-layer chromatography)plates indicated the presence of substances that have potent anti-free radical.As against the BC (carotene bleaching) with TLC revealed that only terpene extract was containing activessubstances.Theseresults can validate the importance of Euphobia granulatain traditional medicine.

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PP-192

A STUDY OF THE PHYTOCHEMICAL PROPERTIES AND THE SYNERGISTIC EFFECT OF *MESEMBRYANTHEMUM CRYSTALLINUM* LINN ON SOME HUMAN PATHOGENIC BACTERIA

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The increased prevalence of antibiotic resistance, as a result of extensive antibiotic use, may render the current antimicrobial agents insufficient to control, at least, some bacterial infections. The aerial part of *Mesembryanthemum crystallinum*was extracted by maceration with methanol (96% v/v) to exhaustion. The solventwas evaporated under reduced pressure. The decoction of the plant is used in traditional folk remedies as vaginal douche to treat vaginitis.To evaluate antimicrobial activity, the agar disc-diffusion assay was used against a Gram-positive bacteria (*Staphylococcus aureus*) and two Gram-negative bacteria (*Escherichia coli* and *Pseudomonas aeruginosa*)[1]. The methanolic extract did not show anyinhibitory effect on the tested bacterial strains. Association of antibiotics and the plant extract showed synergistic antibacterial activity especially with ciprofloxacin, tetracyclin and amikacin. The antioxidant activity of the methanolic extract was investigated using TLC plate method with DPPH[2], their antioxidant characters were also tested utilizing DPPH as the radical reagent and ascorbic acid as reference. The methanolic extract showed effective free radical scavenging.The major chemical constituents reportedfrom the plant parts are flavonoids, saponins, steroids, triterpenoids and phenolic compounds whichshow that this plant part can be a potential candidate to be used as a therapeutic agent.

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PP-193

SOME PHYSICAL AND CHEMICAL PROPERTIES OF BITTER MELON (*MOMORDICA CHARANTIA* L.) SEED AND FATTY ACID COMPOSITION OF THE SEED OIL

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Edible part and leaves of bitter melon are used as food or medicine to control some diseasesbecause of it'santioxidant, antibacterial, anticancer, anti-hepatotoxic, antiviral, antiulcerogenic and larvicidal effects. The fruit contains considerable amount. In this study, some physical and chemical properties of the seed and also fatty acid composition of the seed oil were determined. Oil content of the sample was determined by soxhelet apparatus as 26.10% in dried sample. Fatty acid composition was analysed by GC-MS and seven fatty acids were identified and quantified in the sample. The main fatty acid was determined as linolenic acid (45.60%). The other fatty acids were determined were stearic (28.00%), oleic (12.45%), linoleic (8.90%), palmitic (3.69%), arachidic (0.71%) and gadoleic acids (0.65%) in seed oil of the bitter melon.

PP-194

ADVERSE EFFECTS OF HENNA COLORING ADDITIVES ON FEMALE EXPERIMENTAL MICE

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Henna has been used since ancient times due to its coloring features, traditional and medical uses.Over the time, henna has gained a special place as part of wedding ceremonies and for body painting or temporary tattoo. As a result of the growing interest, many of the henna coloring additives like Saratiya, Mahalabiya and Sheih, have been frequently used to improve staining colors and for beautiful appearance. In this project we studied adverse effects of these oils in accordance with women's complaint in particular in terms of their effects on pregnancy, liver and kidney functions, also their histopathlolgical changes. Henna paste made by mixing henna powder with enough volume of distilled water, the paste divided to four equal portions, quantity of one battle (15 ml) of each oil added as well as 15 ml of distilled water added to the paste, the mixture kept for 2hrs covered in warm place.Extracts made by adding 25ml distilled water to form suspension, each portion filtered in a separate conical flask. Extracts of oils with henna injected to female pregnant mice by daily dose 1 ml for 5 days subcutaneously, the liver and kidney organs were collected, also blood samples and sent for the purpose of the study.In addition to microscopical comparison of marketed henna with each other and with original henna, the resulted showed that the aqueous extract of *L. inermis*alone or with oil have not effected on pregnancy. But there are some histopathological changes on liver and kidney organs which might not revealed 100% to those extracts. Marketed henna are not pure, it might be adulterated or contaminated with other types of plants or substances.

PP-195

ANTIBACTERIAL ACTIVITY AND CHEMICAL CONSTITUTIONS OF *TYMBRA SPICATA* L.

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The genus *Thymbra*, which belongs to Lamiaceae family, includes many species in Turkey. The essential oil obtained from aerial parts of *Thymbra spicata* L. harvested in the Eastern part of Turkey were evaluated for their chemical composition and antibacterial activity against to 9 different Gram-positive and Gram-negative bacteria. The GC-MS analysis of the essential oil resulted in the identification of ten constituents, representing 98.01 % of the oil. The major compounds detected in the essential oil were carvacrol (38.9%), *γ*-terpinene (23.94%), and *p*-cymene (16.95%). Antibacterial activity of the essential oil was determined using the Disk Diffusion Method, against to *Enterococcus faecalis (ATCC51299), Escherichia coli (ATCC25922), M. luteus (ATCC9371), Staphylococcus aureus (ATCC25923), Escherichia coli (O157/H7), Klebsiella pneumoniae, Salmonella enterica* ssp. *enterica*serotype *typhimurium (CCM583), Candida* spp., *Escherichia coli (ATCC 35218)* bacteria. According to data, it could be concluded that the essential oil extract was sensitive to *M. luteus (ATCC9371)* among the studied bacteria. It was also more sensitive to other investigated bacteria. The essential oil demonstrated strong antibacterial activity in a wide spectrum against most microorganisms, particularly the yeasts tested. In conclusion, this study confirms that *T. spicata* L. essential oil could be considered as a natural antimicrobial source.

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ANTIBACTERIAL ACTIVITY OF ESSENTIAL OIL OF WILD HORSE MINT (*MENTHA LONGIFOLIA* L.) COLLECTED FROM EASTERN ANATOLIA

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Antibacterial activity of essential oil of wild horse mint in which commonly found in natural flora of Van and its district was investigated. In the study, flowering plants were collected and dried in shade. The essential oil was obtained by Clevenger apparatus and the essential oil components were identified with GC-MS instrument. GC-MS analysis of the essential oil resulted in the identification of thirty-four constituents, representing 99.03 % of the oil. The major compounds detected in the essential oil were menthone (34.77%), menthol (16.34%), and pulegone (14.31%).

Antibacterial activity of the essential oil were determined using the disk diffusion method, against to *Enterococcus faecalis (ATCC51299), Escherichia coli (ATCC25922), M. luteus (ATCC9371), Staphylococcus aureus (ATCC25923), Escherichia coli (O157/H7), Klebsiella pneumoniae, Salmonella enterica* ssp. *enterica* sero type *typhimurium (CCM583), Candida* spp., *Escherichia coli (ATCC 35218)* bacteria. According to the antibacterial analysis results, the essential oil was effective on the as sensitivity degree on *Escherichia coli ATCC25922, M. luteus ATCC9371, Staphylococcus aureus ATCC25923, Escherichia coli O157/H7, Salmonella enterica* ssp. *enterica* sero type *typhimurium (CCM58)*. Mint essential oil had no considerable affect on other bacteria strains investigated.

PP-197

PHYTOCHEMICAL, ANTICONVULSANTS AND ANTI-INFLAMMATORY EVALUATION OF THE ETHYL ACETATE EXTRACT PORTION OF STEM BARK OF *VITEX DONIANA* SWEET VERBENACEAE

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This study investigate the anticonvulsant and anti-inflammatory properties of the stem bark of ethyl acetate portion of stem bark of *Vitex doniana* sweet as well as its phytochemical content. The *V. doniana* stem bark was macerated for five days with 95% ethanol, filtered and was concentrated *in vacuo*. The ethanolic extract was further partitioned with chloroform, ethyl acetate and n-butanol. The percentage yield of the ethyl acetate portion was estimated to be 2.40% $^{w}/_{w.}$ Preliminary phytochemical analysis of the extract ethyl acetate portion indicates the presence saponins, tannins, flavonoids, carbohydrates, steroids, terpene etc. The acute toxicity (LD_{50}) of extract was estimated to be 2154.06 mg/kg intraperitoneally, while orally it was found to be $\geq$ 5000 mg/kg bodyweight. Anticonvulsion, antiinflammatory and antipyretic properties of the extract portion were evaluated. The rats that received the 600 mg/kg of extract had 65% protection against pentylenetetrazol induced convulsion, while those that received 300 mg/kg had 50% protection. Also the extract reduced the paw diameter with percentages inhibitions of 71.32% and 52.11% at doses of 400 mg/kg and 300 mg/kg in laboratory rats after 5 hours. This research shows that the ethyl acetate portion shows anti-inflammatory and anticonvulsion activities and may be due to possession of phytochemicals such as tannins, steroid and flavonoid.

PP-198

ANTIOXIDANT ACTIVITY OF *PETASITES FRAGRANS* ROOTS METHANOLIC EXTRACT

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Petasites fragrans (Asteraceae or Compositeae) is a rhizomatous herbaceous perennial plant that colonizes mainly wetlands. The genus has been reported to be a rich source of sesquiterpene lactones, especially eremophilane and bakkenane. Some sesquiterpenes with the eremophilane skeleton isolated from this genus have shown potential antitumor properties[1]. Extracts of fresh roots of *Petasites* species were reported as therapeutic agents for migraine, asthma, gastric ulcer and oxidative stress. Traditionally, the roots of *Petasites fragrans* were used to treat certain digestive disorders. Experimentally, no work has been conducted, at present, the antioxidant effects of this species. In this context, we developed a methanol extract of fresh roots of this species, and then assayed content of flavonoids and total polyphenol and its antioxidant activity determined by measuring its ability to scavenge the DPPH radical (2, 2-dihenyl -1-picrylhydrazyl).
The results of the biochemical analysis showed an extract rich in polyphenols, a notorious radical scavenging activity. Indeed, the total polyphenol content was 96.75 ± 0.35 mg EQ / g EB, while that of total flavonoids was 48.75 ± 0.35 mg EAG / g EB. In addition, the antioxidant activity of the methanol extract of the plant (81.7%) was almost similar to that of vitamin C (94.1%).

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PP-199

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

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The genus *Retama* belonging to the family of Fabaceae is endemic of the Mediterranean Basin. It characterizes the dunaires ecosystems, the scrublands (resistance movements) and the desert.
In Algeria, three species of the *Retama* are indicated: *Retama monosperma* Boiss. *Retama raetam* Webb and *Retama sphaerocarpa* L.[1]. *Retama monosperma*, the 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 notammentle xylose which enters the preparation of alcohols such as the butanol, the manufacturing of candies without sugars. The extraction of hémicelluloses by the protocols gives a yield (efficiency) 14.33% of hémicellulose. The qualitative analysis by CCM in shown that hémicelluloses is established (constituted) by some glucose and by xylose (glucoxylane). The presence of xyloses in the construction of hémicelluloses incites us to look for protocols of purification of this sugar which gives the xylitol ($C_5H_{12}O_5$) 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 exploitin food industry as ingredient in the chewing gum and the toothpaste. Furthermore, it can be used by the obese persons or the diabetics[2].

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PP-200

CHEMICAL ANALYSIS AND PHARMACOLOGICAL ACTIVITIES OF *POPULUS NIGRA* FLOWER BUDS EXTRACTS AS SOURCES OF PROPOLIS

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Populus nigra flower bud extracts were subjected to investigate its antioxidant, antimicrobial and anti-inflammatory properties. The phytochemical screening demonstrated the presence of different types of compound like terpenes, some flavonoid aglycons and phenolic compounds. Antioxidant activities were tested using radicals scavenging and inhibition of lipid peroxidation activities, which showed that the aqueous fraction of chloroform extract was the more effective on DPPH (IC_{50}=24.61 µg/ml), ABTS (IC_{50}=17.09 µg/ml), NO (IC_{50}=9.52 µg/ml), HOCl (IC_{50}= 187.90 µg/ml) and OH^- (IC_{50}=113.79 µg/ml). The inhibition of XO and lipoperoxydation by the same extract was dose-dependent with an IC_{50}=60.7 µg/ml and 24.93±1.22 µg/ml, respectively. Aqueous fraction of chloroform extract (200 mg/kg) has exhibited a potent anti-inflammatory activity (62.36%) in carrageenan-induced mice paw edema. The results obtained with organics extracts were particularly interesting, since it was inhibited all bacterial and fungal strains tested. Hence, this plant can be used to discover bioactive natural products that may serve as leads in the development of new pharmaceuticals that address unmet therapeutic use.

PP-201

CHEMICAL COMPOSITION AND ANTIMICROBIAL ACTIVITY OF VOLATILE COMPOUNDS FROM LEAVES AND STEMS OF *INULA VISCOSA*

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The chemical composition of volatile compounds isolated from leaves and stems of *Inulaviscosa* by water distillation (Plant material was collected at Bainam forest, at northwest from Alger, Algeria), we obtained an average yield: leaves (0.29%) and stems (0.036%) were analyzed by GC and GC-MS. The volatile fraction of thestems is rich in diterpenoids (52.5%) and the major compoundsare: *E*-totarol (18.1%), α-cedrol (16.7%), isoabienol (12.1%), abienol (8.3%), isopimaradiene (5.1 %), abietatriene and manyol oxide (3.6%). While the volatile fraction of the leaves is rich in sesquiterpene hydrocarbons (28.9%), the composition of the major compounds are caryophyllene oxide (10.4%), fokienol (9.6%), α-eudesmol (7.6%), E-nerolidol (7.0%), Y-udesmol (6.2%). We note that the composition of the volatile fraction of leaves and stems is completely different.
The volatile composition was also tested against four bacteria; *Bacillus subtilis*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and *Escherichia coli*), and two fungi (*Saccharomyces* sp. and *Candida albicans*) using the Kirby-Bauer disk diffusion method. The bacteria tested were susceptible to the *Inulaviscosa* volatile compounds.

PP-202

COMPARATIVE STUDY OF PHENOLIC COMPOSITION AND ANTIOXIDANT ACTIVITY OF *ARBUTUS UNEDO* FLOWERS AND ROOTS EXTRACTS

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Arbutus unedo L. is native to the Mediterranean basin. The plant is known in Algeria thanks to its use in traditional medicine, due to its antiseptic, diuretic, astringent and depurative properties[1]. The aim of this study was to evaluate the phenolic content, antioxidant activity and characterization of polyphenols by twochromatographic technics, TLC and HPLC of*Arbutus unedo* flowers and roots methanolic extracts.The results of the different phytochemical analysis are respectively: 117.466 and 45.232 mg catechin equivalents/g dry weight for the total phenolic contents; 9.866 mg and 10.906 mg quercetin equivalents/g dry weight relative to the total flavonoids concentrations; 33.636 and 37.872 mg tannic acid equivalents/g dry weight of the tannins composition; finally, 1.775 and 4.780 mg equivalent cyanidin-3-glucoside/g dry weight of anthocyanins contents. The antioxidant activity of the methanolic extracts, determined using several tests, show that the two extracts exhibit an antioxidant activity. Though, roots extract antioxidant activity is the best. Chromatographic profilings have allowed to detect the presence of a series of flavonoids and phenolic acids.

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THIN LAYER CHROMATOGRAPHY (TLC) STUDY OF ANTI-$^{\bullet}$NO AND ANTI-ABTS$^{\bullet+}$ ACTIVITIES OF *PISTACIA LENTISCUS* LEAVES AND SEED EXTRACTS

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Pistacia lentiscus, a spontaneous plant with a common use by rural populations in the treatment of several diseases including some inflammatory pathologies. The aim of this study was to evaluate the free radical scavenging activity ($^{\bullet}$NO) and (ABTS$^{\bullet+}$) of leaves and seeds extracts and chromatographic fractions of *Pistacia lentiscus*, followed by the characterization of the molecules responsible for this activity by thin layer chromatography (TLC). Extracts and fractions obtained from active extracts by column chromatography were tested for their scavenging activity potential against nitric oxide ($^{\bullet}$NO)[1] and (ABTS$^{\bullet+}$)[2], the characterization of active fractions by TLC was conducted using two elution systems. The amounts of phenolic compounds reveal that the leaves extracts contain more phenolics, flavonoids and tannin, than those of seeds showed only appreciable amounts of tannins.Leaves aqueous extracts exhibited the best scavenging activity against ABTS$^{\bullet+}$, with IC_{50}=1 µg/ml register byaqueous chloroform extract. Whereas the seeds, leaves extracts and all chromatographic fractions showed excellent scavenging activity against $^{\bullet}$NO (100 µg/ml), where aqueous of ethyl acetate and ethanolic extracts seed showed lower IC_{50} (1.56 and 2.42 µg/ml) than standards. The characterization of active fractions by TLC, revealed their diversity of secondary metabolites such as phenolic compounds and terpenes.This study proves the various therapeutic applications of this plant in traditional medicine and encourages the research works for new natural antioxidants in the therapeutic field.

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PP-204

MINERAL CONTENT AND MICROBIOLOGICAL ANALYSIS OF SOME WILD EDIBLE VEGETABLES CONSUMED IN KILIS AND GAZIANTEP PROVINCES

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In this study, mineral contents and antimicrobial properties of some wild edible plants belonging to ten different taxa in various plant families, naturally grown and consumed as a vegetable in Kilis and Gaziantep regions were determined. The plants studied here were as follows: *Arum dioscorides*, *Chenopodium album*, *Malva sylvestris*, *Mentha longifolia*, *Nasturtium officinale*, *Papaver rhoeas*, *Polygonum aviculare*, *Rumex acetosella*, *Sinapis alba*, and *Urtica dioica.* The methanolic and hexane extracts of edible plant parts were used for microbiological analysis whereas dried edible parts were tested for mineral concentrations (Al, Ar, B, Ca, Cd, Co, Cr, Cu, Fe, K, Mg, Mn, Mo, Na, Ni, P, Pb, S and Zn). Consequently, the plants were found to be rich in terms of mineral contents depending on the plant taxa. Plant extracts were, furthermore, determined to have very strong antimicrobial properties.

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PHENOLIC CONTENTS AND SOME BIOACTIVE PROPERTIES OF EXTRACTS OBTAINED FROM *SALVIA CERATOPHYLLA* L. (LAMIACEAE)

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The aim of this study is to determine phenolic contents and measure the antioxidant and cytotoxic capacities of methanol and ethyl acetate extracts obtained from the aerial parts of *Salvia ceratophylla* L. (Lamiaceae) collected from Eskişehir (Turkey). The Folin–Ciocalteau assay, measured total phenolic contents of the extracts and phenolic acids of the extracts were also determined by reversed phase-HPLC-DAD[1]. Total phenolic content of the extracts was in the ranged from 16.35 ±1.97 and to 330.15 ±1.28 mg GAE/g extract. Ethyl acetate extract was found to be rich as a source of phenolic. Besides, the main phenolic acid was rosmarinic acid (74.00±0.96 and 234.54±1.22 mg/100 g plant). The antioxidant activities of the extracts were measured by 2,2-diphenyl-1-picrylhydrazyl and β-carotene–linoleic acid tests[2]. Ethyl acetate extract was containing high polyphenolic substances and exhibiting higher antioxidant activities than those of the methanol extract. In addition, toxicity study was achieved by the methyl tetrazolium test on 3T3NIH mouse fibroblast cells. The toxicity of the extracts was increasing depending on thetime and the concentration.
The study demonstrates that extracts from the aerial parts of *S. ceratophylla*, not only in the contents of biologically active compounds, but also by the extent of harmful and beneficial effects.

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PP-206

PHYTOCHEMICALS AND ANTIFUNGAL SCREENING OF *DATURA STRAMONIUM* OF ALGERIA

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The aim of this work is to evaluate the antimicrobial activity of aqueous and methanolic extracted leaves of *Datura stramonium* that grows in the region of Béchar and which has a great therapeutic importance. Phytochemical screening confirmed that the leaves of *Datura stramonium* are rich with secondary metabolites flavonoids; alkaloids; tannin…; that can present biological activities. Two methods have been used with this tow extracts on 4 fungal strains producer of mycotoxins: The first one of growth evaluation in radiation on solid media and the second method of biomass evaluation in liquid media. In relation to the growth of compounds the strain have shown a particular reduction in both growth and biomasses with liberation of mycotoxins ordered as follows: *Aspergillus flavus, Aspergillus ochraceus, Aspergillus niger, Penicillium expansum* giving percentage of inhibition 100%, 61.86%, 100%, 100% for the aqueous extract and 76.08%, 100%, 18.40%, and 65.38% for the methanolic extract.

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PP-207

CONTRIBUTION TO PHYTOTHERAPY BY *SIDERITIS BREVIBRACTEATA* ON ALUMINIUM NEUROTOXICITY, INTERACTION ALZHEIMER'S DISEASE EXPERIMENTAL STUDY IN MICE

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The permanent exhibition with small doses of the human to heavy metals such as aluminum is increasingly recognized as one of the cofactors of certain neurological diseases, cardiovascular and autoimmune diseases. The aluminum (Al) is highly toxic, it was shown that it can disrupt brain development in humans as in animals; there is an increased risk of dementia, including Alzheimer's disease. The aluminum could be implicated in the etiology of diseases other than Alzheimer's disease (neurological, skeletal, respiratory, mainly immunoallergic). Nowadays, aluminum toxicity is well established in the animal laboratory, and their neurotoxic effect is studied by means of behavioral tests, memory tests, and biological analyzes. Research on natural compounds of medicinal plants has accelerated in recent years because of their importance, hence the notion of herbal medicine which is based on the antioxidant effectiveness of the lesions induced by heavy metals. Mountain tea *Sideritis brevibracteata* functions as a powerful antioxidant; it has multiple biological activities beneficial to human health. Current treatments do not go beyond the inhibition of acetylcholinesterase, while herbal medicine, presented in this study, Sideritis brevibracteata can solve other problems of oxidative stress and reduces tissue damage. It was found that he had improved remarkable in memory retention and learning in the rate white blood cells as well as cholesterol.

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PP-208

GAMMA-LINOLENIC ACID IN SOME BORAGINALES SEEDS FROM TURKEY

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γ-Linolenic acid (GLA, 18:3 *n*-6) is the first intermediate in the bioconversion of linolenic acid to arachidonic acid. GLA has proved its therapeutic value in the treatment of a wide variety of pathologies. The family Boraginaceae is known as the most common source of GLA. The *Boraginaceae*Juss.is represented by 44 genera 344 species in Turkey[1]. In the present work, seeds of 8 species (*Cynoglottis chetikiana* Vural & Kit Tan subsp. *paphlagonica* (Hausskn. ex Bornm.) Vural & Kit Tan, *Noneastenosolen*Boiss. &Bal., *Trachystemon orientalis*(L.) G. Don, *Paracaryum sintenisii* Hausskn. Ex Bornm., *Rindera lanata* (Lam.) Bunge var. *lanata*, *Cynoglossum montanum* L., *Cynoglossum officinale* L. and *Heliotropium dolosum* De Not.) collected from 12 populations belonging to Boraginaceae and Heliotropiaceae in Boraginales were evaluated for new sources of γ-linolenic acid. Fatty acid composition of the seeds was determined by GC-MS. Seed oil content ranged from 8.7% in *N. stenosolen* to 37.2% in *C. montanum.* While GLA was detected mainly in seed of all studied taxa, high GLA amounts were determined in seeds of *N. stenosolen* and *T. orientalis*, 16.5% and 15.9% of total fatty acids, respectively, which may be considered as a new source of GLA.

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PP-209

ANALYSES OF ESSENTIAL OIL COMPONENTS OF *TEUCRIUM CHAMAEDRYS, ACHILLEA WILHELMSII* C. KOCH AND *BALLOTA NIGRA* USING GC-MS

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In this study, plants are collected from collection garden situated in Turkish Medicinal and Aromatic Plants Research Center. Essential oils were analyzed by GC-MS. The main components of essential oil of Teucrium chamaedrys are trans-caryophyllene (28.92%), germacrene-D (17.25%), α-humulene (16.24%); the main components of essential oil of *Achillea wilhelmsii* C. Koch are camphor (31.09%), 1,8-cineole (29.09%), borneol (8.16%), camphene (8.07%); the main components of essential oil of Ballota nigra 1,8-cineole (25.87%), limonene (19.90%), camphene (7.67%), *p*-cymene (5.96%).

PP-210

FATTY ACID AND ESSENTIAL OIL COMPOSITION OF *VITEX AGNUS CASTUS* BERRY

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Berry and leaves extracts of chasteberry (*Vitex agnus-castus*) are used to treat disorders, including menstrual and premenstrual disorders, corpus luteum insufficiency, infertility, acne, menopause and disrupted lactation, caused by hormonal disturbances in women. The berry and leaves of the plant contains considerable amount essential oil. And also its berry contains edible oil. In this study, essential oil composition of the berry essential oil and fatty acid composition of the berry oil were determined. The main components of the essential oil were determined as α-pinene (19.31%), 1,8-cineol (14.28%), caryophylene (8.27%) and sabinene (7.24%) in berry. In addition, fatty acid composition was analyzed by GC-MS and seven fatty acids were identified and quantified in edible oil of the berry. The main fatty acid was determined as linoleic acid (69.15%). The other fatty acids were determined as palmitic (6.35%), stearic (6.74%), oleic (17.05%), and arachidic (0.73%) in berry oil of chasteberry.

PP-211

PHENOLIC CONTENT OF DIFFERENT EXTRACTS FROM ROSEMARY (*ROSMARINUS OFFICINALIS)* LEAVES

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The recovery of antioxidants from different herbs is a matter of continuous research and development. Antioxidants can protect cells against the effects of free radicals and thus, play an important role in heart illness, cancer and other diseases. Rosemary (*Rosmarinusofficinalis* L.) has been recognized as one of the Lamiaceae plant with many important biological activities. Particularly, large antioxidant power has been recognized in rosemary and main substances related with this activity were the phenolic diterpenes, flavonoids and phenolic acids.
In this work, antioxidant fractions were isolated using two different extraction techniques: supercritical CO_2 extraction at 40 °C and different pressure (10, 12, and 18 MPa), and soxhlet extraction with different solvent (ethanol, hexane and petroleum ether). HPLC-DAD with UV detection was employed for the quantitation of the main antioxidant compounds: rosmarinic acid and carnosic acid. Rosmarinic acid was the dominant phenolic compound in all extracts and carnosic acid was identified only in the extracts obtained by Soxhlet. Ethanolic extract showed superior content of carnosic acid.

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THE AMELIORATIVE EFFECT OF CARROT PECTINON LEAD ACETATE INDUCED RENAL AND HEPATIC TOXICITY IN RATS: BIOCHEMICAL AND HISTOPATHOLOGICAL STUDY

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Poisoning resulting by the ingestion of lead containing products is an important toxicological concept in pediatric age group. In sub-acute lead poisoning, decontamination options as curative treatments are limited in efficacy[1]. This two steps study is used to show the effects ofpectin, which is anaturaladsorbent on thechelationof leadand the reduction ofthe toxic effectin rats. The adverse effects of lead toxicity were observed on liverandkidney, more precisely, theincreased activityoftransaminases and the renalmarkers. Urea and creatinine have been demonstrated after one month of oral lead administration. To compare the different experimental groups, analysis of variance (ANOVA) was used following post-hocTukey's test. The level of significance between the groups was set at $P<0.05$.The addition of carrot pectin at 3%, in the feeding of intoxicated rats, showed chelating and correcting effects on liver and kidney disturbances that were caused by lead toxicity[2]. This is reflected by a significant decrease ($P<0.05$) of AST (from 107to 90.89 to 80.03 UI/l), ALT (from 48.06 to 35.37 to 37.09 UI/l), PAL (from 210.97 to 195.63 to 191.94 UI/l), Urea (from 0.60 to 0.53 to 0.50 mmol/l) and creatinine (from 15.51 to 13.42 to 10.15 mmol/l) as compared with the untreated groups. The findings of the present study suggest that the possible oxidative stress and histopathological abnormalities induced by lead can be neutralized by *pectin* in the lead exposed population.

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PP-213

ACTIVITIES OF "CARQUEJA" INFUSIONS IN THE GASTROINTESTINAL TRACT: FACILITATING THE DIGESTION AND DECREASING CHOLESTEROL ABSORPTION

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Infusions of the flowers of *Pterospartum tridentatum* (L.) Wk. & Lge. (Fabaceae), known in Portugal as "carqueja", are very popular to treat gastrointestinal problems and decrease cholesterol levels.The antioxidant activity and acetylcholinesterase (AChE) inhibition by the plant infusion were studied *in vitro*, by the DPPH and Ellman methods, respectively. The antioxidant activity may help in inflammatory conditions and the AChE inhibition increases gastro-intestinal motility. As the infusion has to reach the intestine, the activities were measured before and after *in vitro* digestion with gastric and pancreatic juices. The effect on dietary cholesterol bioavailability was also assessed using Caco-2 cell monolayers as a model of the intestinal epithelium. The infusion of *P. tridentatum* proved to be active as antioxidant and acetylcholinesterase inhibitor, presenting IC_{50} values of 22.2±0.6 µg/mL and 1.066±0019 mg/mL, respectively. The activities were kept after the artificial gastrointestinal digestion. The cholesterol bioavailability in Caco-2 cell monolayers decreased in approximately 50% in the presence of *P. tridentatum* infusion.
In conclusion, the infusion of *P. tridentatum* may be helpful in the treatment of "digestive problems" by decreasing oxidative stress and inhibiting AChE activity, and it also may decrease cholesterol levels by inhibiting dietary cholesterol absorption.

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PHENOLIC CONTENTS AND ANTIOXIDANT ACTIVITIES OF AR*TEMISIA CAMPESTRIS* L. EXTRACTS

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Aerial parts of *Artemisia campestris* (Asteraceae) collected in the region of M'sila (Algeria) were evaluated for their total polyphenol (TP), flavonoid (TF) and flavonols contents as well as for their antioxidant activities. *A. campestris* known as 'Tgouft' by local population is a dwarf shrub growing wild in the arid and semiarid regions and used as an herb tea to cure digestive pains. The chloroform, ethyl acetate and ethanol extracts were prepared. Levels of TP, TF and flavonols were determined spectrophotometrically in the extracts using Folin-Ciocalteau reagent and aluminum chloride methods respectively. TP expressed in µg caffeic acid equivalent (CAE)/mg dry weight were about 176.2, 93.2 and 104.2 while FT and flavonols contents expressed in mg of quercetin equivalent (EQ) / mg dry weight were respectively 21.36; 19.25; 19.36 and 31.13; 36.86; 12.7 for chloroform, ethyl acetate and ethanol extracts. The antioxidant activity was determined using the free radical 2,2-diphenyl-1-picrylhydrazyl (DPPH) test and β-carotene-linoleic acid bleaching test. The DPPH test showed IC_{50} values of 105.76; 100.2, and 68.1 µg/ml for chloroform, ethyl acetate, and ethanol extracts, respectively. These effects seem to be weak when compared to the positive control BHA (IC_{50} = 51.07 µg/ml). Antioxidant activity was evaluated using β-carotene/linoleic acid system, it ranged between 76.68 and 89.32 % for all extracts and seems to be close to that of BHT 95% when used at 2 mg/ml after 48h incubation.

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PP-215

VALUATION OF THE THERAPEUTIC EFFECT OF FLAVONOID COMPOUNDS OF *CITRUS CLEMENTINA* HORT. LEAVES OF THE REGION OF BLIDA (ALGERIA)

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This work is a first contribution under investigation characteristics chemical qualitative and quantitative and antimicrobial of leaves citrus's flavonoïdes, selected for their therapeutic effects already known, their great capacity antioxidant and the abundance of citrus fruits in Algeria. The extraction of the flavonoids, by various solvents, allowed us: to qualify the followings composites by spectrophotometer with visible UV: -flavones-flavonols: 2.477 mg/g ± 0.361.-C-glucosides: 3.331 mg/g ± 0.296.- Anthocyanins: 0.337 mg/g ± 0.046-Hétérosides: 3.77 mg/g ±0.204. The tests microbiological, carried out on the microb by the flavonoids extracts, show to the various behaviours of these germs tested (bacterium (G^+, G^- and yeast). The power bacteriostatic of the extracts is determined by the inhibiting minimal concentration (CMI), varying from 0.04 mg/ml to 1.68 mg/ml, and the bactericidal power by the minimal bactericidal concentration (CMB) equal to 1.845 mg/ml. The biocide activity shows that *Staphylococcus* aureuspresent a sensitive to all flavonoids extracts, but they are very sensitive to flavones-flavonols. *S. epdermidis*, *Echerichia coli* and *Agrobacterium tumefaciens* have a big sensitive toflavones flavonols and free aglycones. *Pseudomonas aeruginosa*, *Bacillus subtilis* and *Candida albicans* are highest sensitive to flavones-flavonols extracts, *Saccharomyces cerevisia* is very sensible to flavones-flavonols but it has a medium feeling to the antocyanes and C-glycosides. *Bacillus subtilis* and *Candida albicans* present an intermediate feeling to the extracts of anthocyanins and C-glycosides.

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ANTIOXIDANT ACTIVITY AND FLAVONOID CONTENT OF VITEX (*VITEX AGNUS CASTUS*) COLLECTED FROM FLORA OF TURKEY

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Vitex is a deciduous shrub native to European, Mediterranean and Central Asian countries[1]. The various species of *Vitex* have been used to treat a range of human ailments, particularly relate to insects, fungi, bacteria, snakes, poisonous spiders and diseases associated with menstruation and gynecological problems[2]. In present study, we were aimed to determine antioxidant content, antiradical activity and flavonoid content and of *Vitex agnus-castus* leaves and mixture of flower and fruits were collected from Manisa Yunt Mountain, in August 2012. Antioxidant activity, antiradical activity and flavonoid content of vitex plants were determined in leaves and mixture of flower and fruits separately. Our results demonstrated that leaves of *Vitex* had higher antioxidant and antiradical activity and flavonoid content than mixture of flower and fruits. The highest antioxidant activity (244.3 µmol FRAP/g DrM) and flavonoid content (528.8 mol trolox/g DrM) of leaves were found in population *Vitex10* whereas the highest antiradical activity (138.6 mg rutin/g DrM) in population *Vitex12*. We may suggest that leaves of population *Vitex10* has a greater potential than other populations to use as a natural antioxidant.

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PP-217

ASSESSMENT OF SUSTAINABILITY OF HEDERACOSIDE C BY HPTLC-SCANNER METHOD IN SEVERAL ALCOHOLIC EXTRACTS FROM *HEDERA HELIX* PLANT LEAVES COLLECTED IN ALBANIA

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Hedera helix (Araliaceae) or English Ivy is a climber and perennial plant which is widespread in Albania: found in rocks, walls and trees. The leaves are green, with a hand shape and their collection is made in the spring time. The English ivy leave contains about 2.5-6% bidesmosidic triterpenic saponins with part of aglycon: Hederagenin B, D and greater content in Hederagenin C[1]. Saponins are used in medicine as expectorant, diuretic, antimicrobial and antimycotic agent. In the present work the aim is to determine the sustainability of the principle saponin in extracts obtained with four different methods. Extracts prepared have as digestive alcohol 70% and are extracted in the ratio 1:1 with four methods: Infusion, Reflux-Condensation, Ultrasound and Magnetic-Mixing. Extracts were stored in different temperature, light and moisture conditions. Assessment of the sustainability of Hederacoside C in alcoholic extracts was carried out by the chromatographic method HPTLC-Scanner[2].

In conclusion, the external environmental factors affected the sustainability of Hederacoside C in all four extracts, the largest relative change in content of active principle was in extract obtained with ultrasound method and the smaller relative one was in infusion extract.

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PP-218

DETERMINATION OF THE PHYTOCHEMICAL AND ANTIOXIDANT PROPERTIES OF SELECTED MALTESE MEDICINAL PLANTS

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The increased generation of free radicals during inflammatory processes is associated with upregulation of inflammatory cytokines partly through an activating effect on the transcriptional activity of NF-κB and AP-1. Plant-derived phenolic compounds, alkaloids and triterpenoids have been identified as important modulators of the inflammatory response. The aim of the present work was to delineate the phtyochemical profile and determine the antioxidant properties of 4 medicinal plants growing in the Maltese Islands selected on the basis of ethno-pharmacological records. Extracts were prepared from *Chiliadenusbocconei, Calendula suffruticosa, Rutachalepensis* and *Aloe vera* using 5 separate solvent systems. The findings included alkaloid levels in *Rutachalepensis* that were comparable to those found in plants which are known to accumulate alkaloids and a high phenolic content in *Aloe vera* leaf parts. These results strongly indicate that these plants are potential sources of compounds that have been associated with anti-inflammatory activity. Another finding consisted of a statistically significant correlation between free radical-scavenging activity and total phenolic content of the extracts. Further work is being carried out on cellular models of inflammation, in order to determine the effect of the plant extracts on the release of cytokines and on the transcriptional activity of NF-κB.

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PROTECTIVE EFFECTS OF ANTHOCYANIN AND TAURINE AGAINST MICROCYSTIN-INDUCED LIVER, PANCREAS AND TESTIS INJURIES IN BALB/C MICE

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Microcystinsare cyclic hepatotoxins produced by various species of cyanobacteria.Their structureincludes two variable amino acids leading to more than 80 variants. Microcystin-LR is a potent tumor promoter by inhibiting protein phosphatase activities.Oxidative stress has been implicated as a mechanism of MC-LR induced toxicity[1].The objective of this study was to evaluate the chemoprotective efficacy of anthocyanin extracted from *Punicagranatum*and taurineagainst acute liver, pancreas and testis injuries caused by microcystin-LRin Balb/c mice. Pretreated animals, with 32.1mg of anthocyanin and 100mg of taurine per kg of body weight for 15 days, received a single intraperitoneal dose (34.5mg/kg of body weight) of microcystin-LR extracted from *Microcystisaeruginosa*from King Talal Reservoir in Jordan and sacrificed 24h of post-treatment.The biotoxininhibits alkaline phosphatase in the organs. It induced significant increases in the level of cytotoxic biomarkers. Increased liver glucokinase activity and decreased pancreatic and liverpyruvate kinase activity suggested a pancreatic damage. Alterations in testicular activity of superoxide dismutase and lactate dehydrogenase werereported.Results showed an important protection following the administration of antioxidants against microcystin-LR toxicity.

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PP-220

SOME SPECIFIC PHYTOCHEMICALS WITH POTENTIALS OF BECOMING NOVEL DRUGS

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A myriad of diseases are being treated using plant-based drugs[1].There is need to survey literatures with a view to collating phytochemicals with therapeutic potentials. The examples are hydroxybeyeran-19-oic acid,quercetin (antihypertensive), azadirachtin (sterilant), charantin, 1-deoxynojirimycin, epigallocatechin gallate (diabetes), 2 kuguacin C and E (anti-human immune-deficiency virus 1), forskolin (asthma), deoxypodophyllotoxin (hyperpigmentation), alantolactone (tuberculosis), emodin, zerumbone, eugenol, tanshinone, arctigenin, shatavarin, peltatin, suphoraphane, swainsonine, phytic acid, triptolide (anticancer), paepalantine (colonitis), maltol (metal chelator), matrine (viral hepatitis), sinomenine (hepatitis), rotenoid (Ebstein-Barr virus), β-sitosterol (anticholesterolaemic), ergothioneine (potent and stable antioxidant), gugusterone (antihypercholesterolaemic), abyssinone-v,cowanin, (potent antiplasmodial against *P. falciparum*), 8-acetyl-berberine (anti-hyperlipaedemic), cordycepin (colon cancer), timosaponin A-III (respiratory syncial virus), harpagoside, baicalin (anti-arrhythmia), boswellic acid (auto immune encephalitis and crohn's disease), peganine (anti-tobacco smoke and anorexigenic), (-)-hopeaphenol (human hepatoma), gallic acid (*Trypanosoma brucei*), samentoside A (cardiotonic), Salvinorin (psychotropic), oleanolic and ursolic acids (anti-glycativ, anti-tumor, anti-HIV, anti-hypercholesterolaemic and diuretic), tylophorine (hepatoprotective and stimulant of adrenal cortex), sanguinarine and cheleryhrine (Molluscicidal against *Oncomlania hupensis*), ferulic acid (aperient),β-asarone (cognitive impairment), isoliquiritigenin (hepatoma and lung cancer), cryptolepine (antihypertensive and antipyretic) and scopoletin (leukaemia). All the discovered compounds belong to major groups of secondary metabolites and can be developed into orthodox medicines by pharmaceutical companies[2].

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COLOURS ARE INDICATORS OF MEDICINAL VALUES OF PLANTS

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Medicinal plants serve as source of one in every four drugs on drug market. The work is aimed at using colours to determine medicinal values of plants. Literatures were searched to get medicinal plant parts whose colours solely depend on their phytochemical pigments. Biological pigments selectively absorb certain wavelengths of light to power chemical reactions, while the reflected wavelengths of light determine the colour pigment. Chlorophyll is a porphyrin that absorbs yellow and blue wavelength while reflecting green which is corroborated by the three component theory of colour vision[1]. When β-carotene yellow pigment cleaved, two molecules of vitamin A are produced and converted to II-cis-retinal that combine with opsin to form rhodopsin. When light strikes the rods, metarhodopsin is produced. Caroteinoids are antioxidant and promote healthy eyesight in animals[2]. Dithiins are red with potent cytotoxic, nematocidal and fungicidal properties. African black pepper is uterotonic, fungicide and aphrodisiac. The yellow epimedokoceanoside from Epimediumkoreanum is hypotensive. The blue essential oil of flowers from Matricariachamomilla is used as cosmetic, alcoholic flavour and non-alcoholic beverage. The combination of primary colours (red, green and blue) can form over 1000 colours thatmay be found in over estimated one million higher plants.

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PP-222

QUANTIFICATION OF SOME PHENOLIC ACIDS IN THE LEAVES OF *MELISSA OFFICINALIS* L. FROM TURKEY AND BOSNIA

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Melissa officinalis L. (lemon balm) contains many potentially biologically active compounds, including the caffeic acid (CA), chlorogenic acid (CGA), rosmarinic acid (RA), succinic acid, ursolic acid and thymol. In this study, using the HPLC-ED system, analyses of gallic acid (GA), CGA, RA and CA were performed in hot water extracts of lemon balm. Analyses of GA, CGA, CA and RA were performed in supernatants of lemon balm leaf extracts. The standard solutions of GA, CGA, CA and RA were prepared by dissolvingpure substances in the mobile phase. HPLC conditions were: mobile phase methanol-acetonitrile-water-acetic acid (20+10+70+1); potential +0.84 V, flow rate 1ml/min, temperature 25°C, column ODS Hypersil. The lemon balm leaves from Bosnia contained 0.382 mg/g GA, 0.254 mg/g CGA, 0.136 mg/g CA and 0.51 mg/g RA. The lemon balm leaves from Turkey had a higher CA content (0.71 mg/g), while the GA, CGA and RA content was lower (0.223 mg/g, 0.227 mg/g and 0.236 mg/g, respectively).The highest content of RA, CGA i GA was found in leaves of lemon balm from Bosnia, whereas the highest content of CA was found in leaves of lemon balm from Turkey.

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DETERMINATION OF ARBUTINE IN THE LEAVES OF *ARCTOSTAPHYLOS UVA-URSI* (L.) SPRENG. BY HIGH PERFORMANCE LIQUID CHROMATOGRAPHY WITH ELECTROCHEMICAL DETECTION

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Arbutine, present in bearberry (*Arctostaphylos uva-ursi* [L.] Spreng.), is a hydroquinone derivative with significant therapeutic activity. Bearberryis commonly used as an uroantiseptic, mild diuretic or to reduce inflammation. The aim of the study was to determine the arbutine content in hot and cold water extracts of bearberry leaves by HPLC-ED. The leaves were collected from two different locations in Bosnia and Herzegovina. Arbutine was obtained with both hot and cold water extraction, supernatants diluted and used for analyses. The standard solution was prepared by dissolving rutin in pure water. HPLC conditions: mobile phase EDTA-sodium acetate-acetic acid-methanol-HPLC water; potential + 0.75 V; flow rate 0.9 ml/min; column ODS Hypersil. The arbutine concentrations were higher in cold water extracts of bearberry leaves from both locations (18.18 mg/g and 10.36 mg/g) than the corresponding concentrations in hot water extracts (5.35 mg/g and 3.5 mg/g).Cold water extracts of bearberry leaves have a higher arbutine content compared to hot water extracts. Aqueous extracts used as therapeutical agents should therefore be obtained by the cold water extraction process, as such are expected to have a higher activity and be more effective.

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THE IMPORTANCE OF ANALYSIS OF TOTAL SULFUR CONTENT IN GARLIC, *ALLIUM SATIVUM* L., (ALLIACEAE) BY HIGH PERFORMANCE ION CHROMATOGRAPHY (HPLC)

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The aim of this investigation is to stimulate further research in order to increase total sulfur content in garlic as it relates to the usage of different manures and different locations of growth. The analysis of garlic bulbs and leaves was performed by the high performance ion chromatography (HPIC). At the same time, a monitoring of the sulfur content in garlic during planting periods was conducted. The highest level of sulfur was found in garlic treated with poultry manure, 30% higher than in garlic treated with the beef manure and 40% higher compared to garlic treated with sheep manure. Garlic treated with mineral fertilizer had a value 10% lower than garlic raised with poultry manure. Control samples without any fertilizer had a value between garlic cultivated with sheep and beef manures. The sulfur in garlic from mountainous areas was significantly lower than in garlic from the field. Total sulfur in leaves of garlic in the initial planting period is higher than in the final period of vegetation. In contrast, in the final period of vegetation, the sulfur in bulbs increased. All changes of sulfur content in garlic are possible to examine by utilization of the HPIC technique.

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SPECTROPHOTOMETRIC DETERMINATION OF MALONDIALDEHYDE IN PHARMACEUTICAL FATS

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The aim of this study was to measure the malondialdehyde (MDA), as a marker of lipid peroxidation in pharmaceutical fats which were exposed to daylight[1]. Samples were fresh and rancid pharmaceutical fats: almond, fish and calendula fat. One part of each sample was exposed under the influence of daylight for 15, 42 and 65 days, which was a rancid sample. The other part of each sample left to stay at +4ºC, protected from the light, was used as a control (C). The spectrophotometric method for the measurements of MDA based on reaction with N-methyl-2-phenylindole (NMFI) was used[2]. MDA content was expressed as mass MDA by weight of fresh sample (μg/g). The highest MDA content was found in fish fat that was exposed under the influence of daylight for 65 days. Lipid peroxidation was higher in rancid almond (4.76 μg/g, vs. control 4.02 μg/g) and calendula (6.29 μg/g vs. control 4.07 μg/g) fats which were exposed under the influence of daylight for 65 days. The results showed that the stability of pharmaceutical fats samples to oxidation processes was quite good.

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PP-226

PRELIMINARY PHYTOCHEMICAL AND ANTIBACTERIAL STUDIES OF *CONVOLVULUS ARVENSIS* AND *THYMUS CAPITALUS* PLANTS EXTRACTS

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Convolvulus arvensis (Family: Convolvulaceae) and *Thymus capitalus* (Family: Lamiaceae) are the useful plants used in traditional system of medicines for the treatment of various diseases. The present study was conducted to examine preliminary phytochemical and antibacterial screening of aqueous and ethanolic leaves extracts of both plants. Plants possess almost limitless ability to biosynthesize phytochemicals, which serves as a source for natural therapeutic agents and as plant defence mechanisms against predation by microorganisms, herbivores and insects. The qualitative phytochemical studies of aqueous and ethanolic extracts of the plants leaves were carried out using standard testing procedures for metabolites viz. tannins, saponins, phlobatanins, flavonoids, terpenoids, cardiac glycosides and alkaloids The aqueous extract of *Convolus arvensis* was found to contain tannins, saponins, flavonoids, terpenoids and cardiac glycosides, while the ethanolic extract was found to contain tannins, flavonoids, terpenoids, cardiac glycosides and alkaloids. However, the aqueous extract of *Thymus capitalus* was found to contain tannins, saponins, flavonoids and terpenoids, and the ethanolic extract was found to contain tannins, phlobatanins, flavonoids, terpenoids and cardiac glycosides. The antibacterial activity of ethanolic leaves extract of both plants was tested using Gram positive strains (*Staphylococcus epidermidis, Staphylococcus* spp.) and Gram negative bacterial strains (*Proteus vulgaris, Eschericia coli, Citrobactor freundii*). In general, the extracts of both plants showed considerable activity on the bacterial species. Both plants extracts selectively inhibited the growth of both gram positive and gram negative bacteria with zones of inhibition ranging from … mm at concentrations of 50 mg/ml. It can be concluded that the activity showed by the ethanolic extract of the plants is as a result of the phytochemicals present in both plants and these plants seems to be good candidates for further phytochemicals studies in an attempt to find new chemical entities combating resistant bacteria.

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EXTRA VIRGIN OLIVE OIL COMPONENTS, OXIDATIVE STABILITY AND ANTIOXIDANT ACTIVITY FROM WILD OLIVES GROWN IN BEJAIA

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Virgin olive oil, one of the main components of the Mediterranean diet, is highly appreciated all over the world for its delicious taste and aroma, as well as for its beneficial nutritional properties[1]. With the aim to select new olive with superior physical and chemical properties, the present study focused on the determination of the phenolics compounds, fatty acids composition, oxidative stability and antioxydant activity of oils extracted from some wild olivesgrowing in the province of Bejaia. Our results showed significant differences in the analytical parameters examined confirming the importance of genetic factors in the chemical characteristics of the oil[2]. The results of the analysis of individual phenolic compounds performed by HPLC indicate a similar qualitative composition between wild olive oils. The main phenolics compounds determined are: oleuropein derivatives (43.8 to 228.1 mg/kg), ligstroside derivatives (52.4 to 369.9 mg/kg), flavonoids (3.12 to 13.3mg/kg), lignans (10 to 57 mg/kg) and elenolic acids (66.7 to 168.3 mg/kg). The fatty acid composition is well within the IOOC standard with the predominance of oleic acid (67.5 to78.23%). The antioxidant capacity and oxidative stability of samples follows the same order as that of the levels of polyphenols. The wild olives studied produce oils with good quality characteristics in terms of natural antioxidants and antioxydant activity.

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PP-228

EVALUATION OF THE COMPOSITION OF ANTI-NUTRITIONAL SUBSTANCES IN THE FRUITS OF *GLEDITSIA TRIACANTHOS* L.

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Honeylocust *(Gleditsia triacanthos)*, also called sweet-locust or thorny-locust, is a moderately fast growing tree commonly found on moist bottom lands or limestone soils. 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^{th} 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. Honeylocust 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. Within the framework 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-nutritionals 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%).

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EXTRACTION AND QUANTIFICATION OF PHENOLIC COMPOUNDS AND EVALUATION OF THEIR ANTIOXIDANT ACTIVITIES

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Our study is in keeping with the general pattern of bringing one's contribution to the development of the vegetable kingdom in the region of Laghouat as a source of natural bioactive substances. In this context we are interested in phenolic compounds of *Oudneyaafricana*.The first step in this study consists in extracting of phenolic compounds using different systems: Methanol/water: 8/2 v/v and Acetone /water: 7/3 v/v, the aqueous phases of each extract are subjected to several liquid-liquid extractions by various organic solvents: petroleum ether, dichloromethane, ethyl acetate and n-butanol.The second part of this study concerns the quantification of phenolic compounds[1]andflavonoids[2]. Finally, we assessed the potential antiradical of our extracts by thephosphomolybdenum and DPPHtests. The analysis results of phenolic extracts show clearly a high content of phenolic compounds in investigated plant ranging from 0.577±0.07 to 17.52±0.68 mg/g of gallic acid equivalent and the total flavonoids content lie between 0.039±0.004 and 5.168±0.14 mg/g of quercitin equivalent. The antioxidant activity tests show that our phenolic extracts exhibit good antioxidant capacity comparatively to antioxidants taken as reference.

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PP-230

CHEMICAL COMPOSITION OF THE ESSENTIAL OILS OF SOME *ACHILLEA* SPECIES GROWING WILD IN TURKEY*

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The genus *Achillea* is represented by about 85 species throughout the world and the flora of Turkey includes 42 of total, 23 of *Achillea* species are endemics in Turkey. The *Achillea* genus has a wide distributional range, from deserts and sea coasts to nival pioneer biota and from rock fissure and talus to ruderal habitats the morphologic and chemical composition of *Achillea* species was affected by environmental conditions, because of a chemically polymorphic and perennial. In this study, native *Achillea* plants (*A. biebersteinii*, *A. aleppica*, *A. tenuifolia*, *A. magnifica*, *A. cucullata*) were collected from nine localities of Southeastern and Eastern of Turkey during the flowering period. The essential oils of five *Achillea* species were obtained by hydrodistillation and analysed by GC-MS. Generally the principal constituents of the oils were 1,8 cineol+ascaridol, camphor, isoascaridol, 1,8 cineol and camphor as *A. biebersteinii*, *A. aleppica*, *A. tenuifolia*, *A. magnifica*, *A. cucullata*, respectively. Chemical composition of essential oils of *Achillea* species is highly variable, which may be due to the differences in their chemical polymorphic structure and environmental conditions.

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EFFECT OF *CAMELLIA SINENSIS* AND *TRIGONELLA FOENUM-GREACUM* SAPONINS ON *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 saponins (TS) on *in vitro* ruminal fermentation traits of vetch-oat hay using gas syringes as incubators. The TS were added at levels of 0, 2, 4, 6 and 8 mg and 0, 48, 54, 60 and 66 mg against 200 mg of vetch-oat hay for *Camellia sinensis* and *Trigonella foenum-greacum*, respectively, in rumen fluid. *In vitro* gas production (GP) was recorded and methane concentration was determined at 3, 6, 24, 48, 72 and 96h incubation. After 24 h, the incubation was stopped and the inoculants were determined for pH, ammonia-N, protozoa counts and *in vitro* true digestibility (IVTD). The GP was decreased with the increasing doses of TS for all incubation times and this diminution was dose-dependant. Methane concentration was decreased at all levels of TS at each incubation time. The high methane reduction was observed at 48h of incubation for both plants. This decrease in methane production varied between 48.78-52.84% and 45.52-72.35% for *Camellia sinensis* and *Trigonella foenum-greacum*, respectively. The pH of ruminal fluid was slightly affected by inclusion of TS, but all values were in the normal range. Ammonia-N concentrations decreased significantly ($P < 0.002$) when the TS were included. The TS significantly inhibited the protozoa growth in ruminal fluid ($P < 0.001$). At 24h incubation, protozoa counts were reduced by 41.2, 47.25, 53.22 and 81.86%, respectively at levels of 2, 4, 6 and 8mg of *Camellia sinensis* compared to that in control. A same trend was observed for *Trigonella foenum-greacum* for which reduction levels were 42.7, 48.44, 56.08 and 83.29% at levels of 48, 54, 60 and 66 mg, respectively. However, IVTD was slightly affected by inclusion of TS. It is suggested that TS could modify the rumen fermentation and inhibit the release of methane and ammonia, which may be beneficial for improving nutrient utilization and animal growth.

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EFFECT OF RUTIN ON *IN VITRO* RUMINALE MICROBIOTA ACTIVITY IN SHEEP RUMEN LIQUOR

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A pure flavonoid (rutin) was used in *in vitro* gas production test at 0.5 and 1 mg/ml level to evaluate its effect on rumen fermentation of three substrates: vetch-oat hay, wheat straw and alfalfa. Rutin at 0.5 and 1 mg/ml levels did not show any significant effect ($P < 0.001$) on gas production. The extent of fermentation was different in three substrates. At both the levels, rutin slightly decreased methane production. *In vitro* true dry matter degradability (IVTDMD) and *in vitro* true organic matter degradability (IVTOMD) of all the three substrates was increased due to addition of rutin at 0.5 and 1 mg/ml levels but, this increase was not statistically significant ($P < 0.001$). There was not any significant change in PF and microbial biomass production due to addition of rutin. Rutin at 0.5 and 1 mg/ml levels was not having significant effect on ammonia production from berseem and vetch-oat hay but, it significantly decreased from wheat straw ($P < 0.001$). There was not any significant effect on the acetate: propionate ratio. As methane production was slightly decreased and degradability of the feeds was slightly increased; the methane production per unit of degraded substrate was reduced. This work shows that flavonoid is having potential to favourably alter the rumen fermentation pattern but, level of administration will have to be evaluated further to get maximum reduction in the methane emission.

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DELIVERY OF ARTEMISININ TO BREAST CANCER USING LIPOSOME AS DRUG CARRIER

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Nanotechnology has significantly revolutionized cancer diagnosis and treatment recently. While breast cancer is one of the most destructive diseases among women, Artemisinin, which is a terpene lactone taken from the leaves of Artemisia annua, is one of the drugs used to cure cancer.1 Artemisinin molecules have an endoperoxide bridge which can produce free carbon radical by being combined with iron Fe (II), which ultimately results in cell death. However, it seems to be effective to use nano carriers in order to improve efficiency and cytotoxicity property of artemisinin. This contributes to one of the most controversial issues in nanotechnology, which is the reduction or thoroughly elimination of side effects. Nano carriers seem to be a pioneer aspect of this technology. In this study liposomes are used as a lipid nano carrier. Liposomes consist of one or some concentric layers of lipid which are formed by water and lipids sources. In order to prepare liposomes, some portions of phosphatidylcholine, cholesterol, and artemisinin are mixed. Zetasizer was used to determine nano dimension diameter of liposomes. Encapsulation and drug release in nanoliposomal formulation was respectively obtained as 96.02+4.2% and 8.21%. This study also proves that cytotoxicity effect of nanoliposomal artemisinin was more than standard artemisinin.

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ESSENTIAL OIL COMPOSITION AND THE *IN VITRO* ANTIOXIDATIVE PROPERTIES OF *MELISSA OFFICINALIS* L. FROM IRAN

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Lemon balm (*Melissa officinalis* L.), is a perennial shrub of the Lamiaceae family, native to southern Europe and the Mediterranean region. Lemon balmis considered a calming herb. It was used as far back as the Middle Ages to reduce stress and anxiety, promote sleep, improve appetite, and ease pain and discomfort from indigestion. In this research, chemical composition of the essential oil from the aerial parts of *M. officinalis*that obtained by hydrodistillation were analyzed by GC and GC-MS: The cedrane (14.1%) and 2,2,8,8-tetramethyl-5-nonanone (12.6%), trans-sabinene hydrate (7.8%) were main componentsamong the 24 constituents characterized in the oil of *M. officinalis* representing 89.6% of total components detectedand differ from European plants that major constituents are citronellal, citronellol andgeraniol. Also we studied in vitroantioxidant activities of the methanolic extract of Lemon balm (*Melissa officinalis*L.). The samples were subjected toscreening for their possible antioxidant activity using DPPH[1] and TPC[2].The polar subfraction ofmethanolic extract showed excellent DPPH free radical-scavenging activity and in TPC test, amount of total phenolics was highest in this sample.
In summary, chemical composition of essential oils of *M. officinalis* of Iran was investigated and methanolic extract, exhibited greatest antioxidant activity in the DPPH and TPC tests.

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PP-235

IN VITRO EVALUATION OF NEUROBIOLOGICAL PROPERTIESAND HPLC CHARACTERIZATION OF *RICOTIA CARNOSULA, CONRINGIA GRANDIFLORA* AND*VACCARIA HISPANICA*

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Neurodegenerative diseases are on increasing trend due to raising population of the elderly as their incidence is highly associated with aging. Among them, Alzheimer's (AD) and Parkinson's diseases (PD) are quite common and not possible to be seized by current drug therapy. Therefore, an extensive research is being conducted to discover novel drug candidated for these diseases. Cholinesterase inhibitors are the most prescribed drug class against AD, while inhibition of tyrosinase has been suggested to be beneficial for PD. For this purpose, the ethanol extracts of *Conringia grandiflora* Boiss. & Heldr. and *Ricotia carnosula*Boiss. & Heldr. (natural and cultured sample)from Brassicaceae as well as *Vaccaria hispanica*(Mill.) Rauschert (Caryophyllaceae) were assayed against true (AChE) and psuedocholinesterase (BChE) and tyrosinase using ELISA microplate reader. Their antioxidant potential was tested against DPPH, DMPD, and NO radical scavenging effect as well as metal-chelation capacity, ferric- (FRAP) and phosphomolibdenium-reducing antioxidant power (PRAP) assays. Among the tested extracts, the ethanol extract of the natural sample from *Ricotia carnosula* displayed much better activity in the antioxidant assays, whereas none of the extracts was active against the mentioned enzymes. HPLC analysis indicated presence of rutin in the natural sample of *R. carnosula*and *Conringia grandiflora*, while vitexin was detected in *Vaccaria hispanica*.

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EVALUATION ANTIFUNGAL AND ANTIMYCOTOXICOGENICAL EFFECT OF *CAPPARIS SPINOSA*

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Essential compounds of plants (phenols…) are used in traditional medicine for their antitherapetic action, during previous studies, the extract of *Capparisspinosa* had shown good as an antifungal and antimycotoxicoginical.The methanolic extract were tested on six fungal strains (*A. flavus, A. parasiticus, A. niger, A. ocraceus, Penicillium* sp., *Fusarium* sp.) were effective. With respect to the strain *A. niger*, the hydromethanolic extract was more active. Phenols present in hydromethanolicextract have a good activity more than the methanolic extract of *Capparis spinosa.*

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AN *IN VITRO* INVESTIGATION OF ANTIMICROBIAL ACTIVITY OF BLACK CUMIN (*NIGELLA SATIVA* L.) ESSENTIAL OIL

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Black cumin *(Nigella sativa* L.) seeds and products have been widely used in traditional nutritional and medicinal applications. The aim of this study is to investigate *in vitro* antimicrobial effects of the essential oil from *Nigella sativa* L. The essential oil was chemically analyzed and identified by GC and GC-MS[1]. The composition of essential oil used was *p*-cymene (17.40%), carvacrol (16.94%), thymoquinone (12.33%), borneol (11.55%), thymol (6.61%), linalool (5.21%). The essential oil was tested individually against 49 microorganisms, including 32 bacteria, 14 fungi, and 3 yeasts species. Antimicrobial effects have been studied by using disc-diffusion (DD) and minimal inhibition concentration (MIC) methods. The essential oil showed different antimicrobial activity against tested microorganism. Mean inhibition zones and MIC values of bacterial strains varied from 0 and 50 mm to 0 and 62,5 μg mL^{-1}, respectively. The essential oil did not show any antimicrobial effects against used fungi and yeast species. In general, the essential oil showed lower DD values than tested antibiotics.
In conclusion, essential oil of *N. sativa* L. is not considered a potential source of a natural antimicrobial examined against fungi and yeasts. However, its antibacterial effect found against some bacteria.

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IN VITRO EVALUATION OF ANTIOXIDANT AND ANTIBACTERIAL ACTIVITIES OF EXTRACTS OF *HERTIA CHEIRIFOLIA*'S LEAVES

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The genus *Hertia* belongs to the family Compositae and comprises twelve species distributed throughout South and North Africa, and Southeast Asia[1]. In this study, our objective is to investigate the antioxidant activity by the means of two methods: the β-carotene bleaching method and DPPH assay as well as testing the antibacterial activity by the Agar-well diffusion method, of the extracts (Ether of petrol extract EEp, dichloromethane extract EDm, Methanolic extract EMe and Aqueous extractEAq) from the leaves of *Hertia cheirifolia*. The quantitative analysis are showed that the highest content of total phenolic was concentrated in the methanolic extract with 30.33 ± 2.82 µg EAG/mg of extracts, in the second level the EAq extract and EDm extract with 25.92 ± 7.19 µg EAG/mg of extracts and 21.25 ± 1.76 µg EAG/mg of extracts respectively. The content of polyphenols was determined specrophotometrically and showed the presence of these compounds in all extracts. The analysis by TLC revealed the presence of quercetin in the EMe extract of this plant. In the β-carotene bleaching test, the EMe of this plant displayed highest antioxidant activity (72.97%), than in the DPPH assay with a radical scavenging activity (72.74%). Our results of the antibacterial activity showed the inefficiency of the whole extracts against most of the tested strains.

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ESSENTIAL OIL COMPONENTS, MICROELEMENTS CONTENT AND BIOLOGICAL ACTIVITY OF *LAVANDULA ANGUSTIFOLIA* MILLER

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Lavender (*Lavandula angustifolia* MILLER) is an important medicinal plant that is known for its excellent aroma and is extensively used in the perfumery, flavour and cosmetic industries. It contains important chemical compounds like linalool and linalyl acetate as the major components in its essential oils[1]. These components show variations due to many factors mainly differences among plant genotypes or to the altitude and microclimate of the cultivation area. The present study aimed to determine mineral content, chemical compositions of hydro-distilled essential oil, antimicrobial and antioxidant activities of essential oil of lavender. The dried flowers of lavender were extracted by hydro-distillation. The essential oil composition was analyzed by gas chromatography-mass spectrometry (GC-MS) and microelement contents of herbs were examined by Perkin Elmer Optima 2100 DV ICP OMS. For antimicrobial activity, the disc diffusion tests were carried out on *E. coli* line ATCC25922, *P. aeruginosa* line ATCC27853, *S. aureus* line 25923, *S. pyogenes* line ATCC19615 and *C. albicans* line ATCC10231, and the antioxidant activity was performed by using DPPH radical-scavenging method. It was determined that essential oil of *L. angustifolia* contains linalool, lavandulyl acetate and linalyl acetate as major components. Treatment of 10 µL of the oil exhibited strong antimicrobial activity against *C. albicans* and moderate activity against *S. pyogenes*, *S. aureus* and *E. coli*. The essential oil of *L. angustifolia* exhibited 48% inhibition that is higher compared to the activity exhibited by butylated hydroxytoluene (BHT); which was used as positive control.

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MINERAL CONTENTS AND ESSENTIAL OIL COMPOSITION OF LEMON THYME (*THYMUS CITRIODORUS* L.*)* AND LEMON VERBENA (*LIPPIA CITRIODORA* L.*)*

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Essential oils are complex mixtures of organic compounds that supply characteristic odour and flavour to the plants. The genus *Lippia* belonging to Verbenaceae family includes approximately 200 species of herbs, shrubs and small trees. Lemon verbena (*Lippia citriodora* L.) is indigenous to South America and is cultivated as an aromatic plant in different parts of world[1]. Lemon thyme (*Thymus citriodorus* L.) is also a perennial medicinal plant, belongs to the Lamiaceae family. It is native to southern Europe and is cultivated in the Mediterranean region. Lemon thyme was found to contain an essential oil rich in geraniol (up to 60%)[2]. These species are cultivated mainly due to the lemon-like aroma emitted from their leaves due to the presence of dimethyl-2, 6-octadienal also known as lemonal or citral used in food and perfumery for its citrus effect. The aim of this study was to determine mineral content and essential oil components of *L. citriodora* and *T. citriodorus* grown in semi-arid climatic conditions of Turkey. The aerial parts of *T. citriodorus* and *L. citriodora* were extracted by hydro-distillation. The essential oil composition was analyzed by gas chromatography-mass spectrometry (GC-MS) and microelement contents of herbs were examined by ICP. In terms of micro element contents of two species, the microelements of *T. citriodorus* were found as 0.249, 1.630, 16.41, 0.106 and 13.1–36.2 (mg kg^{-1}) for cadmium, copper, iron and manganese, respectively. The concentrations of *L. citriodora* for the studied elements were found as 0.275, 4.584, 248.1, 15.71 and 1.803 (mg kg^{-1}) for cadmium, copper, iron, manganese and zinc, respectively. Fifty compounds were determined in the essential oil of *L. citriodora*, representing 99.86% of the oil, of which limonene (30.33%) *trans*-citral (17%), *cis*-citral (12.77%), caryophyllene oxide (5.71%) and geraniol acetate (4.02%) were found to be the major components. A total of twenty two compounds, representing about 85.11% of *T. citriodorus* essential oils were identified, major components of the oils were *trans*-geraniol (30.07%), *trans*-citral (15.06%), *cis*-citral (11.71%), *cis*-geraniol (7.65%), 3-octanol (6.18%).

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INVESTIGATION OF ANTIHYPERGLYCEMIC ACTIVITY OF *SOLANUM DULCAMARA* (SOLANACEAE)

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Solanum dulcamara L., a member of the Solanaceae family, is a poisonous plant. The plant is mainly used as an alterative when taken internally in the treatment of a variety of skin diseases, arthritis, rheumatism, bronchial congestion, heart ailments, ulcerative colitis, jaundice and pneumonia[1-3]. In Turkish folk medicine, S. *dulcamara* is used as to increase urine, against rheumatism aches, expectorant, blood purifier for skin diseases, and mild hypnotic. No phytochemical work has been done on S. *dulcamara* species from Turkey. The aim of this work was investigation antihyperglycemic activity of crude extracts of S. *dulcamara* which grows in Trakya region of Turkey.Plants have been collected in their flowering time (July-August, 2012) later it has been separated, fruit and leaves. The air dried plant parts (fruit and leaves) have been macerated with n-hekzane in room temperature. The solvent have beeen evaporated under vacuum. The resudie have beeen extracted by dicholoromethane, ethylacetate and metanol, respectively. Antihyperglycemic activity has beeen examined of diabetic rats by streptozotocin in the MeOH extracts of fruit and leaves[4]. Generally, MeOH extract of S. *dulcamara* fruits showed strong antihyperglycemic activity. According to the result here, it will be isolated secondary metabolites, particularly flavonoids, phenolic compounds from crude extract with high antihyperglycemic effect.The antihyperglycemic activity of S. *dulcamara* fruit exract was presented for the first time in this study.

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DETERMINATION OFANTIOXIDANT ACTIVITY OF *SOLANUM DULCAMARA* (SOLANACEAE) FRUITS

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Solanum dulcamara L., a member of the Solanaceae family, is a poisonous plant. The plant is alsoused externally to treat skin eruptions, ulcers, rheumatism and cellulite. The fruits are marinated in vinegar and applied to cancerous sores and other problems[1,2]. In Turkish folk medicine, S. *dulcamara* (yabanyasemini, sofur) are used as to increase urine, against rheumatism aches, expectorant, blood purifier for skin diseases and mild hypnotic[3,4]. Antioxidants are vital combating the free radicals which damage the cells in our bodies and an imbalance of free radicals causes oxidative stres which can cause grave disturbances in cell metabolism such as DNA and protein damage, lipid peroxidation, cancer, atherosclerosis, ageing, inflammatory activities[5,6]. In this work, antioxidant potential of the *n*-hexane, dichloromethane, ethyl acetate and methanol extracts of *S. dulcamara* fruits were investigated by DPPH (2,2-diphenyl-2-picrylhydrazyl) free radical scavenging method. Plants were collected in their flowering time (July-August 2012) later it was separated, fruit and leaves. The air dried plant parts were macerated with *n*-hekzane in room temperature. The solvent were evaporated under vacuum. The resudie was extracted by dichloromethane, ethylacetate and metanol, respectively. The antioxidant activity of methanol extracts of S. *dulcamara* fruits was determined by DPPH free radical scavenging method.According to the obtained results, it was determined to the most active fruit extract. The antioxidant activity of *S. dulcamara* fruits was presented for the first time in this study.

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DETERMINATION OF ACTIVE PHYTOCHEMICAL COMPONENTS OF LEAF AND FLOWER EXTRACTS FROM *GENTIANA OLIVIERI* G.

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Gentiana olivieri Griseb.,one of the members of Gentianaceae. The plant which is known as Afat, is common in Eastand South-East Anatolia Region especially, in Gaziantep, Siirt, Sanliurfa and Mardin. Just as *G. olivieri* has widely been used in as antianemic, antidepressan, stomachicandantidiabetic in localregions, itshypoglycaemic, immunomodulatory, anticonvulsant, hepatoprotective[1] activity has been reported with *in vivo* studies. We obtained the plant samples from local markets in Gaziantep. The leaf and flower of plant were extracted with methanol and hexane solvent. For the phytochemical characterization of *G. olivieri* methanol and hexane extracts were performed as previously method[2]. An Agilent 6890 GC ported to a 5973 MS detector and MS libraries were used. Phytochemical components were identified by GC-MS. *G.olivieri* leaf hexane extract has 10, methanol extract has 6 major peaks and *G.olivieri* flower hexane extract has 7, methanol extract has 8 major peaks. The major component which we identified in leaf extracts of *G. olivieri* leaf is eicosane. The recent studies have reported that eicosane is one of the active components which have showed antioxidant activity. In our further investigations, we aimed to determine antitumoral effect and if it has, what is the molecular pathway of *G.olivieri* G. *in vitro*.

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SECONDARY METABOLITES AND ESSENTIAL OIL COMPOSITION IN *IN VIVO, IN VITRO* AND *EX VITRO* CULTIVATED PLANTS OF *LAMIUM ALBUM* L.

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Lamium album L. possesses wide spectrum of therapeutic activity such as anti-inflammatory, astringent, antiseptic, antibiotic, antispasmodic, anti-proliferative and antioxidant. The aim of this study was to evaluate the essential oil composition and phenolic compounds accumulated in *in vivo*, *in vitro* and *ex vitro* plants of *L. album*. The essential oils were analyzed by GC-MS. The analysis of phenolic compounds was carried out using a HPLC. Seventy terpenes were detected in the oil from *in vivo* plants and nearly two times less in *in vitro* and *ex vitro* plants. Germacrene D was the main constituent in the oils of *in vitro* and *ex vitro* plants (44.08% and 46.65%) followed by β-caryophyllene E (13.0% and 6.5%). Eleven phenolic acids and six flavonoids were established in the samples. The main phenolic acid was the protocatechuic acid prevalent in *in vivo* and *in vitro* plants (48.36±0.96 mg/g DW and 45.67±0.91 mg/g DW). However, *in vitro* propagated plants accumulated relatively less flavonoids compared to *in vivo* and *ex vitro* plants.

Despite the promising results, further investigations are needed for modulating the biosynthesis of valuable metabolites like germacrene D and β-caryophyllene E having antimicrobial, anti-inflammatory and local anesthetic properties in order to obtain higher yield.

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PHENOLIC ACIDS, FLAVONOIDS AND QUERCETIN GLYCOSIDES OF *IN VIVO* PLANTS, *IN VITRO* AND *EX VITRO* CULTURES OF *ARTEMISIA CHAMAEMELIFOLIA* VILL.

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The *Artemisia* species (Asteraceae) are famous for the insecticidal, antioxidant, antibacterial and anti-inflammatory and flavoring properties due to their essential oils. However, there are more substances related to their potential medicinal application. The endangered aromatic perennial *Artemisia chamaemelifolia* Vill. (Asteraceae) is not extensively studied for its bioactive substances and their distribution in the plants from the natural habitats, in *in vitro* and *ex vitro* cultures. We present a HPLC determination[1] of phenolic acids, flavonoids and quercetin glycosides in lyophilized samples of *in vivo*, *in vitro* and *ex vitro* plants.
The major phenolic acids in all the samples of *Artemisia chamaemelifolia* were ferulic acid (0.1÷16.4 mg/g DW) and chlorogenic acid (1.4÷10.8 mg/g DW), while the prioritized flavonoid was hyperoside (0.4÷15.4 mg/g DW). The *in vitro* cultures synthesized either the least or none of the analyzed substances. One exception was that *in vitro* cultures produced *p*-coumaric acid (2.03 mg/g DW) almost two times higher than flower samples *in vivo* and three times higher than *ex vitro* samples. Hyperoside began regaining its original metabolic rate *ex vitro* (>2.5 mg/g DW) after a huge reduction in *in vitro* samples compared to the *in vivo* samples (16 to 50 times lower).

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CHEMICAL COMPOSITION AND BIOLOGICAL ACTIVITIES OF THE ESSENTIAL OIL FROM LEAVES OF *MORINGA OLEIFERA* LAM. CULTIVATED IN MOZAMBIQUE

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Moringa, native to parts of Africa and Asia, is the sole genus in the flowering plant family Moringaceae. Its most well-known species are *Moringa oleifera* Lam. and *Moringa peregrina* Forssk. ex Fiori. *M. oleifera* is the most economically important species, indigenous to dry tropical areas in Northwestern India, at the Southwestern foot of the Himalayas. Moreover, it is largely cultivated in different countries as India, Pakistan, Bangladesh and Afghanistan. The available literature reports information about chemistry and biological activity of this plant. Only little information, however, could be found about the composition of the essential oil. In the present paper, we report the chemical analysis of the essential oil of *M. oleifera* and its possible *in vitro* antioxidant and antimicrobial activities. In all, 24 compounds were identified, accounting for 92.3 % of the total oil. In the oil, hydrocarbons amounted to 91.1%. The main compounds were hexacosane (13.9%) and pentacosane (13.3%). Moreover, the oil of *M. oleifera* showed a significant antioxidant and antimicrobial activities.

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ANTIOXIDANT POTENTIAL AND ALPHA-AMYLASE INHIBITORY EFFECT OF PHENOLIC EXTRACTS OF *AGATOPHORA ALOPECUROIDES*

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Plants can produce many molecules of different chemical families that are widely used in therapeutic domains1. The aim of this work was to study the antioxidant and antidiabetic properties of phenolic extracts from a spontaneous plant "Agatophora alopecuroïdes". In the first part, different hydro-methanolic extracts were analyzed for phenolic content using Folin-Ciocalteau method2. The analysis results show the low levels in total phenols. The antioxidant activity was evaluated by a chemical test using 2,2′-azinobis (3-ethylbenzothiazoline-6 sulfonic acid) (ABTS·+) as a stable radical. The results show that the phenolic extracts exhibit a good antioxidant capacity compared to the antioxidants used as a reference, especially butanolic fractions with EC50 value up to 3.12 mg/ml. The study of the antidiabetic property of phenolic extracts was revealed by the inhibition of a digestive enzyme α-amylase. The results obtained show that the majority of these extracts exhibit inhibitory effects reached a very high rate of 49%. In addition, the kinetic study of enzymatic reaction shows that phenolic extracts have inhibitory effect with low inhibition constants of the order µM. This work provided new phytochemicals knowledge about spontaneous plant "Agatophora alopecuroïdes", which could be used as a potential preventive intervention for free radical-mediated diseases and diabete.

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EXTRACTION, CHARACTERIZATION, ANTIMICROBIAL AND PHARMACOLOGICAL (SEDATIVE AND DIURETIC) STUDIES OF THE ESSENTIAL OILS OF *ROSMARINUS OFFICINALIS*

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Rosemary, an aromatic plant used in flavoring food, medicine and pharmaceutical industries, grow in wild in the Mediterranean basin, and are also appreciated for his antimicrobial and antioxidant properties. We performed experimental work to extract the essential oils by hydrodistillation. The composition of the essential oil of rosemary was analyzed by gas chromatography-mass spectrometry (GC-MS), 37 components were identify for this oils for 3 different regions, antimicrobial and sedative and diuretic activities were experimented in rats and mouse and different results were obtained for these experiences.

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PHENOLIC CONTENT AND ANTIOXIDANT ACTIVITY OF EXTRACTS FROM *ACACIA ARABICA* BARKS

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Acacia arabica plant is well known in the region of North African Sahara for its efficiency in the traditional treatment of several diseases such as diarrhoea, eczema, tonsillitis and conjunctivitis. This work was aimed to determine the total phenolic content and antioxidant activity of methanol:water (8:2) and acetone:water (7:3) extracts of barks of *Acacia arabica* growing in Tamanrasset (Algeria). Total phenolic contents of the extracts were determined by the Folin-Ciocalteau method and their antioxidant activities were evaluated using Phosphomolybdenum, ferric reducing ability of plasma and DPPH (1,1-diphenyl-2-picrylhydrazine) methods. The highest phenolic content was obtained from acetone:water extract. For the evaluation of antioxidant activity and for Phosphomolybdenum and FRAP methods, it was found that the methanol:water extract is more effective than acetone:water extract who has showen more effectiveness by the DPPH method. These results suggest that *Acacia arabica* may act as a chemopreventive agent, providing antioxidant properties.

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PHYTOCHEMICAL COMPONENT, ANTIBACTERIAL AND ANTIOXIDANT ACTIVITIES OF FERMENTATION YIELDS FROM FRUIT JUICE COMBINED WITH *CITRULLUS VULGARIS* AND *CUCUMIS MELO* BY KOMBUCHA FUNGUS

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Kombucha fermented tea was started to use in Manchuria in B.C. 220. It was spread to Russia from there and in the First World War; it was spread in Germany, in France respectively. And then it was known by North African with domination of France in 1950s in North Africa. In addition, nowadays it has become a very popular drink in Europe and America. Due to its rich ingredients about phytochemical components and bacterial species it helps to develop intestinal flora, to prevent intestinal laziness, to loss of weight by speeding up metabolism and it has known lots of benefits. According to the research, tea fungus (Kombucha) is symbiotic of acetic acid bacteria and yeast fungi. In the field of medical research, it has preferred chemical components extracted from natural products on developing new drugs with fewer side effects. This will also reduce cost of the eligible drugs and give easily accessibility to pharmaceutical agent. Aim of this study is to ferment by Kombucha fungus to fruit juice consisted of *Citrullus vulgaris* and *Cucumis melo* which are good antioxidant and to determine biological activity of obtained fermented products.

Product	DPPH IC_{50} (µg/ml)
Lyophylized Citrullus vulgaris juice	6.66094
Lyophylized Cucumis melo juice	3.421838
Citrullus vulgaris juice fermentation by kombucha	7.059323
Cucumis melo juice fermentation by kombucha	3.073067

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IN VITRO ANTI-TUMOR ACTIVITY OF CHLOROFORM EXTRACT FROM *ARTEMISIA CHAMAEMELIFOLIA* VILL. ON HELA CELLS

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Chemotherapy is among the most promising treatments against cancer diseases. Along with laboratory synthesized drugs, natural substances are also being investigated as possible therapeutics or adjuvants while at the same time being less harmful to the organism. The aim of this study was to evaluate the anti-tumor effects of the chloroform extract of the *in vitro* cultivated plant *Artemisia chamaemelifolia* Vill. alone and in combination with the anthracycline drug epirubicin. The endangered population of *A. chamaemelifolia* is found on the mountain of Ponor in Bulgaria, with further small populations dispersed among the Caucasus, Apennines and Pyrenees, and has poorly studied chemical composition and biological activity. Our results showed that the chloroform extract from *A. chamaemelifolia* exhibits strong cytotoxic effect on Hela cells. Also combinations of non-toxic doses of the extract with low toxic concentration of epirubicin improved the anti-tumor effect of the drug.
In conclusion, *in vitro* cultivation and investigation of the biological activities of *A. chamaemelifolia* extracts may have important implications in drug design and medicine.

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DPPH RADICAL SCAVENGING ACTIVITY AND PHENOLIC COMPOSITION OF DIFFERENT EXTRACTS OF *LAMIUM ALBUM* L.

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Lamium album L. (Lamiaceae) is a perennial herb which is widely used in folk medicine. In the present work we aimed to assess the DPPH activity and phenolic contents of chloroform and methanol extracts of *in vivo*, *in vitro* and *ex vitro* cultivated plants of *L. album*. The samples were extracted by Soxhlet extraction and the analysis of phenolic compounds was carried out using a HPLC. The highest DPPH activity was measured in methanol extract of *in vivo* plant (29.86±0.15 μg/ml). Twelve phenolic acids were detected in methanol extracts and three times less were their quantity in chloroform extracts. The main phenolic acid was the sinapic acid, prevalent in methanol extract of *in vivo* plants (61.82±1.24 mg/g extract). Four flavonoids were detected only in methanol extracts. Hesperidin was predominant in *ex vitro* and *in vivo* plants (15.00±0.30 mg/g and 10.05±0.20 mg/g extracts). Different phenolic acid and flavonoids were established in *in vivo* plants by comparison with *in vitro* and *ex vitro* cultivated plants which suggests that the way of cultivation defines the production of biologically active substances. Further investigations are needed to clarify the methods for manipulating the synthesis of these compounds in order to obtain higher yield.

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STUDY OF INTERACTIONS BETWEEN EXTRACTS OF *EUCALYPTUS GLOBULUS* AND HEATED EGG WHITE PROTEINS

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Food industry uses eggs currently and extensively (notably the egg white) as ingredient in their products. Nevertheless, egg white is sensitive to contaminations of the ambient environment. In order to fight against these contaminations and to protect the consumer, heat treatment of egg products is often required to assure microbial safety. This treatment applied to egg white cause modifications of their physicochemical and functional properties**.** Albumen is a hydrated middle, viscous, rich in proteins; heat treatment would generate a denaturation and coagulation of their proteins. To limit the prejudicial effects of heat, some authors propose the addition of additives as polyphenols, in order to increase the stability of proteins against heat[1,2]. Mixing extracts of *Eucalyptus globulus* (peel, leaves and fruits) with albumen solution (diluted to 1/200 with Tris-HCl buffer, 20 mM, pH 8.2) before heat treatment at different temperatures (56°C – 89°C) within 20 min, leads to: apparition of a trouble due to the formation of polyphenols-proteins complexes, an overtime of denaturation phase, a weak loss of solubility compared to white without plant extract.

In conclusion, the extracts of *Eucalyptus globulus* studied increase the stability of the albumen opposite heat. Polyphenols and tannins specifically, induce a decrease in the rate of proteins aggregation; due to their binding with proteins of albumen, thus reducing the protein - protein interactions. As the peel extract is the richest with total polyphenols and tannins, compared to those of fruits and leaves, respectively, it forms more complexes tannin-protein. This explains the significant loss of protein solubility during the addition of peel extract compared to that seen upon addition of extracts of fruit and leaves, respectively.

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ELECTROPHORESIS OF HEATED EGG WHITE PROTEINS

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Egg products are used as an interesting ingredient in many food industries, for theirs features. Stabilization treatments (heat) applied to egg white provide good control of hygiene, but also induce an alteration of their functional properties. Indeed, when egg white is subjected to heat treatment, its globular proteins are prone to changes in structure and conformation. Depending on the extent of the temperature and duration of heat, these changes can range from denaturation to gelation or coagulation. NATIVE-PAGE of egg white proteins shows, the apparition of several bands what denotes a diversity of proteins content in egg white. The comparison of these profiles heated at different temperatures (56°C – 89°C) within 20 min, with those unprocessed, shows the apparition of new bands and different relative mobilities; due to the formation of aggregates, which remains at the top of the separating gel, due to their high molecular weight. Coagulation and/or precipitation of these proteins have been observed around 74°C/20 min. Ovotransferrine begins to coagulate at 59°C/20 min and ovalbumine at 83°C/20 min. These aggregates include covalente links (disulfide bridges) and non covalente links (hydrophobic, electrostatic and hydrogen interactions), those have been demonstrated here by comparing the electrophoretics profiles gotten with SDS-PAGE under non reducing conditions (absence of β-mercaptoethanol) and reducing conditions (presence of β-mercaptoethano) with those gotten with NATIVE-PAGE[1].

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PP-255

MEDICINAL PLANTS IN THE HOLY QURAN AND THEIR THERAPEUTIC BENEFITS

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There are many plants with medicinal applications have been enumerated in the Holly book of Muslims "Quran". This may point to their extraordinary phytotherapeutical or nutritional values.
Objectives: Identification of the medicinal plants enumerated in the Quran and exploring their phytotherapeutical benefits. Searching the Quran for any enumeration of medicinal plants was conducted. Then, exploration for any documentation and publication of their therapeutical benefits was explored by searching scientific literatures and professional internet websites for well referenced publications. At least nineteen medicinal plants were identified. They include: *Cinnamomum camphora* L., *Phoenix dactylifera* L., *Ficus carica* L., *Zingiber officinale* Roscoe., *Vitis vinifera* L., *Allium sativum* L., *Lens culinaris* Medic, *Olea europea* L., *Allium cepa* L., *Punica granatum* L., *Cucurbita pepo* L., *Ocimum basilicum* L., *Tamarix aphylla* L., *Salvadora persica* L., *Brasica nigra* L., *Acacia spp., Cucumis sativus* L., *Allium Porrum* L., *Zizyphus Spina-Christi* L. Five of them were selected for therapeutical representation due to numerous publications. In conclusion, searching Quran has identified at least nineteen medicinal plants. The phytotherapeutical benefits of some of them were supported by numerous scientific publications, both traditional as well as evidence-based. Further research is required to explore the therapeutical benefits of these plants.

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MAINSTREAMING BIODIVERSITY INTO VALUE CHAINS FOR MEDICINAL AND AROMATIC PLANTS IN MOROCCO

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In the framework of the National Strategy for the Development of Aromatic and Medicinal Plants Sector in Morocco, the project«Mainstreaming Biodiversity into Value Chains for Medicinal and Aromatic Plants in Morocco» of a global 4.3 million dollars amount, will contribute to capacity development of governmental institutions, non-government organizations and local populations forbiodiversity conservationand valorization while increasing the added-value from wild collected Aromatic and Medicinal Plants. An approach that will be based on the introduction of FairWild® certification which guarantees access to international markets with high added value, the conservation of biodiversity and sustainability of production, ensuring the return of a portion of the profits to local populations through the establishment of fair-trade practices. Based on ecological, economic and social criteria, species and target areas are Rosemary in the Eastern region, Thyme in the High Atlas, Pyrethrum in the Middle Atlas and Oregano in the Rif region. The project started in 2012 and would have achieved its objectives by 2015.

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MEDICINAL PLANTS COMMONLY USED BY MOROCCAN SOCIETY: REMEDIES OR TOXICANTS?

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Most of people believe that all medications using medicinal natural products such as medicinal plants are "natural" and therefore, without any side effect, but it is not the case, "just because it's natural doesn't mean it won't kill you". The safety of herbal medicine is of particular importance as the majorities of these products are self-prescribed and are used to treat minor and often chronic conditions. In Morocco, limited toxicological data are available on medicinal plants. That's why, medicinal plants, in this country, requires a serious evaluation.In the present paper we record the toxic plants used as medicine by people in all part of Morocco. This retrospective study encompasses a series of relevant ethnobotanical studies carried out in Morocco. All plants used as medicine by Moroccan people have been grouped. Among the set of plant inventoried, three sub-groups (a, b and c) of toxic plants have been selected: a: toxic plants deeply studied with the toxic compound identified, b: plant tested as toxic and c: plant only cited toxics. The objective of this work is to give a database concerning the plant toxics used as medicine by Moroccan people.By this work, we contribute to the evaluation of the knowledge of users, to prevent intoxications bye these natural products and to documents a database on toxic plants used as medicine by local population and ensure to secure maximum health impact of these plants.

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POTENTIAL DISTRIBUTION OF WILD *MELISSA OFFICINALIS* L. (LAMIACEAE) IN ARMENIA FOR CONSERVATION PRACTICES

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Armenia has a rich flora of ca. 3600 plant species (ca. 50% of the entire Caucasian flora), distributed across (semi)desert, steppe, forest and alpine landscapes. Native plant biodiversity and conservation status of these species, particularly those with economic value, needs further assessment [1]. Only limited information, however, on genetic biodiversity, population ecology, and conservation status of these species is available. Predicting species' distributions has become an important component for conservation practices in recent years. During 2007-2009, field studies and eco - geographic surveys in respect with Maxted et al. (1995) methodology were conducted to examine *M. officinalis* L. populations' ecology e.g. habitat characteristics, distribution patterns, structure, dynamic in sizes, changes in distribution etc.. The research data has been applied in ecological niche theory and identified the plant fundamental niche, potential niche and the actual distribution. Certain categories of factors, e.g. abiotic environmental factors, biotic interactions among species, factors that affect the ability of species to disperse to different areas etc., have been identified as the key elements for determining potential distribution. This research provided baseline data for wild *M. officinalis* L. distribution modeling under global climate change, and contribute to conservation planning of this important species in Armenia.

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VASCULAR PLANT DIVERSITY OF SEYITGAZI PLAIN (ESKISEHIR-TURKEY)-I

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The vascular plant flora of the Seyitgazi Plain (Eskişehir, Turkey) was investigated during 2011-2012. Research area is entirely within the Irano-Turanian phytogeographic region. A total of 1072 plant specimens were collected from the research area and by the evaluation of them and the relevant literature it was determined that there are 419 taxa in the area including 417 species, 2 subspecies and 1 varieties, belonging to 64 families and 262 genera[1-2]. Of the 419 taxa, 3 are Pteridophytes, 3 Gymnosperms and 410 Angiosperms (363 Dicotyledons and 50 Monocotyledons). According to the number of taxa, the largest families are Asteraceae (59 taxa; 14.08%), Cruciferae (39 taxa; 9.30%) and Fabaceae (37 taxa; 8.83%). The largest genera are *Centaurea* (9 taxa; 2.15%), *Alyssum* and *Salvia* (8 taxa; 1.91%) and *Astragalus* L. (7 taxa; 1.67%). The distribution of phytogeographic elements is as follows: Irano-Turanian (60 taxa; 14.32%), Euro-Siberian (40 taxa; 9.78%) and Mediterranean (35 taxa; 8.35%) and others (284 taxa; 67.78%). There are 61 endemic taxa in the research area and the endemism ratio is 14.91%.

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PP-260

DESCRIPTION AND USE OF MEDICINAL PLANTS IN MOSTAGANEM REGION

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Like other regions of Algeria, the region of Mostaganem (western Algeria) has a heritage rich in plants virtuous we must identify and enhance. Therefore, a preliminary census of medicinal plants has been done locally, allowing the establishment of adatabase of 101medicinal species belonging to 53 different families. At Mostaganem, not less than 200 medicinal plants are used by people and over 101 species belonging to 53 different families are identified and recorded through the territory of the prefecture, the most used and sold by herbalists are: Rosemary, the sage brush, the horehound white, globular, thyme, wormwood setting, etc. These species are mostly harvested directly from nature. Currently, gathering abuse may put endangered wild medicinal species, many populations of native medicinal species suffer from overfishing, hence it is necessary to introduce legislationto protect the mandal so create specialized nurseries to curb the use and abuse towards a more rational and scientific.
In this context, through this prospectus, we present some examples of the use of local medicinal plants.

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MEDICINAL PLANTS USED FOR THE TREATMENT OF GYNAECOLOGICAL DISEASES IN TURKEY

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This study was conducted by screening the ethnobotanical surveys to determine the herbal remedies forthe treatment of gynaecological diseases. These include for the treatment in dysmenorrhoea, infertility and menstrual irregularity, as abortifacient, for lactation. According to data obtained from 18 regions investigated, in total 52 taxa in 25 families are used for gynaecological diseases in Turkey. Most species used were Asteraceae family and the most widely used plant was *Achillea species* (6 species are used). The majority of problems herbal preparations were used to dysmenorrhea (37 plants).Over all remedies were prepared single plants rarely as mixtures of multiple ingredients. About 80% of the remedies were applied orally, while the remaining ones were applied tropically. All results are given in comparative tables.

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CURRENT STATUS OF ENDEMIC SPECIES BELONGING TO THE FAMILY IRIDACEAE FOUND IN KAYSERİ

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Turkey is located at the intersection of the center of the world's three major geographic location of which are very different in terms of, geomorphological structure and ecology and biodiversity. They form one of the world's most important gene pool. Turkey has a rich flora and a large number of both endemic and non-endemic. Turkey has large number of geophytes (bulbous-tuberous plant) that grow naturally. Flora of Turkey has around 1000 geophytes (bulbs, tubers, tuberous rooted, rhizomous, etc) taxons. Kayseri province is rich in plant geophytes of which many plants are endemic. Within the boundaries of the province of Kayseri, out of the total available number of 1170 taxa, 302 are endemic taxa of which 2 (*Crocus ancyrensis* (Herbert) Maw and *Crocus kotschyanus* C. Koch subsp. *cappadocicus* Mathew) belongs to the family Iridaceae. Genus Iris L. has 4 species (Siehe galatica Iris, Iris Yellow Schott Ex Baker, *Iris* and *Iris stenophylla* HausskнSchachtii Markgraf. siehe Ex Baker Et). In this study, in the province of Kayseri information about the final status of endemic species belonging to the family Iridaceae will be presented.

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MEDICINAL PLANTS USED BY MOROCCAN PEOPLE IN THE TREATMENT OF CARDIOVASCULAR DISEASES

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Cardiovascular disease (CDV) remains the major cause of morbidity; mortality and disability throughout the world. The ethnopharmcological and ethnobotanical studies are the paramount importance to set a high value on phytogenetic resources and to address health problems of some communities; especially poor peoples.Our work presents an analysis of published data from studies that have been undertaken, in Morocco, by different seeker teams in separately areasduring the last decades.Our objective was toevaluate and identify medicinal plants used for cardiovascular treatment by Moroccan people. All these studies have the same approaches; they were conducted by interviewing people suffering from diabetes.We use Factorial Analysis (FA) and principal Components analysis (PCA) to analyse the aggregated data from the different studies. Globally, 95 plants species were listed, all these plant were used empirically by Moroccan society for treating cardiovascular problems. These plants were divided in to 42 families and 87 genera. The Lamiaceae, Asteraceae, Apiaceae, and Poaceae are the botanical families with high number of plant species.
In conclusion, traditional medicine has been widely used for treatment of cardiovascular problems and it has been recognized as an interesting alternative to conventional medicine.

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FAUNA DIVERSITY OF PETIT CAVALLO ISLAND (JIJEL, ALGERIA)

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The study of patterns that explain the richness and diversity of living organisms within the continental islands, connected to the continent over geological time, or oceanic islands, mostly of volcanic origin, remains a major theme in ecology and biogeography of populations or populations[1,2]. In Algeria terrestrial wildlife inhabiting the islands has been little studied, only the seabirds were more or less well treated. It is against this background that fits our study to assess the faunal diversity of the island of Petit Cavallo is located on the coast west of Jijel (Algeria). Taxa that hold our intention branches belong to the Arthropods, Molluscs and Vertebrates. The results show the existence of 191 species of arthropods composed mainly of insects, two species of terrestrial pulmonate mollusks, 3 species of Reptiles, 22 species of Birds and one species of Mammals, represented by the black rat, *Rattus rattus*. Insects are the most represented with 140 species belonging to 66 families and 9 orders. Regarding species richness by order of insects, the order Coleoptera is best represented. Furthermore, the presence of a large colony of Yellow-legged Gull, Larus michahellis, can influence the composition and structure of animal species on the island.

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ETHNOBOTANICAL PROPERTIES OF SOME GEOPHYTE PLANTS FROM ERGAN MOUNTAIN (ERZINCAN-TURKEY)

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East Anatolia is the most important region of Turkey according to the floristic richness. Erzincan city is found at the intersection point of East Black Sea, East Anatolia and Central Anatolia regions. The city is the center of endemizm and genetic diversity of many plants. There are 795 plant species from 342 genera and 87 family recorded to the flora of Erzincan and. 276 of them are endemics. Ergan Mountain is the study area and the part at the North direction of the Munzur Mountain.Munzur Mountain passes between Tunceli and Erzincan cities. It is the most important national park and plant areas of Turkey.Ethnobotanical properties of some geophytes of the area were determined in between 2010 and 2011 and given in the study. There were 34 geophytic plant taxa from 21 genera and 13 families. 5 of these are endemics (*Allium sintenisii* Freyn, *A. armenum* Boiss. et Kotschy, *Fritillaria armena* Boiss., *Muscari coeleste* Fomin, *Tulipa armena* subsp. *lycica* (Baker) Marais.) and their risc categoris is Lower Risc. Most of the plants are Irano-Turanian elements. In this study ethnobotanical uses of 18 geophytic plants from 11 genera and 9 families were determined. Turkish and local names, used parts, using purposes and usage methods of these plants were also given. In addition, 7 taxa were added to the list because of their ornamental values.

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MEDICINAL AND AROMATIC PLANTS OF THE HOGGAR WEALTH TO ENHANCE

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Hoggar flora consists of more than 370 species of diverse origins adapted to extreme climatic conditions of the region. This vegetation is considered a reassuring element for the people of the desert, including the Touareg. It provides them with food, condiment, flavor, fodder for their livestock and raw materials for its habitat and crafts, without forgetting the medicinal properties of many plants of the hoggar. It has, therefore, focused on a few plants of the Hoggar, even if some of them are considered narcotic, but have medicinal very important especially for modern medicine, since their chemical components are used in the pharmaceutical industry. This is the case of *Fagonia bruguieri*, *Artemisia judaic*, *Balanites aegyptiaca*, *Euphorbia calyptrata*, *Maerua crassifolia*, *Pergularia tomentosa*, *Salvadora persica*, *Hyocyamus muticus* subsp. *falezlez*, *Calotropis procera*, *Caralluma venenosa*, *Lotus jolyi*, etc.These plants, of course, contain one or more active ingredients can pre come, relief or cure of diseases and the values that deserve to be able to produce medicines, but must be protected and preserved. Besides the question of the preservation, collection of these plants is part of practices which, if not controlled, can have a strong impact on the populations of these species and threaten the very survival of these practices.Although the majority of the Tuareg collect a meaningful manner and with a view to preserving these plants, their disorganization and the entry of certain taxa in a market logic with the countries of sub-Saharan Africa could break the fragile balance jeopardizing their future. Because, market development and commercial utilization of medicinal plants on a large scale can threaten biodiversity, as the intense pressure exerted by current human activities may lead to the extinction of endangered species and habitat destruction and natural resources.Thus, the preservation of flora Saharan Africa, in particular the category of medicinal plants arises urgently. It is in this light that we have tried to describe the importance of this natural heritage while bringing out some management proposals sometimes very simple, which can be implemented to best reconcile the preservation of natural resources.

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MEDICINAL PLANTS CONSUMED AS HERBAL TEAAND COLLECTEDFROM HERBALMARKET IN BALIKESIR AND ITS ENVIRONMENT (TURKEY)

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In this study, it was researched the medicinal plantsconsumed as herbal tea and sold at the herbal marketsin Balikesir where is located in western Turkey. During the study, herbal markets in Balıkesir and its surrounding have been visited and samples were taken from plantsused asherbal tea by local people. Herbal samples which is grounded or driedwere taken from herbalists and were identified by using Turkish Flora[1], Pharmacognosy and Pharmaceutical sources. Herbal markets give information usually about this region's medicinal flora and the importance of traditional medicine among its inhabitants. At the end of this study, 24 taxa belonging to 12 families were observed that were sold in herbal markets and consumed as herbal tea. These plants were also seen used as herbal drug and spice. Theherbal teasare generally determined used in the treatment ofdiseases as cold and influenza, stomach diseases and cough by the local people.In conclusion, drugs in herbal markets have been sold as herbal tea for treatment of diseases and spice in foods.

[1]P.H. Davis: Flora of Turkey And East Aegean Islans, Vol. 1-9, Edinburgh University Press, Edinburgh, 1965-1985.

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ETHNOBOTANICAL SURVEY ON MEDICINAL PLANTS IN ULUS MOUNTAIN (BALIKESIR, TURKEY)

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The data obtained from this research contribute to medicinal knowledge use of plants growing in Ulus Mountain. In this area, plants play significant role among people used various medicinal aims. The plants collected were identified according to 'Flora of Turkey and and the East Aegean Islands'[1]. They have been deposited in Balikesir University Necatibey Education Faculty Herbarium. Their vernacular names, part of the plant used and its uses are listed in this paper. The most used families are Lamiaceae, Rosaceae and Asteraceae. Also, the most used taxa are *Urtica dioica* L., *Sideritis perfoliata* L., *Salvia tomentosa* Mill., *Hypericum perforatum* L. and *Origanum vulgare* L. subsp. *hirtum* (Link) letswaart. The traditional medicinal plants have been mostly used for the treatment of cold and influenza, diabetes, ulcer, bronchitis and prostate.
In conclusion, these medicinal plants are collected by this region people sold for the treatment of many different diseases in local markets. It is used different parts of plants for various diseaes and method of treatment.

[1]P.H. Davis: Flora of Turkey And East Aegean Islans, Vol. 1-9, Edinburgh University Press, Edinburgh, 1965-1985.

PP-269

ETHNOBOTANICAL SURVEY IN THE BIOSPHERE RESERVE OF DJURDJURA, ALGERIA: THE CASE OFMEDICINAL 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 ethnomedicinalinformation was gathered on the field, through a questionnaire and direct interviews, with 31 inhabitants of three villages(AitOuabane, AitAllaoua and Darna), situated inside the biosphere reserve. Illiterate women, 51-60 yearsold, 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 isthe 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 forrural populations.

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TRADITIONAL MEDICINEIN WILAYA OF ORAN

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Algerian same like all Arabiccountries especially Moroccanthat have medical tradition in treatment that based on ArabicIslamic view in medicine.ManyArabicscientists are present in Arabic history book in different stages of human history. Inspire of this shay it is that there no recent effects in this knowledge due to presence of recent west medicineand so the medical professional tradition in all Algerian parts that made by the pharmacist and Algerian doctor is not impossiblefrom this view. There is no any traditional pharmacological Algerian view from specialist and there is no clear effects of this substances (toxic effect, how to use, etc)[1]. Our aim in this research was to improve and to show modern share in traditional pharmacology in Algerian. We do work up research in medical plants in the form of statistical review with 287 people in Oran in the period between 2010 to 2012.And the results were as follows there is more than 70 medical plants present in Oran that have been used in traditional medicine.

[1]Hammiche V., Maiza K. (2006). Traditional medicine in central Sahara: Pharmacopoeia of Tassili N'Ajjer. Journal of Ethnopharmacology, 105, 3.

PP-271

ETHNOBOTANICAL SURVEY ON MEDICINAL PLANTS USED IN ORIENTAL MOROCCO

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It has been estimated by the World Health Organization that 80% of the world's population relies on traditional medicine to meet their daily health requirements. In Morocco reliance on such medicine is partly owing to the high cost of conventional medicine and the inaccessibility of modern health care facilities. There was high agreement in the use of plants as medicine in Oriental Morocco. Our objective is to evaluate the informant's knowledge on medicinal plants by the local population and to document the uses of medicinal plants by this community, for the treatment of different illnesses. Using an ethnopharmacological approach, we collected informations concerning the traditional medicinal knowledge and the medicinal plants used, by interviewing successfully 3245 informants living in oriental Morocco (from Nador to Figuig).The data were analyzed by statistical methods (Component Analysis "CA", Factorial Analysis "FA") and other methods such as through Informant's Consensus Factor (ICF) and Use Value (UV).Our results indicate that, more than 60% of the population in oriental Morocco relies on medicinal plants for the treatment of different ailments with predominance of women consumers.161 plant species belonging to 61 families were documented. These plants were used by the population for the treatment of a group of illness (about 14 principal ailments).We conclude that, in oriental Morocco, till now, the population has some traditional knowledge commonly used as medical tradition. These wealthy heritage need conservation and evaluation

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AN ETHNOMEDICINAL INVESTIGATION ON USAGE OF HENBANE SEEDS (*HYOSCYAMUS NIGER* L.) BY THE LOCAL PEOPLE OF ALAŞEHİR (MANİSA) IN TURKEY

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Hyoscyamus niger L. (Henbane) is an important medicinal plant belonging to Solanaceae family. This plant in Alaşehir region is known as "Kurtluca" and "Kulakotu" It is a rich source of medicinal substances including tropane alkaloids such as hyoscyamine, atropine, atropamine, scopolamine and tropine[1,2]. During the study, 62 villages were visited in the vicinity of Alaşehir and, in two of them, the use of Henbane have been identified. The regional people's only seed usage was noticed for the medical purpose about this plant. In the research field, the practice method of the seeds were observed and photographed while implementing to the local people. As a result of the work, it was witnessed to decreasing of ear and head pain on patients' face by exposing the smoke obtaining with sprinkling some water on the red-hot core of the henbane seeds. Also application of this method on ovine animals to reducing the nose worms was detected.

[1]Orbak Z., Tan H., Karakelleoğlu C., Alp H., Akdağ R. (1998) *Hyoscyamus niger* (Henbane) poisonings in the rural area of East Turkey, MJAU, 30:145-148.
[2]Adibfar E., Dilmaghani K., Shoar H.H. (2011). Alkaloids contents of *Hyoscyamus niger* L. at different organs in different growth stages IJPP, 187-192.

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TRADITIONAL SOME MEDICINAL PLANTS USED IN TARSUS AREA (MERSİN, TURKEY)

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In this study, plants used in folk medicine were investigated in some villages of Tarsus (Mersin). Büyükkösebalcı, Beylice, Çamlıyayla, Darıpınarı villages belonging to Tarsus were selected as research fields.Plants collected from research areas were identified according to Flora of Turkey[1]. The information was gathered field collected data and interviewed informants. 36 species were used in the area as a traditional folk medicine.

[1]Davis, P.H., The Flora of Turkey and East Aegean Islands, Vol 1-10, 1965-1985.

PP-274

PRODUCTION OF BIOACTIVE COMPOUNDS IN NON-TOXIC HAIRY ROOTS OF COMFREY (*SYMPHYTUM OFFICINALE*)

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Pyrrolizidine alkaloids (PA) have been found in many plant species, mainly in the families Asteraceae, Boraginaceae and Fabaceae. During metabolisation, these substances form derivatives which can harm human liver, capillaries and lung. Mutagenous and probably carcinogenous effects have also been shown. The use of medical plants like *Tussilago*, *Petasites* or *Symphytum* is thereby limited to application on the skin or requires complex cleaning processes. Medical plant extracts contain the main active compound or compounds and many additive substances that work as adjuvants. Often the extract is more effective than the isolated main compound, which means that synthesizing these substances does not solve the toxicity problem. The aim of the presented project is the downregulation of pyrrolizidine alkaloid biosynthesis in *Symphytum officinale* hairy roots. RNA interference techniques will be used to gain less toxic cultures for secondary metabolite production, especially extracts containing high amounts of the anti-inflammatory compound allantoin. Additionally, secondary metabolites as well as copy number and expression of homospermidine synthase, a key enzyme of PA biosynthesis[1] and target of the approach, are investigated.

[1]F. Böttcher, R.-D. Adolph, Th. Hartmann: Homospermidine Synthase, the first pathway-specific enzyme in pyrrolizidine alkaloid biosynthesis. *Phytochemistry* 32, 679-689, 1993

PP-275

STUDY OF TISSUE CULTURE AND CALLUS INDUCTION IN *PAPAVER BRACTEATUM*

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Iranian poppy (*Papaverbracteatum* lind1) is one of the most important medicinal plants. This plant due to having specific group of alkaloids which named benzylisoquinoline is very important. Thebaine and codeine can be named as the main secondary metabolites in this plant that have an important role in the synthesis of palliative drugs and Stupef action. Tissue culture of this plant has been felt necessary to achieve faster to this class of compounds in shorter time.This study examines the tissue culture of this plant in different hormone treatments to reach the highest percentage of callus induction on samples of root, leaf and hypocotyl. Wide hormone treatments were tested on Auxin and Cytokinin family to achieve the highest callus induction from different explants. Effective treatments to achieve the highest callus induction from different explants consisted of 10 mg /L IBA for root callus induction, 4 mg/l 24-D , 0.25 BAP for hypocotyl and 2 mg/l NAA and 0.1 mg/l KIN for leaf callus induction[1,2].

[1]P.Facchini, D.Bird: Developmental regulation of Benzylisoquinoline alkaloid Biosynthesis in Opium Poppy Plants and Tissue Cultures. *In Vitro* Cell Dev Biol Plant, 34, 69-79, 2002
[2]I.Ilahi, E.G. Ghauri: Regeneration in cultures of *Papaver bracteatum* hormones and temperature Plant Cell 7issue and Organ Culture 38: 81-83, 1994.

PP-276

MICROBIAL CONVERSION OF CARVOMENTHONE TO CARVOMENTHOLS

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Monoterpenes are one of the most abundant and useful substrates for the biocatalytic reactions, which are powerful tools for the production of new biologically active natural products. Carvomenthone is widely used as an aroma ingredient in food industry and it is also used as pesticide for its insecticidal properties[1-3]. In the present study, conversion experiments of carvomenthone (mixture of 1a-d) by various kinds of bacteria were evaluated. After the biotransformation process (1*S*, 2*S*, 4*S*)-*p*-menthane-1,2-diol (2), (1*R*, 2*R*, 4*S*)-*p*-menthan-2-ol (=isocarvomenthol, 3) and (1*R*, 2*R*, 4*R*)-*p*-menthan-2-ol (=carvomenthol, 4) were characterized as the metabolites of substrate 1 by the aid of chromatographic and spectroscopic methods such as TLC, GC-MS, and NMR. Furthermore, the metabolites (2 – 4) were *in vitro* evaluated for their anti-oxidizing capacity, pancreatic lipase, acetylcholine and butyrylcholine enzyme inhibition potential. As preliminary result of the assays, all the metabolites showed bioactivity at various levels when compared with the test standards.

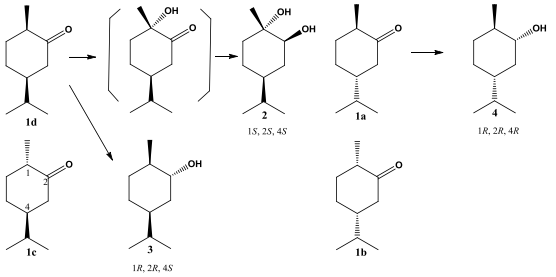

Fig.1. Proposed metabolic pathways of carvomenthone (1a-d) by microorganisms

[1]Noma, Y., Asakawa, Y., Methabolic patways of monoterpenoids by microorganisms, Curr. Topics in Phytochem., 4, 63-78, 2000.
[2]Burdock, G.,Fenaroli's Hanbook of Flavor Ingredients, Taylor & Francis, 2010.
[3]Berger, R.G. (Ed.) Flavours and Fragrances: Chemistry, Bioprocessing and Sustainability, Springer, Berlin, 2007.

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ANALYSIS OF THE BIOSYNTHESIS OF ASTINS FROM *ASTER TATARICUS* AND CYCLOCHLOROTINE FROM *PENICILLIUM ISLANDICUM*

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Astins are cyclic pentapeptides isolated from roots of the plant *Aster tataricus*. The root extract shows potent anti-tumour activity in mouse assays. It is not known whether astins are produced by the plant itself or an associated entophyte[1]. However, the amounts of astins that can be isolated from plants are very low and chemical synthesis is problematic. Therefore, the project aims at enhancing the production of astins using molecular genetic tools. Cyclochlorotine, a secondary metabolite with high similarity to astins, has been isolated from the fungus *Penicillium islandicum*. Cyclochlorotine is a hepatotoxic compound causing necrosis, vacuolation of liver cells and development of blood lakes[2]. Because of the high similarity of the peptides, similar enzymes should be involved in the biosynthetic pathways.
Both metabolites contain a dichlorinated pyrrole carboxylic acid derivative which is most likely derived from proline. The anticarcinogenic activity of astins relies on this dichlorinated proline residue and on the cyclic structure of the peptide. It is assumed that chlorination occurs on the level of a peptide carrier protein tethered pyrrol carboxylic acid moiety by a flavin-dependent halogenase. For genetic analysis the genome of *P. islandicum* was sequenced. A single gene for a potential halogenase was detected, cloned and heterologously expressed in *E. coli*.

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[2]Ghoh et al. (1978) App. Environ. Microb., 35, 1074-1078.

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MULTI ENZYME SYSTEMS INVOLVED IN ASTIN BIOSYNTHESIS AND THEIR USE IN HETEROLOGOUS ASTIN PRODUCTION

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Aster tataricus is a plant native to Siberia, Japan and Northern China. The roots of *Aster tataricus* are tradionally used in Chinese medicinal herb teas due to antibacterial and antiviral activities of compounds present in these roots[1,2]. Amongst the secondary metabolites which have been isolated from these roots are astins and astin derivatives. Astins have been shown to have anti-tumour activity indicating a use in cancer therapy[2]. However, only very low amounts of astins can be isolated from the plant. It is also difficult to synthesise them chemically without environmental impacts. Astins are dichlorinated, cyclic pentapeptides containing non-proteinogenic amino acids indicating a biosynthesis *via* non-ribosomal peptide synthetases (NRPS) and the involvement of one or two halogenases in the biosynthesis.
The aim of the project is to detect the genes of the astin biosynthesis "gene cluster" and to use the genes to enhance astin production in organ cultures like hairy roots or callus.

[1]O. Shirota, H. Morita, K. Takeya, H. Itokawa and Y. Iitaka: Cytotoxic triterpene from *Aster tataricus*. Nat. Med. 51, 170–172, 1997.
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DIRECT SHOOT REGENERATION IN DATE PALM VAR. *PYARUM*

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The palm (*Phoenix dactylifera*) is one of an important medicinal plant. Date palm is useful for the treatment of paralysis, Parkinson, strengthening kidney, loosen the joints and raising backache. Date palm trees gum are use in India to treat diarrhea and treat urinary tract. Date palm helps to hematopoiesis and treat kidney stones. Date palms involved for the reason that too much magnesium in cancer treatment. This study examines the direct of shoot regeneration on date palm var.*pyarum*, figure shows direct shoot regeneration have advantages.Terminal apex and lateral apexes cultures were established on MSmedium supplemented with 0.5 mg/l2ip, 3mg/l NAA, 0.5mg/l BAP,4mg/l 2.4.D. Increase direct regeneration after two subculture[1].

[1]Hussein, B;Ahmad, M and Quraishi, A. Effect of Explants Source on *in vitro* Regeneration of Plants Through Tissue Proliferation in *Phoenix dactylifera* L.*cv. fusli*. Pak. J. Bot. 27(1):101-104.1995

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IN VITRO SHOOT REGENERATION FROM MATURE ZYGOTIC EMBRYO OF *TRACHYSPERMUM AMMI*

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Trachyspermum ammi belongs to Apiaceae family is highly valued traditional medicinally important plant used for curing various diseases in humans and animals in SouthEast Asia, Afghanistan and Egypt. *T. ammi* seeds contain 50% thymol used as anti-spasmodic, fungicide, toothpaste and perfumery[1]. Present study was planned to develop repeatable and reliable *in vitro* regeneration protocol of *T. ammi* using mature zygotic embryos. Mature seeds were surface aterilized with 50 % commercial bleaching (5% NaOCl) for 10 min. followed by culture on MS medium supplemented with 0.10-0.80 mg/l TDZ. Multiple shoot regenration (80.00-100.00%) was recorded within 4 weeks of culture alongwith late callus induction ranged 6.67-100.00%. Mean number of shoots per explants and mean shoot length ranged ranged 8.90-12.96 shoots and 1.25-2.48 cm respectively. Increase of TDZ concentration decreased the mena number of shoots *per* explant. Maximum number of of 12.96 shoots and longer shoots were recorded on MS medium containing 0.10 mg/l TDZ. Regenerated plantlets were transferred to 0.20-1.00 mg/l IBA containing medium for rooting. 100 % rooting was observed alongwith multiple shoot regenration in the rooting medium. Rooted plantlets were transferred to posts[2] containing organic matter for acclimatisation under growthroom conditions.

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[2]Aasim M, Khawar KM, Özcan S (2010). Efficient in vitro propagation from preconditioned embryonic axes of Turkish cowpea (*Vigna unguiculata* L.) Cultivar akkiz. Archives of Biological Sciences, 62:1047-1052.

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IN VITRO SHOOT REGENERATION POTENTIAL OF DIFFERENT EXPLANTS OF SWEET BASIL (*OCIMUM BASILLICUM* L.)

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Sweet basil (*Ocimum basilicum* L.) contains a wide range of essential oils and a wide array of other natural products including polyphenols such as flavonoids and anthocyanins. There is need to develope efficient and repeatable in vitro regeneration protocol in order to isolate these essential oils. Epicotyl, hypocotyl and shoot tip explant isolated from 7-12 days old in grown seedlings were cultured on MS medium supplemented with 0.80-2.40 mg/l TDZ-0-0.10 mg/l IBA. 100% callus induction was recorded on all explants on all culture mediums. Shoot regeneration frequency of shoot tip explant was recorded more compared to other explants irrespective of growth regulators. Number of explants per explant for epicotyl, hypocotyl and shoot tip explant was recorded 1.83-322, 1.00-3.39 and 1.55-3.58 respectively. Mean shoot length ranged 0.27-0.85 cm, 0.22-0.79 cm and 0.39-0.94 cm for epicotyl, hypocotyl and shoot tip explant respectively with maximum shoot length at 0.80 mg/l TDZ. Regenerated shoots were transferred to 0.25-1.00 mg/l IBA supplemented media for rooting. Rooted plantlets were transferred to posts[1,2] containing organic matter for acclimatisation in growthroom conditions where 70% plants survived and continued their growth.

[1]Aasim M, Özcan SF, Khawar KM, Özcan S (2012). Comparative studies on the competence of axillary shoot regeneration on unsliced and longitudinally sliced cotyledon nodes of cowpea (*Vigna unguiculata* (L.) Walp.). Turkish Journal of Botany, 36:281-287 pp., 2012.
[2]Aasim M, Khawar KM, Özcan S, "Efficient *in vitro* propagation from preconditioned embryonic axes of Turkish cowpea (*Vigna unguiculata* L.) Cultivar akkiz. Archives of Biological Sciences, 62:1047-1052.

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EFFECT OF METHYL JASMONATE ON TOTAL PHENOLIC CONTENT OF SWEET BASIL (*OCIMUM BASILICUM* L. CV. GRAND VERT)

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Secondary metabolites are natural chemicals produced by plants for protection against biotic and abiotic stresses such as wounding, pathojen attack or temperature etc. In various plants, secondary metabolites can increase after the treatment of elicitors such as chitosan, β-glucan, and yeast extracts and plant hormones like methyl jasmonate (MeJA)[1]. In this study, the effect of MeJA in terms of total amount of phenolic compounds in sweet basil plants (*Ocimum basilicum* L. cv. grand vert) was investigated. The sweet basil seeds were soaked in various MeJA solutions (0.05, 0.1, 0.5, 1.0, 5.0 mM) for 24 h before sowing. Fresh sweet basil plants harvested before flowering period. The total amount of phenolic compounds in the sweet basil plants was determined using Folin-Ciocalteau's reagent according to Singleton and Rossi[2].The total phenolic content of the sweet basil increased after 0.5 mM MeJA treatment compared with the control.

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BIOTRANSFORMATION OF CEDRYL METHYL ETHER BYEXTREMOPHILE *ASPERGILLUS* SP. ISOLATED FROM VAN LAKE (TURKEY)

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Extremophiles, as a source of new enzyme or enzyme systems, are important tool for the biotransformation reactions. In this work cedryl methyl ether (CME, $C_{16}H_{28}O$), which is widely used in perfumeryindustries as a fragrance substance, was biotransformed by extremophile *Aspergillus* sp. which was isolated from Van Lake in Turkey[1]. Isolated fungus was cultivated in Malt Extract Broth with the substrate CMEfor 14 days. After the biotransformation process, the metabolites were screened by chromato-spectral methods such as TLC, and GC-MS.Totally 3 metabolites (A,B,C) were obtained by the purification by using Gradient Colon Chromotography.The metabolites will be identified by further spectrometric methods (NMR, IR)[2].Furthermore, isolated metabolites were evaluated for their antimicrobial activity by using micro-dilution broth method. The metaboliteA showed remarkable inhibitory effect on pathogenic *S. aureus* MRSA, *B. cereus*, *P. aeruginosa* having MIC values of 31.25 to 62.5 µg/ml.

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ACUTE AND SUBACUTE TOXICITY OF METHANOL EXTRACT OF RHIZOMES OF *RHAPONTICUM ACAULE*

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Rhaponticum acaule (L.) DC., is an endemic plant growing in North Africa[1], the rhizomes of *R. acaule* ,are collected from Tarhuna city in Libya.
The aim of this study has been made to preliminary phytochemical screening of rhizomes of *R. acaule* extracted by methanol in soxhlet apparatus
And study the acute toxicity by oral administration of different doses of aqueous extract of *R.acaule* to the albino rats.
The acute toxicity study revealed the plant have high degree of safety[2], while the sub-acute toxicity study revealed the effect of rhizomes on the weight are not completely safe, and therefore further studies are very important to be done.

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