The 4th International Mediterranean Symposium on Medicinal and Aromatic Plants

ABSTRACT BOOK

APRIL 18-22, 2018
Antalya, TURKEY

4MESAP

The Fourth International Mediterranean Symposium on Medicinal and Aromatic Plants

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MESMAP - 4
ABSTRACT BOOK

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Dear colleagues,

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

MESMAP-2 Symposium was held on April 22-25, 2015 in Antalya – TURKEY, which was organized by academicians from Gazi University (TURKEY), Gaziantep University (TURKEY), Kilis 7 Aralık University (TURKEY), Yüzüncü Yıl University (TURKEY), Association of Pharmaceutical Teachers of India (APTI – INDIA) joint with AMAPMED (Association of Medicinal and Aromatic Plants of the Mediterranean). INDUSTRIAL CROPS AND PRODUCTS JOURNAL with high impact factor from ELSEVIER group published a special issue covering some of the full papers selected after scientific evaluation.

MESMAP-3 Symposium which was held on April 13-16, 2017 in Girne (Kryneia) – Turkish Republic of Northern Cyprus (TRNC), was the third event of MESMAP symposium series on Medicinal and Aromatic Plants. After scientific evaluation selected full papers published in Indian Journal of Pharmaceutical Education and Research (IJPER), indexed with THOMSON REUTERS.

MESMAP-4 Symposium, which was held on April 18-22, 2018 in Sherwood Breezes Resort Hotel Antalya – Turkey, was the forth event of MESMAP symposium series on Medicinal and Aromatic Plants. MESMAP Symposiums provide a platform for herbal medicines, botany, plant biotechnology, ethnobotany, phytopharmacology, pharmacognosy, food, agriculture and forestry, plant biology, phytochemistry and aromatherapy.

You can find abstracts of all the scientific works presented in MESMAP-4 in this ABSTRACT BOOK. We are proud to announce that selected full papers will be published in the official journals of MESMAP-4 after scientific evaluation. We are happy to invite MESMAP-4 participants to submit their full papers which were presented at the symposium 'Annals of Phytomedicine', International Journal of Agriculture, Environment and Food Sciemces', Journal of Pharmaceutical Research', Current Perspectives on Medicinal and Aromatic Plants (CUPMAP)'.

We would like to thank for their sincere supports of Turkish Ministry of Forestry and Water Affairs, General Directorate of Forestry, TURKISH AIRLINES, ÇAYKUR, Kilis 7 Aralık University, Khon Kaen University, Ordu University, AMAPMED, Talya Herbal Compony, Naturin Nutraceuticals and all the other supporters. Moreover, organizing committee members would like to thank you all the participants their valuable scientific participation.

Organizing Committee hope that MESMAP-4 Symposium participants would have an amazing experience and unforgettable memories to take back their homes, and would like to thanks for all MESMAP-4 participants for their valuable contributions. We would like to remind you that MESMAP Symposium series will be organized every year. Hope to meet you in the fifth meeting series of MESMAP in 2019 spring.

Sincerely,
Symposium Chairman

Prof. Dr. Nazım ŞEKEROĞLU
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Annals of Phytomedicine (Publication fee will be covered by authors)	http://ukaazpublications.com/publications/index.php
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OPENING SPEECH

Dear MESMAP-4 participants, our guests from all over the world, brother and sisters welcome to Turkey and Antalya

Today we are very happy and excited that we are together the fourth time under the MESMAP umbrealla. When we started to the symposium we had big targets, so we would collect many scientists working on Medicinal and Aromatic Plants in all disciplines. After five years we are here a big family at MESMAP-4. Our family is getting biger and bigger. However, our scientific level is also increasing year by year. In this point, MESMAP symposiums have been recognized by scientific aouthourities all over the world. So far, we have published ABSTARCTS BOOKS, with all the abstracts presented at the MESMAP symposium, with the ISBN number. We also published selected full papaers as special issues in respected scientific journals. Now we have our own international scientific journal "Current Perspectives on Medicinal and Aromatic Plants, CUPMAP" with ISSN 2619- 9645. We will support this publication in the field of Medicinal and Aromatic Plants researches, and we will place it among the most respected scientific journals as soon as possible.I would like to thank you for your sincere efforts to MESMAP international organizing and scientific committees. I have a special thanks for local organizing committee. I would like to thank our participants for their valuable contributions. During all our symposium TURKISH AIRLINES, Ministry of Forestry and Water Affairs (Republic of Turkey) and General Directorate of Forestry (Republic of Turkey) are together with us, so we are proud and would like to thank you for all their supports. We have big thanks for all our supporters and sponsors, as well. After these succeded symposiums and scientific activities, we will work more and make our best as MESMAP family. Wishing you a fruitful symposium, thank you and welcome again.

Prof. Dr. Nazım ŞEKEROĞLU
Chair of MESMAP Symposiums

PLENARY & INVITED LECTURES

PLENARY LECTURE

NATURAL PRODUCTS: NATURE MIRACLE OR HUMAN IMMAGINATION

Anake Kijjoa

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Natural products have been investigated and utilized to alleviate disease since early human history. In the early 1900s, 80% of all medicines were obtained from roots, barks and leaves. However, it was not until the 19th century that man began to isolate the active principles of medicinal plants. Although the quest for plants with medicinal properties had led to innumerous expeditions to Africa, South America and many remote regions in Asia, there were inherent problems associated with plant-derived Natural Products. Since plant extracts are complex mixtures of materials, interactions among the components of the extracts, either the antagonism by one material of another's activity or the addition or even synergy of activities, often gave misleading results. Thus, the general consensus was that the active constituents must be isolated, characterized and verified for activities. Until about 50 years ago, structure elucidation of Natural Products was an extremely difficult and lengthy task which required carrying out numerous synthetic and degradation reactions. However, with the advent of NMR spectroscopy and the rapidly expanding pharmaceutical companies, many laboratories became center of isolation of the active principles of medicinal plants from around the globe. Although a myriad of Natural Products had been isolated in many laboratories, only a small fraction was evaluated for biological and pharmacological activities, and this was partly due to the small quantities of isolated compounds. The development of high throughput screens based on molecular targets, which required a small amount of compounds, has caused a dramatic change in the strategy of Natural Products research. Instead of focusing on new structures, like in the 80s and 90s, nowadays, the researchers use bioassays to pinpoint the desired compounds. Furthermore, the change of the direction of Natural Products research was also based on the concept of biodiversity, i. e. a consequence of interaction of the rich variety of organisms with each other and their environment is the evolution of diverse complex natural chemicals in the organisms that enhance their survival and competitiveness. The fact that the marine environment possesses much higher biodiversity than its terrestrial counterpart, combined with the new technology of sample collection, the research on marine Natural Products, which has started in the 90s, is now in full gear. Therefore, the evolution of research on Natural Products starting from isolation of secondary metabolites from medicinal plants to identifying bioactive compounds from marine organisms will be presented.

Keywords: Medicinal plants, marine natural products, marine sponges, soil fungi, marine-derived fungi, anticancer activity, antibacterial activity

Acknowledgements: Strategic Funding UID/Multi/04423/2013 through national funds provided by FCT – Foundation for Science and Technology and European Regional Development Fund (ERDF), in the framework of the programme PT2020.

PLENARY LECTURE

ADVANCEMENTS IN ANALYTICAL CHEMISTRY FOR QUALITY CONTROL AND SAFETY OF HERBAL PRODUCTS – PHYTOVALLEY® WHERE SCIENCE MEETS NATURE IN THE HEART OF THE ALPS

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Herbal preparations offer a unique approach for the development of phytodrugs, phytocosmetics and food supplements. Since herbal preparations like plant extracts are multi-component mixtures, they typically possess a broad spectrum of bioactivities. Their potential applications are generally designed to influence many biological pathways simultaneously. Therefore, the development of herbal products appears promising for applications in which several cell types, organs, biological processes as well as interactions between them might play an important role. However, the achievements in natural product research are largely based on the constant development of highly selective and sensitive analytical technologies. For that novel enrichment and purification methods based on modern solid-phase extraction technologies are applied to reduce the complexity of plant-materials, while HPLC is used for separation, pre-concentration and fractionation. The opportunity to hyphenate these methods to robotic systems permits high-throughput screening. Significant progress has also been made in the development of novel stationary phases which can be tailored to a specific application, allowing endless possibilities in terms of selectivity tuning. Further hyphenation to high-resolution mass spectrometry facilitates the identification and quantitation of active components in natural products. Furthermore, the combination of separation science with spectroscopy represents an attempt to combine different technologies in phytopharmacy and food analysis. Near and mid infrared spectroscopy provides the advantages of fast, non-invasive measurements being also suitable for the imaging of plant tissues. These advances offer new possible quality control strategies in phytoanalysis and enable to get deeper insights into the biochemical background of medicinal relevant questions. In this talk I would like to demonstrate new analytical approaches by several applications in medicine, phytopharmacy, phytocosmetics and nutrition science. Many of the presented methods have already been successfully applied within the recently established Phytovalley® - Tyrol platform, where science meets nature in the heart of the Alps.

PLENARY LECTURE

HERBAL ENZYME INHIBITORS AS PROMISING DRUG CANDIDATES AND COSMETIC AGENTS

İlkay Erdoğan Orhan[1], F. Sezer Şenol[1], Övgü Çelikler[1,2]

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Objective / Purpose: Natural products are potential molecules with an immense range of biological activities desired for human health. Not only in drug discovery, but also exploration of new cosmetic agents, plants and other natural sources are very popular and fruitful targets for researchers. In this sense, we have been screening many medicinal plants and natural molecules for their enzyme inhibitory activity using *in vitro* and *in silico* methods.

Material and Methods: Many extracts from especially Turkish medicinal plants as well as pure natural molecules have been tested by our group since the year of 2002 against a number of enzymes including cholinesterases, tyrosinase, lipoxygenase, elastase, collagenase, xanthine oxidase, etc. using ELISA microtiter assay. The active extracts were either proceeded to isolation or analyses using chromatographic methods in order to determine active compounds.

Results: Up to date, among the tested compounds, we have reported a good number of active molecules with enzyme inhibitory effects from plants such as polyphenols, flavonoid derivatives, coumarins, terpene derivatives verified *via* molecular interactions of these compounds using docking simulations. Besides, we also developed some cosmetic formulations on scientific base.

Conclusion / Discussion: Our findings have once more emphasized the importance of natural molecules and medicinal herbs in discovery of new drug and cosmetic agents. Examples of the active molecules will be given in this talk.

Keywords: Enzyme inhibition, medicinal plants, docking simulations

INVITED LECTURE

EFFECT OF MIROESTROL ON OVARIECTOMY-INDUCED DEPRESSION AND COGNITIVE IMPAIRMENT 4

Yaowared Chulikhit

Department of Pharmaceutical Chemistry, Faculty of Pharmaceutical Sciences, Khon Kaen University, Khon Kaen, Thailand

INVITED LECTURE

CHEMICAL CONSTITUENTS AND BIOLOGICAL ACTIVITY OF MEDICINAL PLANTS FROM THE BRAZILIAN CAATINGA BIOME

Jackson Roberto Guedes da Silva Almeida[1,2]

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The Caatinga biome (semi-arid vegetation) is a highly threatened biome covering a vast area in Northeastern Brazil and is the source of few studied natural resources. Many medicinal plant species from Caatinga are widely known and used in folk medicine and for commercial manufacturing of phytotherapeutic products. Few ethnobotanical and pharmacological studies have been undertaken in this region, in spite of the great cultural and biological diversity to be found there. The purpose of this lecture is to present results of research carried out at the Federal University of Vale do São Francisco with the species Annona vepretorum, Annona leptopetala, atemoia (A. cherimola Mill. x A. squamosa L.), Hymenaea martiana, Passiflora cincinnata, Bromelia laciniosa, Encholirium spectabile and Neoglaziovia variegata, typical species from the Caatinga biome. The fundamentals of the main methods for assessing the antinociceptive, anti-inflammatory, antiulcerogenic and central nervous system activity of a natural substance or plant extracts will be presented. The main chemical constituents (alkaloids, flavonoids and terpenoids) isolated from extracts of these species will be presented as well as the chemical composition of some essential oils. Regarding the pharmacological activity, results will be presented on the antinociceptive, anti-inflammatory, antiulcerogenic and on the central nervous system. Furthermore, the in vitro photoprotective and antioxidant activity was also investigated. The exact mechanism involved in the antinociceptive and anti-inflammatory activities is not completely understood but, at least in part there is the participation of opioid receptors and inhibition of cyclooxygenase enzyme. Pharmacological and chemical studies are continuing in order to characterize the mechanism responsible for these effects.

Keywords: Medicinal plants, phytochemistry, pharmacology, natural products, Caatinga.

INVITED LECTURE

OXYPRENYLATED PHENYLPROPANOIDS FROM *CITRUS* SPP. THEIR ROLE IN NEUROPROTECTION AND CANCER CHEMOPREVENTION

Francesco Epifano, Serena Fiorito, Francesca Preziuso, Vito Alessandro Taddeo, Salvatore Genovese

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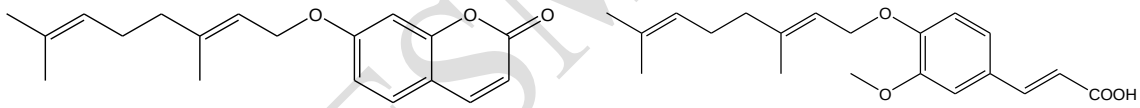
Oxyprenylated secondary metabolites from plants, i.e. 3,3-dimethylallyloxy- (C_5), geranyloxy- (C_{10}), and farnesyloxy- (C_{15}) derivatives, represent a rare family of natural products. These phytochemicals have been recently discovered as interesting and valuable biologically active products. *Citrus* spp. are nowadays well recognized among the main source of such natural compounds: prenyloxycoumarins like auraptene, bergamottin, imperatorin, heraclenin, and oxypeucedanin, and ferulic acid derivatives like 4'-geranyloxyferulic acid and boropinic acid have been isolated both in citrus juices and peels extracts [1, 2]. Oxyprenylated phenylpropanoids from the genus *Citrus*, in particular auraptene 1 and 4'-geranyloxyferulic acid 2 have been subject of intensive research during the last decade in order to disclose their pharmacological and therapeutic potential. Both phytochemicals are able to act as powerful dietary feeding cancer chemopreventive agents *in vivo*, in particular against colon adenocarcinoma, when administered to animals as such as in form of pro-drug and β-CD inclusion compounds [3, 4]. In the mean time they showed a marked *in vitro* and *in vivo* neuroprotective effect in animal models of neurodegenerative syndromes like Parkinson's disease [4]. Biomolecular targets of compounds 1 and 2 accounting for the observed effects include cycloxygenases 1 and 2, melatonin receptor 1, glucose transporter type 4, aryl hydrocarbon receptor, and farnesoid X receptor.



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Results we obtained in the course of our research activity will greatly contribute to enhance the consideration of citrus as efficient and powerful epidemiological means for an effective prevention strategy of socially and economically severe syndromes affecting humans.

Keywords: Cancer, *Citrus* spp. Neuroprotection, Oxyprenylated secondary metabolites

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INVITED LECTURE

FROM PLANTS TO LEAD FINDING: CAN WE ACCELERATE THIS LONG JOURNEY?

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Throughout most of the history medicinal plants have long had a central role in the treatment of a wide spectrum of diseases, hence continuously supporting the health of human populations. Nowadays, in excess of 25% of modern medicines are derived (either directly or indirectly) from plants; moreover in the case of cancer therapy and infectious diseases these numbers exceed 70%. Artemisinin (antimalarial), paclitaxel (antineoplastic), codeine and morphine (analgesic), and galanthamine (reversible cholinesterase inhibitor) are good examples in this direction and amongst the best-selling drugs worldwide. Recently in the USA, for instance, two new drug applications have been approved for marketing botanical products as prescription drugs, namely Veregen (a topical drug for the treatment of genital and perianal warts) and Mytesi (an oral drug for the treatment of HIV/AIDS related diarrhea). These two new drug approvals are testimonial examples that complex botanical mixtures can be developed as new drugs in order to meet modern FDA standards [1-3, and the literature cited therein].At the same time the development of new drugs is rather costly, laborious and time-consuming process, hence platforms for accelerated lead finding/drug discovery, quality control assessment and mode of action of healing herbs, and sustainable production are continuously sought.

An overview of the phytochemical (incl. NMR-based metabolomics) and pharmacological (*in vitro* and *in vivo* studies) aspects of research on selected medicinal plant species towards accelerated lead finding will be given and discussed [4-7].

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Acknowledgements: The authors gratefully acknowledge the support obtained through the project SusMAPWaste, SMIS 104323, Contract No. 89/09.09.2016, from the Operational Program Competitiveness 2014-2020, project co-financed from the European Regional Development Fund.

INVITED LECTURE

HYPHENATED HPCCC AND HPLC/DAD/ESI-TOF AS A PLATFORM TO SEARCH FOR BIOLOGICALLY ACTIVE SECONDARY METABOLITES

Krystyna Skalicka-Woźniak

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The purification of natural products is a complex process, due to the vast array of diverse molecules available for discovery in the natural world. The development of a purification protocol to pull an active, target molecule from the many hundreds that may be present in a mixture is an extremely challenging task, due in part to the wide range of polarity, as well as many of the desired compounds being very rare, in small amounts, and easily lost during preparation and separation. There is therefore still a need to develop new, specific, efficient chromatographic methods which permit the easy screening and identification of phytochemicals and potential bioactive hits, as well as the standardisation of herbal medicines (1,2). It is also important to be able to isolate compounds with high purity and in sufficient amount to enable potential biological activities to be tested.

Counter-current chromatography (CCC) is a novel purification tool that enables fast and effective separation of compounds from mixtures, regardless of their nature, depending on their affinity to each of the phases in a given biphasic solvent system. It is a liquid–liquid partition chromatography process where both the mobile and stationary phases are liquids. The lack of a solid adsorbent, allows a wide range of polarities to be processed due to the range of possible two phase solvent systems. With the ability to produce high purity components and with a simple scale- up to industrial conditions, these make the technique a suitable tool for the purification process.

Due to its wide range of advantages, CCC can be an ideal starting point to build an efficient platform for natural product discovery. It gives possibilities for the efficient isolation of pure compounds for further testing in in vitro and in vivo models. Some examples of CCC application for the searching of novel antimicrobials, enzyme inhibitors, and molecules active in Central Nervous System (rodents and zebrafish model) will be presented here.

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INVITED LECTURE

POTENTAIL OF EXTRACTS FROM THAI MEDICINAL PLANTS AGAINST PLANT PATHOGENIC FUNGUS

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Objective / Purpose: The objectives of this study were to determine the efficacy of ten Thai medicinal plant extracts against *Alternaria brassicicola* in vitro, to evaluate their preventative and curative activities against the black spot of Chinese kale compared with a commercial fungicide, iprodione, under greenhouse conditions and to identify the active substance (s) in the extract showing the best antifungal activity against *A. brassicicola*.

Material and Methods: Crude extracts obtained from ten Thai medicinal plants were evaluated their antifungal activity against *A. brassicicola* causing black spot of Chinese kale using dilution plate method and determined their preventative and curative activities against the black spot of Chinese kale under greenhouse conditions. The crude extract that showed the best activity being analyzed bioactive compounds using various chromatography techniques coupled with minimal inhibitory concentration bioassay.

Results: Our results indicate that *Coscinium fenestratum* and Piper betle extracts have potent antifungal activity against *A. brassicicola* with results similar to those of iprodione. Both of these medicinal plants have been used in folk medicine, indicating that their metabolites may be low in toxicity to humans. We found berberine, an alkaloid substance isolated from *C. fenestratum* extract, to be a key antifungal constituent. The results in this study will support the potential of berberine as well as the extracts of *C. fenestratum* and *P. betle* for use in the development of plant-derived fungicides that will be promising alternatives to the use of synthetic fungicide for the management of black spot in Chinese kale.
Conclusion / Discussion: The results of this study showed the potential of Thai medicinal plants as alternatives to the use of synthetic fungicides for controlling black spot in Chinese kale caused by *A. brassicicola*.

Keywords: *Alternaria brassicicola*, antifungal activity, alternate fungicide, botanical fungicides

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INVITED LECTURE

RESVERATROL: A MOLECULE WITH CHAMELEONIC PROPERTIES CHEMICAL STRATEGIES FOR TOPICAL APPLICATION

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Resveratrol is a natural small molecule possessing a wide variety of biological/pharmacological activities, such as anticancer, anti-inflammatory, inhibition of aggregation of platelets, antioxidant, vasodilation, antiaging, etc. [1]. These different activities could be due to the capacity of resveratrol to interact with a large number of targets and biochemical pathways [2]. For these reasons, resveratrol can be considered as a molecule with chameleonic properties. Resveratrol also exhibits a myriad of effects on the skin [3], however, its fast *trans-cis* isomerization and poor water solubility have limited the efficacy and elaboration of topical formulations. For these reasons, further innovation is required to overcome these challenges to transform resveratrol into a cosmeceutical with therapeutic properties. For this purpose, our group has developed a microwave-assisted synthetic process to obtain a water soluble derivative of resveratrol for topical application. In order to verify its potential use as cosmeceutical, cytotoxicity assays with keratinocyte HaCaT cell line and SIRT1 protein modulation were evaluated as well as *in silico* docking studies. The results obtained so far revealed that for this synthetic derivative was observed increased water solubility, no relevant decrease in HaCaT cell viability, similar behaviour to resveratrol regarding protective effects against oxidative stress-induced cytotoxicity, increased SIRT1 protein content, while the *in silico* studies anticipated that the new synthetic derivative binds more stably to SIRT1 than resveratrol. These results support the possible use of this derivative in topical formulations [4]. Studies with melanoma cell lines to compare the inhibition of cell line performance for resveratrol, resveratrol glucoside and this synthetic derivative are underway.

Key words: Resveratrol, synthetic derivative, cytotoxicity, sirtuin modulation, topical application

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INVITED LECTURE

"FISHING" BIOACTIVE METABOLITES FROM THE BRAZILIAN BIODIVERSITY

Miriam De Barcellos Falkenberg

Universidade Federal de Santa Catarina Centro de Ciências da Saúde Depto. de Ciências Farmacêuticas CIF-CCS - UFSC, Campus Trindade, Brazil

TECHNICAL SPEECH

COMMERCIALISATION OF JP53 IMMUNOSTIMULANT IN JAPAN: BENCH-TO-BEDSIDE

Ozan Fidan

General Directorate of Tea Enterprises, Turkey

BUSINESS SESSION & MAPs ORGANISATIONS SESSION

Talya® herbal	**Business Speech: Halis ERTAŞ** TALYA HERBALS INC., Antalya – TURKEY
Naturin® Nutraceuticals	**Business Speech: Levent ALPARSLAN** NATURIN Nutraceuticals, İzmir – TURKEY
GREENBODY	**Business Speech: Cumali BORA** GREEN BODY, Alanya – TURKEY
AKIŞIK® natural cosmetic	**Business Speech: Mehmet Işık ADALI** AKIŞIK Medicinal Herbs and Natural Cosmetics, İstanbul – TURKEY

ORAL PRESENTATIONS

ORAL PRESENTATION

CHEMO TYPES OF ESSENTIAL OILS PRODUCED BY THE PLANT POPULATION OF *JUNIPERUS COMMUNIS* L. GROWING WILD IN SLOVAKIA

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Objective/Purpose: *Juniperus communis* L. (Cupressaceae) is widely distributed in different regions of Slovakia. Its fruit (*Juniperi fructi*) produces a valuable essential oil (*Juniperi aetherolium*). The aims of the present study were to use isolated essential oil and GC-FID and GC-MS methods to elucidate the levels and patterns of juniper chemo type diversity in Slovakia.

Material and Methods: Samples of juniper fruits were collected from different places (20) in Slovakia and the content of essential oil was determined. Each sample of juniper fruits with weight of 10 g was grounded in a blender. The essential oil from this raw-material was prepared by hydro-distillation (2 hours) in Clevenger-type apparatus according to the Ph. Eur. The GC-FID and GC-MS analysis of the juniper essential oils was carried out using a Gas Chromatograph type: Varian 3090/MS Saturn 2100 T with injection entrance Split/Split less. The following operating conditions were used: column: RX-5MS, 30 m x 0.25 mm i. d., film thickness: 0.25 μm, carrier gas: Helium, adjusted to a flux of 1.50 ml.min^{-1}, injection temperatures: 220 °C and volume of sample: 2 μl. Components were identified by their GC retention times, software library NIST 98, and the resulting values were comparable to those of literature. Oil component standards for comparison were supplied by Extrasynthese, Merck, Fulka and Sigma-Aldrich. Results are presented in the percentage. Percentage of single chromatographic peak areas was measured on the basis of area of the single peaks to the total peak area ratio. Statistical analysis were done by using confidence intervals (n = 5) on the significant level $p < 0.05$ with calculation through the mean, standard deviation and standard error.

Results: The content of essential oils ranged between 0.50±0.10 % and 1.80±0.10 %. Many chemical constituents have been identified in Slovakian juniper plant populations. Of these compounds, certain ones appear more important (on the basis of quantity and/or pharmacological activity) to the character of the plants and can be designated as major constituents. The first major constituent of all berry essential oils under study was α-pinene (29.0±0.68 – 61.0±0.60 %). The second, third and fourth main constituents from berries were sabinene (8.00±0.30 – 22.0±0.98 %), myrcene (7.5±0.10 – 16.2±0.66 %) and caryophyllene (3.5±0.30 – 17.5±0.33). Chromatographic assessments of the composition of the juniper essential oils were confirmed the α-pinene-chemotypes: **type A** : α-pinene (29 – 33 %) > sabinene (14 – 22 %) > yrcene (8 – 22 %), **type B:** α-pinene (35 – 47 %) > sabinén (9 – 21 %) > myrcene (9 – 17 %), **type C :** α-pinene (49 – 54 %) > sabinene (8 – 24 %) > myrcene (11 – 18 %), **type D :** α-pinene (60 – 62 %) > sabinene (3 – 4 %) > myrcene (10-11 %).

Conclusion/Discussion: It was found for the first time that berries of the same junipers growing wild in Slovakia, 20 localities from the 35 investigated habitats, produced essential oils of different α-pinene-chemotypes. Ecological diversity of sites, where juniper occurs, its geological age tertiary resulted in great variability, that is, adaptation to the specific conditions (ecotypes, chemo types, varieties, etc.).

Acknowledgements: This research was supported by the Slovak Research and Development Agency (SRDA), the project: APVV-14-0843: "Research of possibilities of growing juniper (*Juniperus communis* L.) for the production of fruits".

ORAL PRESENTATION

INVESTIGATION OF SOME SELECTIVE EXTRACTS AGAINST CLINICAL ISOLATED MICROBIAL STRAINS

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Objective / Purpose: Plant extracts are rich resources for bioactive compounds, some of which possess good antibacterial and antifungal properties. Emerging sources are needed in a moment in which the microbial resistance to most classes of chemotherapeutics is rising. Therefore, our aim was to evaluate some selective extracts for their biological properties, taking into account its antimicrobial activity.

Material and Methods: Different forest berries (*Aronia melanocarpa, Sambucus nigra, Vaccinium myrtillus*) and flower inflorescences of ornamental *Asteraceae* (*Rudbeckia hirta, Chrysanthemum indicum* and *Tagetes erecta*) were used to obtain selective extracts. Liquid extracts were lyophilized and quotas were used for testing. The microbial strains included some clinical isolates (*E. coli 2041, E. coli 1851, E. coli 1992, Pseudomonas aeruginosa 1908, P. aeruginosa 1128, Klebsiella pneumoniae 2110, K. pneumoniae 1074, K. pneumoniae 831, Morganella morganii 2520, Acinetobacter baumanii 1908, A. baumanii 2329, Enterobacter cloacae 2951, E. fecalis 2823, E. faecium 2862, E. faecium 2980, E. faecium 2027, S. aureus 14, S. aureus 17*) and standard pathogens (*E. coli ATCC 13202, Pseudomonas aeruginosa ATCC 27853, Enterococcus fecalis ATCC 29212, Staphylococcus aureus ATCC 29212*). The minimal inhibitory concentration (MIC) and minimal biofilm eradication concentration (MBEC) of the extracts were calculated. For the most promising extracts synergic activity was evaluated.

Results: Our results indicated that the best activity was shown by the selective extracts fractioned in ethanol. MIC concentrations amounted to 2.5 – 5 mg/mL. Moreover, the same extracts presented a good antioxidant potential, too. The results indicate a good antifungal activity for the ethanolic extract obtained from *Sambucus* berries and *Tagetes* flowers.

Conclusion / Discussion: In conclusion, the investigated extracts represent a promising resource for further antimicrobial studies. Nevertheless, well obtained and standardized extracts should be taken into consideration for expanding the preventing measures and treatment in case of drug resistant microbes.

Keywords: Antimicrobial, antifungal, synergy, secondary metabolites

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ORAL PRESENTATION

BAOBAB (*ADANSONIA DIGITATA* L.) FRUITS AND LEAVES: CHEMICAL CHARACTERIZATION THROUGH A MULTI-METHODOLOGICAL APPROACH.

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Objective / Purpose: *Adansonia digitata* L. (also known as baobab) is a plant food whose fruit pulp is consumed in Europe, since its authorization as novel food in 2006 [1]. Differently, in Africa all parts of baobab tree (fruits, seeds, flowers, roots and bark) are used as food. Due to the presence of bioactive compounds, baobab exerts beneficial effects shown both in *in vitro* and *in vivo* studies (i.e. anti-inflammatory, analgesic, gastroprotective, and hypoglycemic properties) [2]. In this study we investigate the chemical profile of baobab fruit pulp and leaves, using a multi-methodological approach, which involves the use of NMR and RP-HPLC-PDA-ESI-MS^n methods.

Material and Methods: NMR analysis was carried out using a Bruker AVANCE 600 spectrometer operating at the proton 154 frequency of 600.13 MHz and equipped with a Bruker multinuclear z-gradient inverse probehead. RP-HPLC-PDA-ESI-MS^n analysis was performed using a Thermo Finnigan Surveyor Plus HPLC, equipped with a Surveyor UV−Vis diode array detector and a LCQ Advantage ion trap mass spectrometer (Thermo Fisher Scientific, Waltham, MA, USA).

Results: NMR analysis allowed to obtain the metabolite profile of aqueous and organic extracts of baobab fruit pulp and leaves. Specifically, in the aqueous extracts the presence of amino acids, organic acids, carbohydrates and other metabolites was detected. Differences between fruit pulp and leaf extracts were registered. For instance, the amount of sucrose was found to be much higher in pulp than in leaves, whereas the amount of β-fructopyranose and myoinositol was higher in leaves than in pulp. Galacturonic acid, α-galacturonic acid pectic reducing end, and β -galacturonic acid pectic reducing end were identified only in fruit pulp extracts. Galactose was identified only in leaves extracts. The analysis of fruit pulp and leaf organic extracts revealed the presence of oleic, linoleic, linolenic fatty acids, and saturated fatty acids, mono-, di, and triglycerides, free fatty acids, galactosyldiacylglycerols, β-sitosterol, squalene, phophatidylcholine, phosphatidyletanolammine. However, the amount of phosphatidyl choline was found to be much higher in fruit pulp than in leaves. The HPLC-PAD-ESI-MS^n analysis showed that the baobab fruit pulp contains organic and phenolic acids (citric/isocitric acid, malic acid, malic acid dihexoside, glucaric acid, galacturonic acid, 3,4-dicaffeoyl quinic acid and feroylquinic acid), sugars (hexoside and dihexoside), proanthocyanidins (procyanidin dimer, procyanidin trimer), flavan-3-ol (catechin), flavonol (kaempferol-3-O-(6-p-coumaroyl)-hexoside and kaempferol-3-O-glucoside) and flavones (2-O-xylosyl-8-galactosyl apigenin). As far as leaves are concerned, the analysis of baobab leaves showed the same compounds found in the fruit pulp with the exception of tryptophan, which resulted to be the main amino acid occurring in the leaves, and rutin, quercetin and isovetexin, which are not present in the fruit pulp.

Conclusion / Discussion: Our data indicated that both baobab fruit pulp and leaves are rich in nutrients and bioactive compounds to which the baobab functional properties can be ascribed.

Keywords: *Adansonia digitata,* fruit pulp, leaves, NMR, RP-HPLC-PDA-ESI-MS

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ORAL PRESENTATION

IMMUNE-ENHANCING CAPACITY OF PLANT EXTRACTS DEPENDS ON THE RAISING SYSTEM, SEASON AND STRESS LEVELS IN GOATS

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Objective / Purpose: Raising technologies in goats involve a highly variable, potentially pathogenic microbiome. Appropriate immunity is essential in preserving the health of the animal, therefore medicinal plants mainly those on the pasture could be an immune-enhancing resource. This study aimed to assess the effects of plant extracts on cell-mediated immunity in goats, depending on the season and raising system (pastured or zero grazing). **Material and Methods:** Blood was sampled during winter and summer seasons from goats extensively raised on pasture and zero grazing. N/L ratios were calculated as stress indicators (Panoptic stain). An *in vitro* blast transformation test was carried out using a purified lectin isolated from *Phaseolus vulgaris* and alcoholic extracts of *Equisetum palustre, Avena sativa, Achilea millefolium, Capsella bursa-pastoris, Symphitum officinale, Taraxacum officinale* and *Salvia officinalis*. Blast transformation indices were calculated versus untreated controls, by glucose concentration measurements (orto-toluidin method). The statistical significance of the differences between the groups was interpreted by Student-s t test.

Results: Stress levels were much higher ($p<0.001$) in goats raised confined when compared to the grazing flock (N/L ratio=1.087±0.591, and 0.452±0.251 respectively). There were significant ($p<0.001$) differences between the *in vitro* response to plant extracts in the restrained group in summer versus winter and also versus the farmed group (summer and winter).

Conclusion / Discussion: The overall cell-mediated responses to plant extracts were negatively influenced by the hot season and also restraint. Nevertheless, some of the plants exerted enhancing effects, with possible future use as immune modulators.

Keywords: goats, medicinal plants, raising system, stress, immunity

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ORAL PRESENTATION

GC-MS PROFILING, ANTIOXIDANT AND ANTIBACTERIAL EVALUATION OF ESSENTIAL OILS OF SEVERAL AROMATIC AND MEDICINAL PLANTS CULTIVATED IN GREECE

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Medicinal plants present a rich source of new biologically active compounds. Especially popular today is the concept of food that combines nutritional and medicinal benefits. Essential oils (EOs) from aromatic and medicinal plants receive particular attention as potential natural agents with a wide spectrum of biological activities. In our screening project for the search of antioxidant agents from natural sources we evaluated the antioxidant and antimicrobial activity of nine aromatic and medicinal plants cultivated in Greece. The studied species were *Coridothymus capitatus, Daucus carota, Lavandula angustifolia Melissa officinalis*, *Mentha piperita*, *Mentha pulegium*, *Origanum vulgare* subsp. *hirtum*, *Salvia fruticosa*, *Satureja thymbra*. The essential oils (EOs) were obtained by hydrodistillation in a modified Clevenger-type apparatus, and their analyses were performed by capillary GC-MS with an HP-5 column and with an EI detector. Identification of the compounds were made by comparison of mass spectra and retention indices with literature records [1]. From the point of composition and compound proportions, the major components for each species were the following: linalool (29,97%) carvacrol (17,56%) and p-cymene (16,78%) for *C. capitatus*, α-pinene (20,49%) and benzene 1,2-dimethoxy-4-(1-propenyl)-(E) (14,76%) for *D.carota*, linalool acetate (31.72%) and linalool (22,08%) for *L. angustifolia*, camphor (38,02%), β-caryophyllene (27,69%), γ-muurolene (12,57%) and geranial (8,83%) for *M. officinalis*, menthol (54,57%), menthone (13,72%), and 1,8-cineole (12,02%) for *M. piperita*, pulegone (47,56%) and piperitenone (33,02%) for *M. pulegium*, carvacrol (66,65%) and thymol (16,32%) for *O.vulgare*, eucalyptol (53,24%), camphor (8,13%) and β-caryophyllene (7,46%) for *S. fruticosa*, γ-terpinene (34,01%) and carvacrol (32,81%) for *S. thymbra*. Under *in vitro* conditions oils of *S. thymbra*, *O. vulgare* subsp. *hirtum*, *C. capitatus* showed high antioxidant and antimicrobial activity compared with the other EOs used in this study. EOs of these three plants have as main components phenolic compounds such as carvacrol, thymol, p-cymene and γ-terpinene. These components may be responsible for the higher biological activity compared with the other essential oils of *Lamiaceae* family.

Keywords: Essential-oils, antioxidant, antibacterial, carvacrol, GC-MS.

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ORAL PRESENTATION

DEVELOPMENT OF LOTUS TEA DERIVED FROM EXTRACTED *NELUMBO NUCIFERA GAERTN* LEAVES: A JOURNEY OF THAI TRADITIONAL ANTIHYPERTENSIVE MEDICINE

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Objective / Purpose: In Thailand traditional medicines dried *Nelumbo nucifera* leaves are used to reduce blood pressure. Hypertension is a major contributor to cardiovascular events which directly threatens quality of life. Currently available antihypertensive drugs are far from satisfactory and have been associated with numerous of side effects. The study of Thai herbal formulas for treating hypertension has received much research attention. This study seeks to develop lotus tea mainly from *Nelumbo nucifera* leaves extract and evaluate the efficacy of the product in hypertension volunteers. **Materials and Methods:** Lotus herbal tea have been made from the mixture of dried *Nelumbo nucifera* Gaertn. leaves extract, stamen and petal in vary proportions to obtain twelve different formulations, each tea bag contained approximately 2 g of the product and have been selected based on the stability test and favor. Antihypertensive effect evaluation was carried out by 30 subjects: 10 people for Pre-hypertension patients (HP), 10 people for hypertension patients with medications (HPM) and 10 people for healthy subjects (HS) by receiving lotus tea once daily for 90 days.

Results: The results indicated that the formulation number 9 showed the promising result in stability test and taste preferences. This Lotus tea formulation were statistically significant to lower Systolic blood pressure (SBP), Diastolic blood pressure (DBP) and Heart rate (HR) in both HP and HPM group when compared with the HS volunteers ($p < 0.05$). With the improvement of biochemical blood testing, which are lipid profiles, liver enzymes and blood sugar level.

Conclusion / Discussion: Lotus herbal tea product, an application from a traditionally used Thai medicine, showed the blood pressure reduction effect in hypertension patients, thus, supports the acclaimed use of the product in the management of hypertension.

Keywords: *Nelumbo nucifera* leave, acute oral toxicity, acute intraperitoneal toxicity, subacute toxicology

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ORAL PRESENTATION

ENZYME INHIBITORY EFFECTS AND *IN VITRO* ANTIOXIDANT PROPERTIES OF TWO EXTRACTS FROM *PELARGONIUM* SP.

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Purpose: All compounds that have the capacity to block acetylcholinesterase (AChE) and butyrylcholinesterase (BChE) will increase the amount of neuromediator in cholinergic synapses and will be an alternative to classical therapy in Alzheimer's disease. The aim of our study was to assess the cholinesterase and lipoxygenase inhibitory capacity of two extracts obtained from *Pelargonium hispidum* and *Pelargonium grandiflorum*.

Material and Methods: We prepared both methanolic and ethanolic extract from *P. hispidum* and *P. grandiflorum*. The total phenolic compounds and flavonoids were determined spectrophotometrically. Cholinesterase and lipoxygenase inhibitory activity of extracts were determined at different concentrations.

Results: Methanolic extracts contain more phenolics compounds, with 2475.92 mg/100 g dried extract for *P. hispidum* and 1279.62 mg/100 g for *P. grandiflorum*. The extracts block the enzymes in a dose dependent manner. Methanolic extracts were more active than ethanolic extracts. In BChE inhibition test, EC50 values for methanolic extracts were 104.49 ± 0.96 µg/mL for *P. hispidum* and 122.87 ± 0.66 µg/mL for *P. grandiflorum*. The effects on lipoxygenase are not so important, but we have noticed the ability of extracts to increase the resistance of red cell membrane to oxidants.

Conclusion: BchE and AchE inhibition capacity of extracts is more correlated with phenolics content than flavonoids.

Keywords: *Pelargonium hispidum*, *Pelargonium grandiflorum*, enzyme inhibition, antioxidant

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ORAL PRESENTATION

UREASE, ANTICHOLINESTRASE, THYROZINASE, ANTIOXIDANT AND TOXICITY EVALUATION OF NEW BORONIC ESTER COMPOUND WITH PLANT CONTENT

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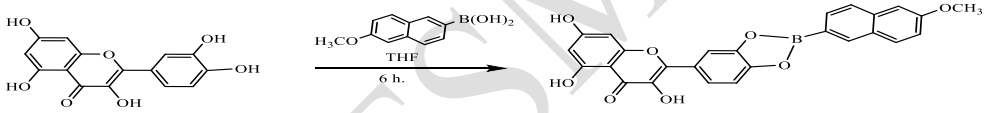
Objective / Purpose: While antioxidant and anticancer studies on compounds containing boron in the world we see literature and Turkey. In this context, boron and plant-derived phenolic compounds anticancer compounds formed and there are few studies on the other activities. The phenolic herbal compound with high antioxidant properties was synthesized with boronic acid. They were characterized by ^{1}H, ^{13}C NMR, LC-MS-IT-TOF, UV-Vis., XRD, FTIR. The antioxidant activities of the novel boronic ester compound with plant content were investigated by DPPH free radical scavenger activity, ABTS cation radical scavenging activity and copper reduction capacity by CUPRAC method [1]. In addition, urease, tyrosinase and toxic-cytotoxic activities of this compound were determined. **Material and Methods; Synthesis of Boron compound:** 1 mmol of quercetin (0.302 g) in 30 mL of THF it was dissolved. Then 1 mmol (0.202 g) of 6-methoxy-2-naphthalene phenyl boronic acid in 10 mL dissolved in THF and added to the reflux flask. The reaction was carried out at 120 ^{o}C for 6 hours. At the end of the reaction, stirring was continued until room temperature. The heating process was stopped and the mixing process was continued to cool the system to room temperature. The crude product was filtered off and washed with THF and dried.



Results: Antioxidant activities of these two compounds were examined by 3 methods. DPPH, which is used in the two compounds we have obtained, is found to be more active than BHT and α-tocopherol which are used as standard in the three of the ABTS and CUPRAC methods. The DPPH and ABTS methods of these two compounds were found to have IC50 <1. It has been determined that acetylcholinesterase has a high degree of butyrylcholinesterase (IC50: 2.53) activity in the middle of this compound. It was also found that it showed moderate antithyrosinase and high degree urease enzyme (inhibition: 99.66%) activity. It has been determined that there is no toxic-cytotoxic effect against the three cell lines studied.

Keywords: Boronic ester Compound, Urease, Thyrozinase, Antioxidant, Toxicity and Cytotoxicity Evaluation

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ORAL PRESENTATION

EXPLORATION OF LICHENS IN *KITAB AL SAYDANAH FI AL TIBB* BY AL-BIRUNI

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Objective / Purpose: Lichens or better known as 'lichenized fungi' in today's taxonomical botany, are symbiotic organisms consisting of a *mycobiont* and at least one *photobiont*. The mycobiont is a fungal partner, whereas the photobiont is generally an algal partner. This mutual partnership results producing unique secondary metabolites, which are used in pharmacy, and medicine. The purpose of this study is to investigate the usage of lichens through some Arabic terms used to depict them, in the famous book of pharmacy: *Kitab al Saydanah fi al Tibb* written by Abu Rayhan Muhammad ibn Ahmad al-Biruni (973 – 1048).

Material and Methods: The text given by al-Biruni (Aliboron) under the title(s) of 'lichens' is compared to that of his most famous contemporary Ibn Sina (Avicenna), in order to identify and confirm if the cited simple-drugs are lichens or not.

Results: Based on lichens, text of al-Biruni, which resembles the medieval pharmaco-botanical lore in Masriq together with that of Ibn Sina, is examined through recent literature on lichens' biological activities. It is found that, al-Biruni mentions اشنة for epiphytic lichens and حزاز الصخر for saxicolous lichens in accordance with Avicenna. However, the nomenclature he used are different being related to Medieval Persian-Indian Medicine. Following the legacy from the antiquity, lichens have been used in pharmacy and medicine during the medieval.

Conclusion / Discussion: Simple drugs of Medieval Medicine, as compiled in encyclopaedic works like *Kitab al Saydanah fi al Tibb,* can be considered as potential sources for today's pharmacy, in the case when they inspire future works.

Keywords: Lichens, medieval pharmacy, medieval botany, Biruni

ORAL PRESENTATION

PHYLOGENETIC DIFFERENCES IN CELL-MEDIATED IMMUNE RESPONSES TO PLANT EXTRACTS IN *AVES* AND *MAMMALIA*

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Objective / Purpose: Species-specific immune diversification occurred during the evolution of animals. This study aimed to define the potential differences in the cell-mediated response as a measure of adaptive immunity and the dose-effect relationships for medicinal plant extracts in *Aves* and *Mammalia* classes.

Material and Methods: An *in vitro* blast transformation tests was carried out on heparinized blood sampled from adult hens and rabbits (micromethod) to estimate the effects of alcoholic extracts of *Calendula officinalis*, *Vaccinum myrtilus*, *Echinacea spp.* and *Hippophae rhamnoides* using concentrations of 1.5% and 6.5%, by a glucose consumption assay (orto-toluidine test). The statistical significance of the differences between the variants was interpreted by Student-s t test.

Results: In chickens the plant extracts acted maximal in a reversed dose-dependent manner, (ie, for 1.5% concentration, 81.93 ± 18.74% and 74.70 ± 22.15% for *Vaccinum myrtillus* and *Calendula officinalis* respectively). All extracts stimulated rabbit immune cells *Calendula* (80.72 ± 6.82% for 6.5% concentration) and *Echinacea* (68.67 ± 17.04% for 6.5% concentration) being more stimulating than *Vaccinum* (65.06 ± 35.78% at 1.5% concentration).

Conclusion / Discussion: Both the phylogenetic position and the plant species influenced the *in vitro* immune responses in chickens and rabbits. While in birds some of the extracts showed a "homeopathic response", in rabbit the maximal effects were directly dose-dependent. The results supported the importance of preliminary tests in choosing one or other vegetal extract for obtaining the strongest immune stimulation/modulation.

Keywords: phylogeny, chicken, rabbits, medicinal plants, immunity

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ORAL PRESENTATION

IDENTIFICATION OF THE ANTI-ANGIOGENIC POTENTIAL OF MOROCCAN MOUND EXTRACTS USING THE CHICK EMBRYO CHORIOALLANTOIC MEMBRANE ASSAY

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Background/objective: The flowering plants of the spurge family (*Euphorbiaceae*) are world widely recognized as medical herbs to cure multiple types of cancer. Morocco hosts a variegation of Euphorbia species. The peculiar microclimate of the Middle and High Atlas of Morocco exclusively grows the Moroccan mound (*Euphorbia resinifera A. Berger*) a species endemic to these limestone mountains. While *Euphorbia officinalis* is well blended into Moroccan folklore remedies to alleviate uterine cancer, local populations do not use the Moroccan mound to treat cancer.

Solid tumors trigger angiogenesis to sustain their expansion. Angiogenesis is the process by which new blood vessels are derived from a pre-existing vascular network. During tumorigenesis, the endothelial cells lining blood vessels switch from quiescence and proliferate to initiate the branching of new blood vessels that will provide the nutrients and oxygen necessary for tumor growth. If angiogenesis is inhibited, tumor growth may be blocked. Hence, anti-angiogenic molecules often display anti-cancer properties.

However, neither the anti-angiogenic nor the anti-cancer potentials of the Moroccan mound have been investigated although these properties are well documented in other Euphorbia species. Hence, we sought to investigate for the first time the anti-angiogenic properties of various extracts derived from Morocco's endemic species *Euphorbia resinifera A. Berger.*

Methods: We used the well-established chick embryo chorioallantoic membrane assay to screen several extracts of *Euphorbia resinifera A. Berger* for their anti-angiogenic potential on the vascular density of avian chorioallantoic membranes.

Results: After validation of the test using Diclofenac and α-choriogonatropin known for their respective negative and positive modulator effect on angiogenesis we evaluated various fractions extracted from *Euphorbia resinifera A. Berger*. Diclofenac displayed a dose-response effect when used at 0.5 µg/g of egg and 5 µg/g of egg with a vessel density of 45.26% and 57.2% respectively. α-choriogonadotropin induced angiogenesis by a factor 1.77 when used at 0.05 µg/g of egg and 2.22 when used at 0.5 µg/g of egg. The F fraction derived from *Euphorbia resinifera A. Berger* specifically displayed anti-angiogenic properties. Indeed, when eggs where treated with 0.5 µg/g of egg or 5 µg/g of egg of the F fraction, we observed an inhibition in blood vessel density in the chorioallantoic membrane of 60.89% and 75.72% respectively.

Conclusion: While the latex of *Euphorbia resinifera A. Berger* is a known carcinogen, we report for the first time the anti-angiogenic potential of the F fraction of *Euphorbia resinifera A. Berger.* We will further decipher the bioactive compound(s) contained in *Euphorbia resinifera A. Berger* responsible for the anti-angiogenic effect observed.

Keywords: Angiogenesis, Cancer, *Euphorbia resinifera A. Berger*

ORAL PRESENTATION

MEDICINAL HERBS USED AS A SUPPORT FOR CANCER TREATMENT IN CULTURE

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Objective / Purpose: Cancer treatment is difficult and often unsuccessful where patients requires to use Medicinal Herbs (MH) as a supportive therapy. Unconsciously used MH can be useless or even harmful. In this study, the effect of MH as a support to paclitaxel (PT) therapy was examined in breast cancer cell lines.

Material and Methods: Pomegranate (Punica granatum, PG), Ganoderma Lucidum (Lingzhi-Reishi mushroom, GL) and Inula viscose (Arum italicum viscosa, IV) were selected as examples of MH. MCF-7, MDA-MB-231, NR67 and 4T1 were used as breast cancer cell lines. TBS extracts were used in combination with PTX to investigate inhibition of proliferation by 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium (MTT). Vascular endothelial growth factor (VEGF), endothelial nitric oxide synthase (eNOS) and Terminal deoxynucleotidyl transferase dUTP nick end labeling (TUNEL) staining were evaluated for vascularization, oxidative stress and apoptosis.

Results: It was determined that PT with MH significantly inhibited the proliferation of breast cancer cell line in a different degree by their agresivity. In the immunohistochemical evaluations performed with H-score, it was seen that VEGF staining was significantly decreased and e-NOS and TUNEL staining were increased when they were used together.

Conclusion / Discussion: MH produced more meaningful results when used in conjunction with the PT. It was understood that this supporting effect was caused by decreased vascularity and increased oxidative stress with apoptosis which induced cell death. It was thought that the use of MH would be important in terms of reducing the costs and side effects of classical drugs used in cancer treatment for more life quality of patient.

Keywords: Medicinal Plant, Breast Cancer, Cell Line, Vascularization, Oxidative Stress, Apoptosis.

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ORAL PRESENTATION

CHEMOPROTECTIVE EFFECTS OF VITEXILACTONE ON CISPLATIN-INDUCED NEPHROTOXICITY IN RATS: VIA ANTI-OXIDANT AND ANTI-APOPTOSIS EFFECTS

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Objective / Purpose: Cisplatin (CP) is widely used as antineoplastic drug at presenteffects, but nephrotoxicity reduces its clinical utility in humans. The objective of this study was to evaluate whether vitexilactone (vitex) is a safe and effective treatment for kidney injury and to discuss the implications of these findings for clinical practice.

Material and Methods: With this aim Sprague-Dawley rats were divided into six groups: control; 6 mg/kg CP, 40 mg/kg and 80 mg/kg vitex for 6 days. Duration of this study was 11 days and CP was injected on the 6th day of the experiment. After exposure to the chemotherapy agent and vitex, total oxidative stress (TOS), and total antioxidant status (TAS) were assessed to determine the oxidative injury in kidney cells. The histology of the kidney was examined using two different staining methods: hematoxylin-eosin (H&E) and periodic acid Schiff (PAS). We hired immune-histological staining, and fluorescence staining to detect the expression of caspase-3. In addition, the blood urea nitrogen (BUN), uric acid (UA), and creatinine (CRE) levels were established.

Results: Nephroprotective effects of vitex were associated with decrease in serum toxicity markers and increase in antioxidant enzyme activities. It also reduced the expression of apoptotic marker (caspase-3). In addition, treatment with CP elevated the levels of BUN, UA, CRE, and TOS, but lowered the level of TAS compared to the control group.

Conclusion / Discussion: The vitex using for treatment against cisplatin-induced nephrotoxicity suggested that the vitex is a safe and efficacious alternative to be considered for the treatment of kidney injury.

Key words: Cisplatin, Vitexilactone, Nephrotoxicity and Apoptosis

ORAL PRESENTATION

THE RADIOPROTECTIVE ACTIVITY OF AMIFOSTINE ON ANTIOXIDANT ENZYME SOD AND AGAINST RADIATION IN VESICULAR SEMINALIS OF WISTAR RAT

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Objective / Purpose: Free radicals and reactive oxygen species (ROS) are generated using various endogenous systems or from external sources such as exposure to different physiochemicals. Radiation damage to the cell can be caused by the direct or indirect effects of radiotherapy processes. Amifositine is a phosphorylated thiol that holds its radioprotective actions by several indirect mechanisms. The aim of the present study was to evaluate the radioprotective effect of amifostine on germinal epithelium of the adult vesicular seminalis of rats induced by radiation.

Material and Methods: A total number of 28 adults, male rats were randomly divided into four equal groups. The control group was neither treated with amifositine nor irradiated. The second group was only irradiated with 2 Gy for 3 days. The third group was firstly treated with 150 mg/kg of amifositine per day for 3 days, and one day later, irradiated by 2 Gy of for 3 days. The fourth groups received only 150 mg/kg of amifositine for 3 consecutive days. All the animals were treated intraperitoneally. Histopathological (Crossman modified Mallory's Triple staining, periodic acid Schiff), immunohistochemical (8-hydroxy-20 -deoxyguanosine (8-OHdG)) and biochemical (superoxide dismutase, malondialdehyde) and examinations were performed.

Results: In vivo, amifostine pretreatment alleviated vesicular seminalis injury and decreased apoptosis, which was paralleled by increased superoxide dismutase (SOD) and reduced malondialdehyde (MDA) in germinal epithelium of the adult vesicular seminalis.

Conclusion / Discussion: Our results indicate that amifostine treatment has a protective effect against vesicular seminalis injury via suppressing reactive oxygen species (ROS).

Keywords: Radiotherapy, Amifostine, Vesicular Seminalis, Superoxide Dismutase

ORAL PRESENTATION

AN INNOVATIVE APPROACH TO THE MEDICINAL PLANTS OF TURKEY AND NORTHERN CYPRUS FOR THE HERBAL MEDICINE PRODUCTION

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The plant and cultural diversities in Turkey and Cyprus, provide very rich traditional treatments and folk medicines. Folk remedies and medicinal plants of Turkey and Cyprus are investigated by Turkish scientists working in Faculty of Pharmacy and related professions. More than 1200 new compounds have been isolated from the plants collected from different areas of Turkey. The active principles of *Crataegus, Thymus, Origanum, Salvia* species, *Silybum marianum* and *Dorystoechas hastata* which is a monotypic plant endemic to Antalya of Turkey, have been determined and their uses as sources of herbal medicinal products have been also investigated by us(1,2). The leaves of *Phillyrea latifolia* L, which is used to lose weight as tea in Turkey are investigated (3). On the other hand some plants containing diterpenoid alkaloids can be used for producing some homeopathic remedies; diterpenoid alkaloids containing plants; *Aconitum, Consolida* and *Delphinium* species growing wildly in Turkey were also investigated. *Ceratonia siliqua, Prunus dulcis and Sideritis cypria, Thymus capitatus* are the most important plants used traditionaly in Northern Cyprus(4,5). In this speech, our researches on some medicinal plants from Turkey and Northern Cyprus and their possibility of herbal medicines production will be summarized.

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ORAL PRESENTATION

INVESTIGATION OF ANTIDEPRESSANT-LIKE POTENTIAL OF *WOLFFIA GLOBOSA* (L.) EXTRACT IN AN UNPREDICTABLE CHRONIC MILD STRESS MOUSE MODEL AND ITS POSSIBLE MECHANISM OF ACTION

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Objective/Purpose: Unpredictable chronic mild stress (UCMS) has been used as a model of depression. Antidepressant agents can reverse most effects of UCMS. *Wolffia globosa* (L.) is a medicinal herb. The present study intended to determine antidepressant activity of *W. globosa* extract (WG) on unpredictable chronic mild stress (UCMS) model in mice.

Materials and Methods: Mice were divided into 5 groups which were non-stress, UCMS, UCMS + WG extract 250 mg/kg/day, UCMS + WG extract 500 mg/kg /day and UCMS + imipramine (20 mg/kg/day). Mice were exposed to nine stressors for five consecutive weeks. Sucrose consumption test, tail suspension test (TST), and forced swimming test (FST) were used to evaluate antidepressant-like activity. Locomotor activity was tested by Y-maze test. The serum corticosterone level and brain lipid peroxidation were determined for the oxidative stress mechanism.

Results: The results exhibited that UCMS significantly decreased sucrose consumption and increased immobility time in FST and TST. It indicated that UCMS model could simulate the present social situation of people, which were often exposed to many stress conditions and were risk cause of depression. Both doses of WG could reverse sucrose consumption and WG extract 500 mg/kg/day significantly reduced immobility time in TST. There was no effect to locomotor function. Moreover, WG extract could reduce serum level of corticosteroid and also inhibit lipid peroxidation in mice brain, significantly.

Conclusion / Discussion: *W. globosa* extract can alleviate depression in mice via depletion of oxidative stress in brain and modulation of serum corticosterone level which is relevant to hypothalamic-pituitary-adrenal (HPA) axis. It indicated that W. globose extract displayed antidepressant-like potential and support the benefit of consuming as the functional food to prevent depression and development of an antidepressant.

Keywords: *Wolffia globosa*, Unpredictable chronic mild stress, depression

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ORAL PRESENTATION

CHEMICAL COMPOSITION OF THE ESSENTIAL OILS FROM FLOWER BUDS AND LEAVES OF THE *CISTUS CRETICUS* AND *CISTUS SALVIFOLIUS*

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The volatile oils from flowers and leaves of *C. creticis* and *C. salvifolius* were extracted by two extraction methods, namely, hydro-distillation and solid phase micro-extraction (SPME). The chemical composition of the essential oils was analyzed by GC and GC-MS. The SPME oil from leaves and flowers of *C. creticus* was dominated by monoterpenes with α-pinene, α-cubebene and camphene as major components. However, in the hydro-distillation the leaves oil was dominated by sesquiterpenes and oxygenated diterpenes with manoyl oxide, sclarene and γ-cadinene as major components. The flower oil dominated by oxygenated diterpenes with manoyl oxide, and abietatriene as major components. The oils from flowers and leaves of *C. salvifolius* obtained by SPME were dominated by monoterpenes and sesquiterpenes with δ-3-carene, α-pinene, β-pinene and E-caryophyllene as major constituents. On the other hand, the oils from flowers and leaves of *C. salvifolius* obtained by hydro-distillation were dominated by oxygenated diterpenes and ester with methyl strictate, abietol, methyl octadecanoate and manoyl oxide as a major component. In the leaves the major components of the oil were manoyl oxide, E-ethyl cinnamate and Z-ethyl cinnamate.

ORAL PRESENTATION

HPLC DEVELOPMENT FOR DETERMINATION OF ACTIVE CONSTITUENTS IN *MORINGA OLEIFERA* BY THE AID OF EXPERIMENTAL DESIGN

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Objective / Purpose: This research aimed to develop a high performance liquid chromatographic (HPLC) method for the analysis of active constituents which were quercetin, kaempferol and myrecetin in *Moringa oleifera*, one of the popular herbal plants in Thailand by the aid of using experimental design approach.

Material and Methods: The HPLC method was developed and carried out using C18 reverse-phase column (Hypersil ODS, 250x4.6 mm.i.d., 5-micron particle size). Twenty-nine experiment of HPLC method were set by experimental design approach with four different variables including flow rate, percentage of acetonitrile, formic acid and propanol which were the composition in mobile phase. The experimental responses were the retention time of three compounds and their peak areas which were recorded and optimized to predict the optimum condition.

Results: The optimum condition of HPLC method was obtained from this study which the flow rate was 0.8 mL/min., percentage of formic acid, acetonitrile and propanol was 1, 15 and 20, as followed. This optimum condition performed the highest responses of peak area for all three compounds.

Conclusion / Discussion: Our results revealed the usefulness of using experimental design for the development of HPLC method in the analysis of quercetin, kaempferol and myricetin in *Moringa oleifera* powder.

Keywords: *Moringa oleifera*, experimental design, quercetin, kaempferol, myricetin

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ORAL PRESENTATION

THE EFFECT OF DIFFERENT MEDICINAL HERBS ON DIFFICULT WOUND HEALING IN EXPERIMENTAL *IN VITRO* SKIN AND BONE FORMATION MODEL

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Objective / Purpose: Skin and bone wound healing is particularly hard to heal in situations such as diabetes. Since the desired treatment can not be obtained in the classical treatments, the patients use Medical Herbs (MH) unconsciously for support purposes. MH need to be added to the treatment by proving benefits and harmful effects with the medical methods based on the evidence. In this study, the effects of wound healing in culture media on the TSB samples used by patients were examined.

Material and Methods: Pomegranate (*Punica granatum*, PG), *Ganoderma lucidum* (Lingzhi-Reishi mushroom, GL) and Inula viscose (Arum italicum, IV) were selected as examples of MH. L-929, osteoblast cells derived by differentiation of Mesenchymal Stem Cell (MSC) and MSCs were proliferated in culture medium to be confluent. Semiconfluent cells, a wound pattern was created by a scratch with a pipette tip. A high-glucose medium was used to simulate a difficult wound condition. The effect of TSB was calculated by depending on the wound closure process. Characterization of the cells was determined by Stro-1 (+), CD90 (+) and CD45 (-) for MSC. Alizerin red and Von Kossa histochemistry, osteonectin and osteocalcin positivity were used for osteoblastic differentiation.

Results: It was observed that MSC cells proliferated in a similar manner to L-929 cells. They were confluent and exhibited similar behavior in wound closure. In the osteoblastic differentiation, bony like tissue with mineralized calcium formed as calcified islets. In the created wound model, cell proliferation and migration were standardized for comparison of the MH effect. All three MH produced a faster and more effective wound closure compared to those of control.

Conclusion / Discussion: There was significant effect of MH for wound healing. They have to be investigated by in vivo experiments which may go to phase studies for support to treatment protocols. Thus, it was thought that effective treatment with less costs and more patient life quality could be achieved by MH.

Keywords: Medicinal Plant, Wound Healing, Culture, Fibroblast, Mesenchymal Stem Cell, Osteoblastic Differentiation.

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ORAL PRESENTATION

ANTIDEMENTIA ACTIVITY FROM *ALTERNANTHERA PHILOXEROIDES* EXTRACT AND ITS MECHANISM IN OVARIECTOMIZED MICE

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Objective/Purpose: The aims of this study were investigation the effects of ethanolic extract of *Alternanthera philoxeroides on cognitive deficit-related behavior using ovariectomized (OVX) mice model and the underlying molecular mechanism* of actions.

Material and Methods: This study was conducted in OVX mice that mimic to estrogen deprivation and its effect on cognitive performance was evaluated by using behavioral models. *OVX mice were treated daily with A. philoxeroides extract (250 and 500 mg/kg, p.o.) or reference drug, 17β-estradiol (1 ug/kg, p.o.) for 8 weeks.* Behavioral activities were *elucidated by Y maze test, novel object recognition test and Morris water maze test.* The anti-cognitive dysfunction function of ***A.*** *philoxeroides* extract that induced by OVX in behavioral studies, oxidative stress-induced brain membrane damage was determined**.** *Expression levels of genes encoding brain-derived neurotrophic factor (BDNF) and* cyclic AMP-responsive element-binding protein (CREB), factors implicated in neurogenesis and synaptic plasticity*, in the hippocampus and frontal cortex* were evaluated by using reverse transcription-polymerase chain reaction. Serum and uteri were collected to assess estrogenic activity.

Results: *A. philoxeroides* administration significantly ameliorated cognitive deficit behaviors in OVX mice. *Expression levels of genes BDNF and* CREB in treatment groups and positive control group were significantly increased. Likewise, *A. philoxeroides* treated groups showed anti-oxidant activity in the brain via inhibiting of lipid peroxidation similar to 17β-estradiol group. The extract also enhanced *serum 17β-estradiol level*, uterine weight and uterine volume.

Conclusion / Discussion: This finding showed that the anti-dementia effect of *A. philoxeroides* may due to a role of phytoestrogen on anti-oxidative stress in the brain, restoring synaptic plasticity-related signaling and neurogenesis process in the hippocampus and frontal cortex, including via estrogenic activity.

Keywords: *Alternanthera philoxeroides*, ovariectomized mice, anti-dementia

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ORAL PRESENTATION

AGRICULTURAL ASPECTS OF MEDICINAL PLANT LARGE-SCALE CULTIVATION IN SLOVAKIA

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Objective/Purpose: The large-scale production of herbs is important for Slovakia´s agricultural industry and would seem the best way of ensuring the required quality and quantity of particular plants in future. Commercial cropping of herbs is important both for the economy and employment and also allows utilize land which is not ideal for food production to be used to grow plants, which thrive in poor, mountainous and other marginal soils.

Material and Methods: Cultivation of medicinal plants depends on sufficient amount of good quality biological material during establishment of stands. Success of cultivation depends on selection of good quality seeds or planting material, especially varieties that fulfil a yield requirement together with qualitative demands on quality, mostly on the content of an active ingredient. There are many advantages in medicinal plants cultivation in comparison to harvest of wildly growing medicinal plant species: higher concentration (number) of plants per area; regular agro-biological control of stand; higher and more stable yields; possibility of using mechanization; better harvest access, conservation and processing of raw material. The most important parameter of cultivated medicinal plant species is yield of main product, which can be reached only in optimal conditions. Production ability of stands is influenced by many external agro-ecological conditions, e.g. climate, soil, terrain.

Results: In 2017, in the Slovak Republic, 1,350,179.72 ha were used for the production of agricultural crops on arable land. The total area of cultivated medicinal, aromatic and spice plants was 2,881.14 ha, which represents a gradual increase from 2010. The highest amount of raw material for all types of medicinal plants of 7,189,710 kg was harvested in 2017, yielding 2,890.12 $kg.ha^{-1}$. The highest average hectare yield crops was recorded in 2012, when it reached 4,006.41 $kg.ha^{-1}$. Although production is improving there is still considerable potential: the small-scale producers treating their plots like market gardens to manage stable yields of 2,900 – 4,000 $kg.ha^{-1}$, which is considerably higher than the volume of collectors. Using standards agricultural techniques may thus not be the best way of cultivating medicinal plants. It is also a fairly unpredictable business with problems of yields, variable demand for particular plants, chemical protection, inadequate drying and storage facilities and labour-intensive production systems.
In recent years, the most cultivated medicinal plant in Slovakia is Milk Thistle (*Silybum marianum* (L.) Gaertn). It is the main raw material for the production of medicines and other nutritional supplements with phyto-therapeutic protection of the liver. The technology of cultivation, harvesting is fully mechanized. From large areas, fruit harvesting is carried out by a cereal harvester without drying, often with direct sales for the extraction of active substances. Between 2014 and 2017, the second most cultivated medicinal plant within Slovak conditions was plantain (*Plantago lanceolata* L.) with the largest cultivated area, of about 120 – 195 ha. Production growth of lavender (*Lavandula angustifolia* Mill.) is growing every year. Next medicinal plants cultivated in Slovakia at the large scale fields are German Chamomile (*Matricaria recutita* L.) and Peppermint (*Mentha × piperita* L.).

Conclusion/Discussion: The special crop production is of great importance from several points of view in the specialized agricultural farms: (*) rational (offering appropriate opportunities for unemployed people), (**) production (better utilization of marginal land resources e.g. salty soil, lower quality soils in sub-mountainous or mountainous areas) and (***) economic (from the viewpoint of market value the medicinal, aromatic and spice plants belong to the most effective agricultural crops).

ORAL PRESENTATION

MODIFY THE ANALYSIS METHOD OF GC-MS TO OBTAIN MORE ACCURATE RESULTS WITH REDUCE THE RUN TIME

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Objective / Purpose: The essential oils are highly complex mixtures of often hundreds of individual aroma compounds. The variability in the chemical composition of essential oils depends on several factors including climate, geographical location and genotype of the plant. Method of analysis for the chemical composition of essential oil, is one of the factors leading to variation in essential oil composition and could alter the commercial usefulness it. The main aim of this study is to investigate the accuracy of analysis in the management of chemical profile of different essential oils by using Gas chromatography combined with mass spectrometry (GC-MS).

Material and Methods: The essential oil components identified by GC-MS through two different ways. The first way was taken around 3 hours for each sample by compared the mass spectrums obtained with the existing data in GC-MS set software. Identification of compounds carried out based on Wiley and NIST libraries search. The second way taken about 27 minutes for each sample by compared with commercial standards for analysis of organic compound classes with high purity. Six different mixtures of nine standard compounds were made in different concentrations. In brief, a processing method was written which, using data obtained by the individually run standards, identified each essential oil on the basis of a retention time (RT).

Results: The results show that the most marked difference between classical and modified analysis is in the undetermined compounds which overlapped with the main compounds in the normal methods.

Conclusion / Discussion: The data indicated that there is a difference between the two methods in accuracy of main compounds identification, in addition of the high difference in the run time.

Keywords: GC-MS, essential oil, method of analysis

ORAL PRESENTATION

UHPLC-BASED ANALYSIS OF BIOLOGICALLY OXYPRENYLATED PHENYLPROPANOIDS IN TEA TREE OIL

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Objective / Purpose: Tea tree oil (TTO) is the volatile essential oil obtained by distillation from leaves and branches of the native Australian plant *Melaleuca alternifolia* (Maiden & Betche) Cheel (Fam. Myrtaceae). During the last decade we have been deeply involved in the characterization of the phytochemical profile of spontaneous edible herbs and vegetables, with a particular reference to the qualitative and quantitative of biologically active oxyprenylated secondary metabolites.[1]

Material/ Methods: An efficient analytical strategy based on different extraction methods of biologically active naturally occurring oxyprenylated umbelliferone and ferulic acid derivatives 7-isopentenyloxycoumarin, auraptene, umbelliprenin, boropinic acid, and 4'-geranyloxyferulic acid and quantification by UHPLC with spectrophotometric (UV/Vis) detection from Tea tree oil is reported.

Results: Absorption of the pure oil on Al_2O_3 (Brockmann activity II) prior washing the resulting solid with methanol and treatment of this latter with dichloromethane was shown to be the most powerful extraction methodologies in terms of yields in oxyprenylated secondary metabolites. Among the five *O*-prenylphenylpropanoids under investigation auraptene and umbelliprenin were not detected while 4'-geranyloxyferulic acid was the most abundant compound resulting from al the three extraction methods employed.

Conclusion / Discussion: The UHPLC analytical methodology set up in the present study showed to be a powerful and versatile technique for the simultaneous characterization and quantification of prenyloxyphenylpropanoids in Tea tree oil, that is reported herein for the first time as a result of a UHPLC-based method.

Keywords: UHPLC, Prenylphenylpropanoids, Tea Tree Oil

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ORAL PRESENTATION

CHEMICAL AND BIOLOGICAL VALORISATION OF *JACARANDA MIMOSIFOLIA* D. DON

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The present work is a valorization by the determination of the chemical composition and biological activity of the leaves of *Jacaranda mimosifolia* or Blue Jacaranda of Morocco.
The essential oils were extracted steam evaporation and the yield was equal to 0.128%. The analysis of the chemical composition by GC / UV showed the presence of more than twenty products with five majorities in percentages of 7.7; 5.52; 12.13, 12.9 and 32.19%.
Chemical analysis by HPLC / UV of the ethyl acetate extract of the leaves of *Jacaranda mimosifolia* showed the important presence of fumaric acid and quercetin as well as other standard phenolic compounds.
On the other hand, the DPPH test and the chelating power showed that the essential oils and the phenolic extract have a very important antioxidant activities with 2.50 ± 0.38 (DPPH) and 4.71 ± 0.03 mg / ml (chelation). However, this activity remains below the positive control: quercetin (0.0032 mg / ml) and EDTA-Na (0.02 mg / ml).
For the antimicrobial test realized by the bioautography agar overlay method, we demonstrated the existence of an important antibacterial activities for essential oils and extracts from Jacaranda mimosifolia leaves.

Keywords: Jacaranda, Bignoniaceae, Phytochemistry; antioxidant, antimicrobial, Essential oils.

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ORAL PRESENTATION

Astragalus neurocarpus and *Astragalus elongatus* subsp. *nucleiferus* EXTRACTS AS A POTENTIAL SOURCE OF POLYPHENOLS WITH ANTIOXIDANT AND CHOLINESTERASE INHIBITORY ACTIVITIES

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Background and Objective: *Astragalus* species, a member of the *Fabaceae* family, known as strengthening the immune system by encouraging the production of interferon, and supporting the body's defense system against microbial infections. As far as our literature survey could ascertain, enzyme inhibitory activity, radical scavenging and ferric reducing antioxidant power activities of different parts of *A. neurocarpus* and *A. elongatus* subsp. *nucleiferus* have not previously been reported elsewhere. Thus, the present study was carried out to assess total polyphenolic contents, neuroprotective and enzyme inhibitory effects of the ethanol and water extracts from different plant parts of these plant species. **Material and Methods:** The aerial parts and roots of *A. neurocarpus* and *A. elongatus* subsp. *nucleiferus* were collected from Gaziantep province, located in South-Eastern part of Turkey. To prepare the extracts, air dried samples (40g) obtained from the different plant parts were individually extracted with 300 ml ethanol and water for 2 days in the room temperature. Then, the extracts were freeze-dried, and stored at +4°C until analyzed. Total phenolic and flavonoid contents of the extracts were determined spectrophotometrically. Antioxidant activity was analyzed by using DPPH free radical scavenging and ferric reducing antioxidant power (FRAP) assays [1,2]. Neuroprotective activities of the extracts on AChE and BChE were evaluated according to the method of our previous research [3]. All the assays were carried out in triplicate, and the results were expressed as mean ± SD. **Results and Discussion:** Extraction yields of the ethanol and water extracts from aerial parts and roots of *A. neurocarpus* and *A. elongatus* subsp. *nucleiferus* were determined as 2.62%, 2.58%, 2.34%, 2.21%, and 2.58%, 2.35%, 1.98%, 2.26% (w/w), respectively. Regarding of total phenol and flavonoid quantities, all the extracts obtained from the aerial parts possessed higher polyphenolic contents, when compared the root extracts. Additionally, the roots extracts of *A. elongatus* subsp. *nucleiferus* contained higher polyphenolic contents than the extracts form *A. neurocarpus.* Ethanol extract prepared from the aerial parts of *A. neurocarpus* were found the highest amount of total flavonoid quantity (179.34±1.02 mg/g extract, as QE), while ethanol extract prepared from the root part possessed the lowest amount of total flavonoid quantity (49.73±1.56 mg/g extract, as QE, $p<0.01$). According to antioxidant assays, all the extracts obtained from different parts of the plants exhibited remarkable scavenging activities on DPPH and FRAP. Scavenging activity of the ethanol extract from the aerial parts of the plants on DPPH were found to be in the range of 60.10±1.07 - 82.51±1.64 mg TEs/g extract, $p<0.05$. In contrary to the results obtained from total polyphenolic contents, the extracts from root of *A. neurocarpus* showed the weakest antioxidant activity, and it is followed by the water extract of the root from *A. elongatus* subsp. *nucleiferus* (33.61±0.49 and 55.68±1.06 mg TEs/g extract), respectively. Enzyme inhibitory results obtained from the extracts were found a similar activity profile as seen in total polyphenolic quantities. Cholinesterase inhibitory activity assays on both enzymes were resulted in the superiority of the ethanol extracts obtained from the aerial parts. They showed significant led to 68.14 and 9.06 mg GALAEs/g extract inhibition against AChE and BChE, respectively. **Conclusion:** Overall, the results revealed that the extracts of *A. neurocarpus* and *A. elongatus* subsp. *nucleiferus* have considerable amount of antioxidant activity as well as anti-acetylcholinesterase and anti-butyrylcholinesterase activity. There has been suggestion that these plant species would be used a potential source in the treatment of Alzheimer's disease for their inhibitory activity on the AChE and BChE enzymes, and also cancer for their rich antioxidant capacity.

Keywords: *Astragalus* sp., neuroprotective, polyphenolic content, antioxidant, enzyme inhibition.

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ORAL PRESENTATION

FACTORS AFFECTING THE *IN VITRO* ACTIVITY OF A *HIPPOPHAE RHAMNOIDES* EXTRACT ON PHAGOCYTOSIS IN MASTITIC COWS

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Objective/Purpose: Innate cell-mediated defense mechanisms include neutrophils as important actors during phagocytosis and killing of the bacteria. Their presence is considered to be crucial in controlling the *in situ* infection, especially in high yielding cows. The research was carried out to evaluate the impact of clinical mastitis on non-specific cell-mediated responses to *Hippophae rhamnoides* alcoholic extract and its potentials therapeutic use.

Material and Methods: Randomly selected dairy cows showing clinical signs of mastitis were sampled for blood on two farms which were different in terms of raising technologies. Causative agents were identified from the milk by Sensititre OptiRead from Mueller Hinton agar plates. Carbon particle inclusion test was performed using an alcoholic seabuckthorn extract treated cells. Phagocytic activity index was calculated as the difference between the natural logarithms of the optical densities of the phagocytosis divided by time (45 and 15 min respectively). The statistical significance of the differences between the groups was interpreted by Student-s t test.

Results: The results indicated that *Streptococus uberis* represented the dominant bacteria on one farm while *Staphylococcus aureus*/*E. coli* were present in mastitic milk on the other. The spontaneous phagocytosis was similar in both units, but the response to the *Hippophae* extract significantly ($p<0.0004$) increased with 132.86% on one of the farms, but not on the other (1.06%). On both farms, the sea-buckthorn activity was inhibiting.

Conclusion/Discussion: The effects of the plant extract on the phagocytosis were conditioned not only by its composition but also by external factor complex, including the management of the farm.

Keywords: subclinical mastitis, phagocytosis, microbiome, *Hippophae rhamnoides*, dairy cows

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ORAL PRESENTATION

THE TOTAL PHENOLIC CONTENTS AND ANTIOXIDANT PROPERTIES OF INVASIVE SPECIES *ERIGERON ANNUUS* PERS. (ASTERACEAE) GROW AT DIFFERENT LOCATIONS IN TURKEY

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Objective / Purpose: *Erigeron* L. is used in traditional medicine for varied purposes. In the present study, *Erigeron annuus* Pers. grow at three locations in Turkey were examined and compared for phenolic contents and antioxidant activities.

Material and Methods: The aerial parts of *E. annuus* were collected from Ayder-Çamlıhemşin (Rize), Pazar (Rize), and Trabzon. Extracts of *E. annuus* were examined and compared for total phenolic contents (TPC), free radical scavenging properties against the 2,2-diphenyl-1-picrylhydrazyl radical (DPPH•), and the radical ABTS•+.

Results: The results showed *E. annuus* samples from different locations have dissimilar results against DPPH•, ABTS•+ and TPC.

Conclusion / Discussion: The different results can correlate with solar radiation, altitude, and heavy metal rates.

Keywords: *Erigeron annuus,* Total Phenolic Contents (TPC), DPPH•, ABTS•+

ORAL PRESENTATION

ANTI-PROLIFERATIVE AND APOPTOTIC EFFECTS OF VINCRISTINE AND VINBLASTINE ON MULTIPLE MYELOMA

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Objective / Purpose: The *Vinca* alkaloids have been generally included in combination chemotherapy regimens for medicinal therapies. *Vinca* alkaloids derived from *Catharanthus roseus* (Apocynaceae). *Vinca* alkaloids are chemically indole alkaloids and are known to possess anti-cancer, anti-hypertensive and anti-diabetic roles. The purpose of this study is to demonstrate the anti-proliferative and apoptotic effects of two *Vinca* alkaloids vincristine and vinblastine on multiple myeloma cells.

Material and Methods: In accordance with this purpose, for cell proliferation analyses RPMI-8226 and ARH-77 cells were grown under the conditions of 5% CO2 at 37°C. WST-1 assay was performed to determine cytotoxic effect of alkaloids. In order to determine the apoptotic effects of alkaloids, firstly RNA extraction was performed and RNA quantifications were measured by using Nanodrop ND-2000 spectrophotometer. RNA extraction was followed by cDNA synthesis. The expression levels of apoptotic gene regions were evaluated via quantitative Real Time PCR. PCR amplifications were performed in a 20 µL reaction mixture using Biorad CFX Connect system. The data was analysed by comparative CT method and the fold change was calculated by $2^{-\Delta\Delta CT}$ method.

Results: According to WST-1 results, two *Vinca* alkaloids were displayed cytotoxic effect on each multiple myeloma cell lines. WST-1 results were shown that at applied 25-100 µM concentrations vinblastine is more effective than vincristine. On the other hand, real time PCR results indicate that, alkaloids act upon different apoptotic gene regions at the molecular level. These results show that vincristine and vinblastine have different effects in terms of gene expressions.

Conclusion / Discussion: Consequently, this study promotes further studies of the *Vinca* alkaloids and their mechanism of actions.

Keywords: *Vinca* alkaloids, WST-1, multiple myeloma

ORAL PRESENTATION

ASSESSMENT OF ANTIGLYCATING POTENTIALS OF *NIGELLA SATIVA* (BLACK CUMIN)

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Objective / Purpose: Diabetes has become a major socioeconomic and health issue worldwide. It is manifested as an increased level of sugars in the affected individual. Sugars react nonenzymatically with other nitrogenous molecules to produce a range of deleterious molecules which are commonly known as advanced glycation end products (AGEs). These AGEs have been implicated in many pathophysiological disorders and secondary complications of Diabetes. The effects of black cumin seeds extract were checked on the prevention of AGEs generation.

Material and Methods: The amount of early and advanced glycation end products in the *in vitro* glycation system was checked in the presence and absence of black cumin seed extracts. The methods included measurement of browning, NBT assay, carbonyl content and Congo red assay for aggregation. The extract was also used to check its antioxidant effect by DPPH assay and prevention of Glycoxidative damage of DNA.

Results: Analysis of results indicates that extracts significantly prevented the generation of early as well as advanced glycation end products. There was also a decrease in the level of glycation-mediated protein aggregation. Seed extracts were able to prevent the Glycoxidative damage of DNA.

Conclusion / Discussion: The results indicate that black cumin seed extracts can be used as potential antiglycating agent and antioxidant. They can be also used for the prevention of protein aggregation related neurodegenerative diseases.

Keywords: Advanced glycation end products (AGEs), antioxidant, DNA damage, *Nigella sativa* seeds, protein aggregation

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ORAL PRESENTATION

SUSCEPTIBILITY OF OPPORTUNISTIC PATHOGENIC MICROORGANISM TO PLANT ESSENTIAL OILS

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Objective / Purpose: Essential Oils (EOs) are complex natural mixtures of volatile secondary metabolites isolated from plant material (flowers, buds, seeds, leaves, twigs, bark, herbs, wood, fruits and roots) by hydro or steam distillation. The major components of EOs are different biological substances, as well as carbohydrates, alcohols, ethers, aldehydes and ketones. EOs antimicrobial activity can be attributed to inhibition or interaction with multiple targets in pathogenic microbial cells [1, 2]. Essential oils often demonstrate their high level of direct antimicrobial activity [3]. They can consider as an alternative to antimicrobial agent. The purpose of this contribution was the study of sensitivity opportunistic pathogenic microbiota to selected essential oils. The pathogenic microbiota was isolated from sputum of people with pneumonia, obstructive bronchitis, bronchial asthma, chronic obstructive disease and oral cavity patients with periodontal disease. **Material and Methods:** Antimicrobial activity of essential oils was determined using disk diffusion method. As test culture, the following bacteria and yeast from the ATTC (American Type Culture Collection, USA) collection were used *Candida albicans* ATCC 885-653; *Staphylococcus aureus* ATCC 25923 F-49*; Escherichia coli* ATCC 25922 (F-50), *Enterococcus faecalis* ATCC 29212. Also we used clinical strains of bacteria and yeasts (*C. albicans, C. krusei, C. tropicalis, S. aureus, E. coli, Cirtobacter* spp.), which were isolated from sputum of people with pneumonia, obstructive bronchitis, bronchial asthma, chronic obstructive disease and oral cavity patients with periodontal disease. The essential oils of *Thymus vulgaris* L., *Rossmarinus officinalis* L., *Hyssopus officinalis* L., *Menta piperita* L.; *Salvia officinalis* L., *Coriandrum sativum* L., *Juniperus communis* L., *Pinus silvestris* L. and *Abies alba* L. were supplied from a large-scale steam distillation by the Calendula, Co. in Nova Lubovna, Slovakia. Sterile filter paper disks (6 mm in diameter) impregnated with 10 μL of essential oil were placed on the plate previously inoculated with a microbial suspension. The diameters of the inhibition zones were measured in millimeters including diameter of disc. Each antimicrobial assay was performed in at least triplicate. **Results:** Essential oil of *Thymus vulgaris* L. showed high level of antibacterial activity against *S. aureus*, with a more expressed impact upon the museum culture than the clinical isolates. This same essential oil showed broad-spectrum high antimicrobial activity by affecting microscopic fungi of *Candida* genus, gram-positive and gram-negative microorganisms. Antibacterial activity of *Juniperus communis* L. was identified: weak – on *S. aureus* and *C. albicans C. krusei*, and high on *Citobacter* spp. Essential oils of *Hyssopus officinalis* L. and *Menta ×piperita* L. manifested moderate antimicrobial activity. *Hyssopus officinalis L.* essential oil was seen to inhibit the growth of both typical and clinical isolates of *S. aureus*, and of *E. coli, Citobacter* spp. and *Candida* spp. – i.e. it showed broad-spectrum moderate antimicrobial activity. *Rossmarinus officinalis* L. essential oil showed moderate level of antimicrobial activity against microscopic fungi of *Candida* genus and *Enterococcus faecalis*, and low level against *Citobacter* spp. genus bacteria. Essential oil of *Coriandrum sativum* L. showed moderate antibacterial activity against *S. aureus, E. coli* and *Candida* fungi. However, this essential oil did affect *C. tropicalis* and *C. krusei* but it did not affect *C. albicans. Abies alba* L. displayed bacteriostatic activity on *Citobacter***,** and high antimycotic activity against *C. albicans. Pinus silvestris* L. essential oil revealed low antimicrobial activity on *Citobacter* and *C. albicans* bacteria. *Salvia officinalis* L. essential oil showed low to moderate activity against microscopic fungi of *Candida* genus and *E. coli*. **Conclusion / Discussion:** The obtained results have proved the actuality further studies of the essential oils impact upon bacterial isolates, including those with multiple resistances to medical preparations.

Keywords: antimicrobial activity, essential oils

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ORAL PRESENTATION

BIOACTIVITY GUIDED ISOLATION OF A MEGASTIGMAN GLYCOSIDE FROM *MALVA NICAEENSIS* ALL.

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Objective / Purpose: The genus *Malva* is represented by 9 species in Turkish Flora [1]. *Malva nicaeensis* which is a herbaceous perennial plant has been used for the treatment of cough, fever, poisoning, gastrointestinal complaints, cancer and gynecological diseases and also externally as painkiller, wound healer, against rheumatism and burns[2-5]. Up to date, terpenes, phenolic compounds, flavonoids and anthocyanin compounds were isolated from *Malva* species. However, no phytochemical studies on *Malva nicaeensis* have been found. In the present study we aimed to isolate the major metabolite of the active sub-extract of *M. nicaeensis*.

Material and Methods: The aerial parts of *M. nicaeensis* were extracted with methanol. The crude methanol extract was dispersed in water and partitioned with chloroform and ethyl acetate, respectively to obtain sub-extracts. Radical scavenging activity of the methanol extract and all subextracts were examined using DPPH test. The structure of the isolated compound was identified on the basis of 1D- and 2D-NMR experiments.

Results: Among the tested sub-extracts, water sub-extract showed the radical scavenging activity (60% inhibition) at the dose of 198 µg/mL. Phytochemical studies on water sub-extract led to the isolation of a megastigman glycoside; roseoside.

Conclusion / Discussion: This is the first study which reports the isolation of a megastigman glycoside from *M. nicaeensis.* Biological activity test results support the ethnobotanical data of the plant.

Keywords: *Malva nicaeensis*, roseoside, megastigman glycoside, Malvaceae, DPPH.

Acknowledgement: This research was supported by Karadeniz Technical University (BAP 1202).

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ORAL PRESENTATION

SOLVENT NATURE INFLUENCES THE EFFECTS OF *MELISSA OFFICINALIS* EXTRACT ON THE MILK MICROBIOME IN COWS WITH SUBCLINICAL MASTITIS

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Objective/Purpose: Mastitis represents one of the most economically impacting diseases of dairy cows, also due to the difficult to diagnose subclinical development. Antibiotics used heavily in its treatment are less and less efficient, therefore therapeutic alternatives have to be found. In this study the influence of the extraction solvent on the antimicrobial effectiveness of *Melissa officinalis* was assessed on subclinical mastitis microbiome.

Material and Methods: Milk and blood samples were harvested from dairy cows at the peak of the lactation. N/L ratios from the blood were calculated as stress indicators (Panoptic stain) to estimate the degree of stress induced by the subclinical disease. The microbiome components were identified by use of classical bacteriological methods and cultivated against *M. officinalis* alcoholic extract and essential oil in the Kirby-Bauer well diffusion method. The statistical significance of the differences between the groups was interpreted by Student-s t test.

Results: N/L ratios indicated significantly increased stress levels ($p<0.01$) in sub-clinically affected animals (1.24±0.69) than in the healthy ones (0.56±0.12). In mastitic microbial strains, *Melissa* tincture was less effective than the essential oil (11.3±3.6mm versus 12.3±4.3mm) but comparable to amoxicillin**,** amoxicillin/clavulanic acid and higher than cefoperazone (total resistence). In healthy milk strains the effects were more pronounced for the essential oil than for the tincture (13.0±8.2mm versus 18.67±7.0mm) and higher than in cefoperazone (15.67±3.2mm).

Conclusion/Discussion: *Melissa officinalis* tincture and essential oil proved to be efficient against bacteria from mastitic milk, depending more on the strain than on the solvent type also suggesting a therapeutic alternative to antibiotic treatment.

Keywords: subclinical mastitis, microbiome, medicinal plants, dairy cows, bacteria

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ORAL PRESENTATION

GALANTAMINE AND LYCORINE CONTENTS AND ANTIOXIDANT ACTIVITIES OF THE TURKISH GIANT SNOWDROP

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Background: Galanthamine and lycorine, named *Amaryllidaceae* alkaloids, exhibit various pharmacological activities [1]. Galanthamine is used for the treatment of mild and moderate cases of Alzheimer's disease. Lycorine has been proven to have a wide spectrum of biological activities.

Objective / Purpose. The objective of the present study is to determine Galanthamine and lycorine contents and antioxidant activities of the extracts obtained from four plant organs (root, leaf, bulb and flower) harvested at three growing stages (at the beginning of flowering, post flowering and fruit ripening) of *Galanthus elwesii* Hook, the Turkish Giant Snowdrop.

Material and Methods: The plant material was grown in Amasya province of Turkey during autumn-winter growing period in 2016-2017. The plant samples were taken from four plant organs (root, leaf, bulb and flower) and at three growing stages (at the beginning of flowering, after flowering and fruit ripening). The air-dried samples were subjected to extraction with methanol previously acidified with 10 % dilute solution of CH_3COOH, which was subsequently rendered alkaline, following with 25% dilute NH_3 solution and then extracted with a chloroform. The extract was quantified by HPLC. The analysis of galantamine and lycorine was performed on Schimadzu Liquid Chromatograph with diode array detector [2]. Antioxidant effects of the extracts were detected via DPPH radical scavenging activity, reducing activity and metal chelating activities using spectrophotometrical methods.

Results: The highest Lycorine content was obtained in the leaf samples harvested at fruit ripening stage, but no Lycorine was detected in the root samples. On the other hand, the bulb samples harvested at post flowering produced the highest Galanthamine content, whereas there was no Galanthamine in the root samples.

Conclusion / Discussion: The results indicated that Galanthamine and Lycorine alkaloids had a high level of antioxidant activity.

Keywords: *Amaryllidaceae*, Alkaloid content, Antioxidant activity, *Galanthus elwesii* Hook

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ORAL PRESENTATION

EFFECT OF LIGHT ON BIOSYNTHESIS OF ALKAMIDE, CAFFEIC ACID DERIVATIVES AND ECHINACOSIDE IN *ECHINACEA PURPUREA* L. CALLUS CULTURES

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Background: Light is not only effective in photosynthesis, growth and development, but also play an important role in biosynthesis of primary and secondary metabolites by increasing phenylalanine ammonia lyase (PAL) activity in cell cultures.

Objective: The present study was aimed to determine effect of light on biosynthesis of alkamide, caffeic acid derivatives and echinacoside in cell suspension cultures of *Echinacea purpurea* L.

Material and Methods: The sterile plants were obtained from the seeds germinated in a medium including 2.0 mg/l BAP+0.01 mg/l IBA+2.0 mg/l GA_3. The stem explants taken near the root zone were subjected to callus culture in a B5 media containing 1.0 mg/l BAP and 2.0 mg/l NAA. Afterward, 8-day cell cultures were incubated in light and dark environments and cell harvesting, with a three-day interval, was carried out five times. The contents of alkamide, caffeic acid derivatives (caftaric, chlorogenic, and cichoric acid) and echinacoside were determined using HPLC.

Results: The amount of alkamide, caftaric acid and echinacoside increased regularly with light application, depending on incubation time. Among caffeic acid derivatives, on the other hand, chlorogenic and cichoric acids were not detected in the cell cultures evaluated. Light application increased alkamide content by %319.1, as the highest 530 µg g^{-1} dw in the cells with the longest time of incubation, compared to dark condition. The highest caftaric acid and echinacoside accumulations, however, were observed in the cells subjected to light for 12 days, as 120.6 µg g^{-1} dw and 196.32 µg g^{-1} dw, respectively.

Conclusion: This study showed that light application in cell suspension culture of *Echinacea purpurea* L. had great potential for increasing certain important phytochemical compounds.

Keywords: Caftaric acid, Elicitor, Purple coneflower, Secondary metabolites

ORAL PRESENTATION

DETERMINATION OF ANTIOXIDANT ACTIVITY AND TOTAL PHENOLIC CONTENT OF *DIGITALIS LAMARCKII* EXTRACTS

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Objective / Purpose: *Digitalis* spp. are known as foxglove. The first use of foxglove as a medicine was in 1785 by Withering. *Digitalis* species contain biologically active compounds such as cardenolides, phenylethanoid glycosides, flavonoids, and anthraquinones.[1] In this study, total amount of phenolics and antioxidant activities of extracts of *Digitalis lamarckii* Ivanina collected from alpine region of Giresun Mountains was determined by UV-Spectrophotometer.[2]

Material and Methods: All parts of specimens were subjected to maceration and Soxhlet extractions with methanol. Folin-Ciocalteu assay was used to determine the total phenolic contents of the extracts.[3] Antioxidant activities of the extracts were evaluated by UV-spectrophotometer. The possible antioxidant activities of extracts were screened by free radical scavenging activity method. DPPH (2,2-diphenyl-1-picrylhydrazyl) and ABTS (2,2-azinobis-(3-ethylbenzothiazoline-6-sulfonic acid)) were used antioxidant activity analysis. BHT, BHA, Gallic Acid, α-Tocopherol, Trolox, Ascorbic acid were used as a standart. [4,5]

Results: While the total phenolic contents of soxhlet extracts were revealed to range from 58,82 to 153,42 mg GAE/g maceration extraction extracts were 59,84 to 159,84 mg GAE/g, respectively. The obtained results have shown that all parts of the species have normal level antioxidant properties.

Keywords: ABTS, antioxidants, *Digitalis lamarckii*, DPPH, total phenolic content.

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ORAL PRESENTATION

INFLUENCE OF ASPARAGUSIC ACID AND STERODIAL SAPOGENIN IN DIABETIC NEPHROPATHY

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Objective / Purpose: Diabetic nephropathy relates to a complex lesion arteries, arterioles, tubules and glomeruli of the kidneys, resulting errors of metabolism of carbohydrates and lipids in kidney tissues. Unfortunately, at treatment of mentioned disease, the major factor that has a toxic effect on the body is a high concentration of creatinine and increased blood pressure of the patient. In the scientific literature, there are numerous data on the positive effect of the decoction shoot asparagus for the treatment of kidney diseases. We found that the active substance is much more in the root than in the shoot. The extracts obtained from the multi-root *Asparaqus polphyllus Stev*., Very close to the species *A. offisianalis*, suppress the formation of creatinine without affecting the glomerular filtration rate. In contrast to type *A. offisianalis*, in the roots of *A.polphyllus* asparagusic acid (ASa) and steroidal sapogenin (SAS) is localized in 2 times more.

Material and methods: In order to obtain an extract in this study we used *A.polphyllus* roots of wild flora of Azerbaijan. The roots were collected in the vicinity of the Goy-Gol l region in September 2016. ASa and SAS were obtained from the feed using the polyamide chromatography method, as well as the microwave plant extraction method. The sarsasapogenin saponin can be extracted from the dried powdered root with 95% ethanol. After removal of the fat from the resulting gum, the glycoside linkage is hydrolyzed with hydrochloric acid (approx. 2 M) and the resulting crude steroid is recrystallized from anhydrous acetone.

Results: Our results showed that ASa and SAS obtained from the root extract by blocking the receptors slowed down and suppressed the action of angiotensin II. Eliminates the vasoconstrictive effect of angiotensin II, reduces the concentration of aldosterone in the plasma. This is probably related to the binding of the sarsagenin-receptor complex to DNA and can cause amplification of mRNA expression that encodes cholinergic, dopaminergic or adrenergic or membrane-bound receptors. The parallel action of ASa and SAS has an effect on the membrane, organoid and metabolic level. It is assumed that the effect of the compounds described in this study can be explained by participation in the processes of G-protein adhesion receptor regeneration or G-protein homeostasis. In patients receiving the A.polphyllus root extract, the level of the kliros of creatine urea blood due to the vasodilating acting ASa and SAS is reduced to normal; the arterial pressure is stabilized to 120/80. In addition, the itching disappears.

Conclusion / Discussion: Based on the ethnobotanical sources and manuscripts of the Institute of Manuscripts of the Academy of Sciences of Azerbaijan, it can be concluded that the extract obtained from the roots of A.polphyllus relieves edema in kidney diseases. In order to find out what became the source of inhibition of angiotensin II, further studies are needed. In kidneys, where the enzyme ASa utilizes amine compounds, the formed ammonia is combined with inorganic salts and is excreted in the urine. Asparagusic acid bind, transport and utilize biologically active nitrogen. In fact, all the nitrogen involved in the metabolism passes through the amino acids. ASa contributes to the maintenance of nitrogen balance in the body.

Key words: asparagusic acid, steroidal sapogenin, aldosterone, angiotensin II

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ORAL PRESENTATION

DROUGHT STRESS-INDUCED PHYSIOLOGICAL AND BIOCHEMICAL CHANGES IN OPIUM POPPY (*PAPAVER SOMNIFERUM* L.) CULTIVARS UNDER *IN VITRO* CONDITION

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Objective / Purpose: Opium poppy (*Papaver somniferum* L.) is a very important medicinal plant cultivated for seed, oil and opium for food, perfume, cosmetic and medicinal industries [1]. Unsuitable climatic conditions influence the plant growth and cause some biochemical changes [2,3]. Drought is also one of the most important stress factors affecting the opium poppy plants. *In vitro* techniques provide to determine the effects of stress factors on plants in a short time and under controlled conditions. This study was carried out to determine the effects of drought stress on the growth, development and biochemical properties in some opium poppy cultivars.

Material and Methods: *In vitro* plants obtained from the seeds of four different opium cultivars (TMO-3, Tınaztepe (TT), Zaferyolu (ZY) and Kemerkaya (KK)) were cultured in ½ Murashige and Skoog media added 1 mg l^{-1} gibberellic acid, 0.1 mg l^{-1} indol-3 acetic acid, 3% sucrose, 0.6% agar and different concentrations of PEG 6000 (0%, 2% and 4%). Plants were cultured in this media for 8 weeks. Then, germination rate, injure index, shoot length, plant weight, chlorophyll and proline contents, lipid peroxidation and antioxidant enzyme activities (SOD, CAT and APOX) were examined to determine the effect of drought stress in harvested plants.

Results: In this study, all of the investigated parameters were affected by the applications of PEG. An increase in PEG led to reduction in germination rate, shoot length and fresh plant weight and chlorophyll content. The most striking result is that the fresh plant weight was reduced 77.65% in plants applied with 4% of PEG compared to control plants. Based on the result, An increase in PEG led to reduction chlorophyll content while and proline, lipid peroxidation and antioxidant enzyme activities increased depending on rising of the PEG concentrations.

Conclusion / Discussion: As a result of this research, PEG treated plants compared to control plants, were negatively affected by drought stress induced by PEG and there were important differences among opium poppy cultivars in terms of resistance to drought.

Keywords: *Papaver somniferum*, polyethylene glycol, drought, proline, enzyme activity

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ORAL PRESENTATION

KARYOMORPHOLOGICAL FEATURES OF SOME TAXA BELONGING TO SUBGENUS *CYANUS* (*CENTAUREA*, ASTERACEAE)

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Objective / Purpose: The aim of this study is to determine karyomorphological characteristics of some taxa belonging to subgenus *Cyanus.*

Material and Methods: Between the years 2014-2017, many specimens were collected from different localities and populations belonging to subgenus *Cyanus* during the field studies. Mature achenes were selected and periodically germinated for chromosomal analyses. Chromosome counts were made on somatic metaphases in root tips using the squash technique. After germinating, the root tips were pretreated by 8-hydroxyquinoline and fixed by the Carnoy solution. Before staining, root tips were hydrolyzed with 5-N HCl, and stained with 1% aceto-orcein. At least 10 metaphases were examined per taxa; the best metaphase plate was photographed. Moreover, the coefficient of variation of the chromosome length (CV_{CL}), coefficient of variation of the centromeric index (CV_{CI}) and mean centromeric asymmetry (M_{CA}) were calculated. Idiograms and karyograms of these taxa were made by using the KAMERAM analysis system.

Results: The somatic chromosome number was counted as 2n=20 for *Centaurea tchihatcheffii* Fisch.&Mey., *C. pichleri* Boiss. subsp. *extrarosularis* (Hayek&Siehe) Wagenitz, *C. woronowii* Bornm. and *C. reuteriana* Boiss. var. *reuteriana.* Besides with *C. bourgaei* Boiss., *C. germanicopolitana* Bornm., *C. mathiolifolia* Boiss., *C. pichleri* Boiss. subsp. *pichleri*, *C. huetii* Boisss. and *C. triumfettii* subsp. *axillaris* (Čelak.) Stef. & T. Georgiev have 2n=4X=40 chromosome numbers. Six taxa have tetraploid chromosome numbers while four taxa have diploid chromosome numbers. AI, A1, A2, CVCL, CVCI and MCA indexes were calculated for all taxa. According to the asymmetry indices it can be concluded that most of the taxa have symmetric karyotype. The most common karyotype formulas respectively 40m, 20m and 16m + 4sm. Satellites were identified in karyograms of most of taxa.

Conclusion / Discussion: As a result of our study, we conclude that there are significant differences between chromosomal differences between chromosomal characteristics in *Centaurea* subgen. *Cyanus* and the reported notes about the intraspecific variation may be useful for taxonomy.

Keywords: Karyomorphology, Endemic, *Cyanus*, Compositae, Turkey

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ORAL PRESENTATION

PH AND TEMPERATURE INFLUENCE ON STABILITY OF BIOPHENOLS IN OLIVE LEAF EXTRACT DURING STORAGE

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Objective: Olive production is carried out in 37 countries on almost 10 million hectares of land with 890 million olive trees. Approximately 98% of the olive tree on the earth is located between the latitudes of 30-40° in the northern hemisphere and generally in the Mediterranean basin [1]. Turkey has more than 10% of the world olive groves and olive trees with 95 million olive trees spreading 877 thousand hectares [2]. On the other hand, olive and olive oil production generate large amounts of leaves, representing approximately 10% of the total weight of olives arriving to the mill. Considering the intensive trend towards natural products and the great development in the cosmetics industry, it is necessary to realize the seriousness of olive leaves which is a very important resource with low cost and high availability and to work on this matter.

Material and Methods: Olive leaves extracts were prepared under the optimized parameters of homogenizer-assisted extraction (HAE). Spectrophotometrically the antioxidant activities, and the total phenolic contents in extracts were measured. For more accurately the High-performance liquid chromatography analysis was used to determine the main individual phenolic compounds of the extract. The relations between total phenolic contents and antioxidant of extracts were also founded. We investigated the effect of pH and temperature on the concentration of the total /individual phenolic contents and antioxidant activities for olive leaf extracts.

Results: All the ethanolic extracts of olive leaves were prepared with the different pH (4, 7, and 10) values. The degradation of many drugs in solution accelerates or decelerates exponentially as the pH is decreased or increased over a specific range of pH values. In the present study, polyphenolic compounds are degraded when exposed to basic media. When the temperature effect is considered, 4°C of the refrigerator and ambient conditions had the same influence on the stability of the major compound of the olive leaf, oleuropein.

Conclusion: The concentration of oleuropein at pH 7 was relatively stable for 330 days while it was relatively stable for 365 days at pH 4. On the other hand, oleuropein at pH 10 was stable for 21 days. Regarding temperature conditions, samples at -20 ˚C has been maintained stable for more than 16 months.

Keywords: Oleuropein; stability;degradation; pH; temperature.

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ORAL PRESENTATION

A TRADITIONAL REMEDY RUBUS SANCTUS SCHREBER ROOTS AGAINST HEMORRHOID- *IN VIVO*

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Objective / Purpose: Hemorrhoidal diseases are common illnesses worldwide. Patients have tried to cope with the disease with both herbal and chemical products. Rubus species from Rosaceae, are the most commonly used plants in traditional therapy in Turkey. Their root decoction consumed as tea to heal the hemorrhoidal symptoms [1-2]. In this study, we examined *in vivo* antihemorrhoidal activity of *Rubus sanctus* Schreber root extracts.

Material and Methods: Hemorrhoid was induced by croton oil in rats. Then *R. sanctus* methanolic extracts were implemented both externally (50%) and internally (250 mg/kg and 500 mg/kg). A commercial herbal product was used as positive control. After 7 days of the treatment, the animals were anesthetized, intracardiac blood samples were taken and separated into serum to determine TNF-α and IL-6. Sacrified animals were weighed, then 2 cm long anorectal tissues were cut and weighed to calculate anorectal coefficient (ARC). Then the tissues were fixed in formaldehyde (10%) for histopathological and immonohistochemical evaluations [3-5].

Results: According to ARC scores, biochemical and histopathological results, *R. sanctus* methanolic extract showed higher biological activity than the positive control. Also, the activity increased as the dose increased in oral administration. Results will be discussed.

Conclusion / Discussion: The effectiveness of the traditional usage has been proven on the scientific platform. It is aimed to elucidate the phytochemical content and to determine the active compound/compounds by means of further studies.

Keywords: Hemorrhoid, *in vivo*, *Rubus*, croton oil

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ORAL PRESENTATION

PROXIMATE COMPOSITION AND EVALUATION OF ANTIOXIDANT ACTIVITY, TOTAL PHENOLIC AND FLAVONOIDS CONTENTS OF TWO ALGERIAN MEDICINAL PLANTS; GARLIC (*ALLIUM SATIVUM L.*) AND RED ONION (*ALLIUM CEPA L.*)

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Garlic (*Allium sativum L.*) and Onion (*Allium cepa L.*) are ones of the most promising medicinal herbs known from ancient times having nutritional value. Secondary metabolites found in these medicinal plants play an important role in curing different diseases. Therefore the present study aims to determine the physico-chemical characteristics of local varieties of garlic and onion and their phytochemical profile and to evaluate the antioxidant activity of these plants.

The physico-chemical analysis carried out was pH, titratable acidity, moisture, ash, total soluble solids, electrical conductivity, viscosity, proteins, fats, crude fiber, pectin, total and reducing sugars and minerals (sodium, potassium and calcium). It was found that these plants are good source of proteins, fats, fibers, minerals and energy.

The extract yield recorded by the maceration method was 62.87%, 57.38% for garlic and onion respectively. The determination of total phenolic compounds in methanol extract of garlic and onion using Folin Ciocalteu reagent gave an amount of 0.41 mg GAE / g DM; 10.86 mg GAE / g DM, respectively. Flavonoids contents in garlic and onion were 0.36 mg QE / g DM, 6.56 mg QE / g DM respectively. The phytochemical screening of above extracts revealed the presence of flavonoids, tannins, anthocyanins, steroids, terpenoids, cardiac glycosides and mucilage. The antioxidant activity of the methanol extract of our plants was measured by the method of free radical scavenging method (DPPH) which gave IC 50 values; IC 50= 3 µg / ml, 6 µg / ml for garlic and onion respectively. This research has shown that our plants are rich in phenolic compounds, and have a considerable antioxidant capacity.

Key words: Garlic, Onion, Physico-chemical, Phytochemical, antioxidant.

ORAL PRESENTATION

CHEMICAL CHARACTERISTICS OF FIXED OIL OF LENTISK TREE (*PISTACIA LENTISCUS* L.)

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This work aimed at characterizing fixed oil of the lentisk tree (*Pistacia lentiscus* L.) from four regions in northern Tunisia. A chemical characterization of the different samples of oil was carried out by determining its fatty acid composition, quality index, structural indexes, refractive index, vitamin E content and fat content. The chemical analyses showed that this oil is rich in oleic acid (46.30%), linoleic acid (22.65%) and palmitoleic acid (1.65%) across all the four regions. The various parameters and indexes of quality and structure obtained were; acid index (21.86), peroxide index (14.88), saponification index (176.02), iodine value (8.70), Refractive index (1.46), water content (3.04%), content of insoluble impurities (2.05%) and fat content (97.05%). The oil was also rich in alpha tocopherol (45.63 mg / 100g) and gamma tocopherol (20.17 mg / 100g). These results indicate that the composition of the fixed oil is not dependent on the origin of the lentisk tree, but rather on the individual tree and the processing of the fixed oil. Therefore, it is important to take the necessary precautions, such as avoiding contamination, while processing the oil and also that individual trees need constant monitoring and care so as to ensure maximum growth potential.

Key words: Fixed oil, chemical analyses, fatty acids, quality indexes

ORAL PRESENTATION

IN VITRO AND IN VIVO EVALUATION OF ANTIOXIDANT ACTIVITY OF *EPHEDRA ALTE* EXTRACT*

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Objective: The aim of the present study was to evaluate the *in-vitro* and *an in-vivo antioxidant activity of different extracts* from the *Ephedra alte* which growing wild in northern Jordan.

Material and Methods: Stem and flowers samples of *Ephedra alte* plant were extracted using different solvents namely; butanol, methanol, water and hexan. The *in-vitro* antioxidant activities were examined by four different procedures including DPPH radical scavenging, ABTS radical scavenging, ferrous ion chelating effect and hydroxyl radical assay methods. Moreover, the *in-vivo* effects of different doses of the stem butanol extract on the activities of serum and liver superoxide dismutase (**SOD**) and catalase (**CAT**) activities were measured in mice.

Results: All extracts showed different levels of radicals scavenging activity, however, the butanol extract of the stem and the flower of *E.alte* exhibited strongest DPPH, ABTS radical scavenging and ferrous ion chelating activity compared to other extracts. In addition, the IC50 values of the of the DPPH, ABTS and ferrous chelating activity were the lowest when using the butanol extract of stem and flower of *E.alte* compared to other extracts, indicating the high antioxidative capacity of the butanol extract. As well, significant increases in both liver and serum CAT enzyme activity and in serum SOD activity were observed in mice after 12d treatment with different doses of the stem butanol *E.alte* extract.

Conclusion: These results suggested that the butanol extract of *E.alte* exhibited high antioxidant activity both *in vitro* and *in vivo* that can be an important source for natural antioxidants.

Keywords: antioxidant, *Ephedra alte*, *in vitro*, *in vivo*, butanol extract

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ORAL PRESENTATION

EFFECT OF LED DRYERS ON FOOD CHARACTERISTICS OF HAZELNUT (*CORYLUS AVELLANA* L.)

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Background: There has recently been an increasing interest focusing on hygienic drying systems which will protect hazelnut food quality as reducing moisture content to 6%, shortening drying time, dropping the cost, eliminating kernels' touch to soil surface and not causing kernel quality losses.

Objectives: A large amount of world hazelnut production has been provided by the provinces located on the Black Sea coast of Turkey. Hazelnut harvest in the region is practiced in August and September, a period of rather rainy and humid. However, hazelnut has mostly been sundried on soil surface, using a cover during rainy weather. Hazelnut drying time takes 3-7 days in dry and hot weather, while it takes longer than 15 days in rainy weather which results in aflatoxin formation and quality losses. In view of these, the present study was carried out aiming to determine the effects of LED dryers on food characteristics of hazelnut.

Methods: In this experimental study, a drying system with natural circulation and LED using three different color temperatures (3000 K, 4000 K and 6500 K) is designed and then manufactured. The kernels of Tombul hazelnut (*Corylus Avellana* L.) variety collected from Giresun province were dried at three diameters (14-15 mm, 16-17 mm and 18 mm and above) and three LED distances (L = 5 cm, 10 cm, 15 cm) using the designed system. Furthermore, hazelnuts were oven and sun dried to make sound comparisons. Time-dependent kernel mass loss, ambient temperature, kernel inner temperature, aflatoxin formation along with protein, fat, total phenolic compound, total flavonoid content of the kernels and antioxidant activities were determined.

Results: As a result of drying with three LED color temperatures, no aflatoxin (B1, B2, G1, G2) growth was recorded in hazelnut kernels. LED drying with different colors resulted in a decrease in oil content by 2,17%, as compared to the sun drying. The oil rate decreased by 1% depending the distance between kernel and increasing LED. LED drying increased the content of total phenolic compounds by 55,84%, in comparison to the sun drying. Based on LED color temperatures and distances, kernel protein contents slightly varied, within the range of 13.5% lower and 6.2%, when compared to sun drying.

Conclusion: The results of the present study suggest that drying systems using LEDs are suitable for hazelnut because they lead to slight changes in nutritional properties of kernel, reduce drying time and consequently lower labor and energy costs.

Keywords: Aflatoxin, Hazelnut drying, Hazelnut quality, LED color temperature, Sun drying.

ORAL PRESENTATION

INVESTIGATION OF THE ACTIVITIES AND SYNERGISTIC POTENTIALS OF COLON TARGETED GLYCYRRHIZIC ACID AND ROSMARINIC ACID IN THE EXPERIMENTAL ULCERATIVE COLITIS MODEL*

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Objective / Purpose: Ulcerative colitis (UC) is a pathogenesis is not fully elucidated chronic inflammatory bowel disease which oxidative stress, genetic effect, immunological abnormalities and environmental agents plays a role in its etiology. Rosmarinus officinalis which is known as biberiye has been using in ethnomedicine due a to numbers of pharmacologycal effects include antioxidant, antiulcer and anti-inflammatory effects of its major component of plant rosmarinic asid (RA) has been shown by studies. Glycyrrhizic acid (GA) or glycyrrhizin is a natural pentacyclic triterpenoid glycosides of licorice root and has many effects such as antioxidant, antiulcer and anti-inflammatory. The purpose of this study was to investigate the possible protective effects and synergistic potentials of colon targeted RA and GA in dextran sulfate sodium induced UC model in rats.

Material and Methods: The active principles administirated to animal by gavage after mix with succinylated chitosan and then lyophilized for targeted to the colon. A total of 48 Wistar albino rats were used in the study. The rats were divided into 8 groups with 6 in each group. The colon tissue that was taken at the end of the experimental *in vivo* model; MDA, GSH, CAT and GPx parameters by spectrophotometrically, TNF-α by ELISA, and Cox-2, Nrf-2 and NF-kB expression levels by Western blot were examined.

Results: In conclusion, it has been determined that targeted RA and combinations were caused histopathologically marked decrease in necrosis and inflammation severity, increase in Nrf-2, GSH and GPx levels ($p<0.05$), decrease in the levels of MDA, TNF-α and NF-kB in UC model ($p<0.05$). On the other hand, targeted GA increased Nrf-2 and GSH ($p<0.05$) while decreased MDA, TNF-α, Cox-2 and NF-kB ($p<0.05$).

Conclusion / Discussion: Treatment by targeted RA was found to be more effective than targeted GA in UC induced by dextran sulfate sodium (DSS). In addition, These data indicate that the combinations might have medicinal effect against DSS- induced UC in rat also.

Keywords: Ulcerative colitis, colon targeting, rosmarinic acid, glycyrrhizic acid, protective effect.

Acknowledgements:
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ORAL PRESENTATION

ADAPTATION OF ORNAMENTAL PLANTSIN A SEMI-ARID AREA: CASE STUDY KILIS, TURKEY

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Objective/Purpose: This article is about production or propagation, selection, adaptation and transplantation of ornamental plants to the climatic conditions, but also about the identification of the ornamental plants encountered in the Kilis region. In this document I refered strictly to the research area, Kilis, more precisely, the area where the Kilis 7 Aralik University is located, the place of analysis and my source of inspiration.

Materials and Methods: Briefly, some general information about the area,the methods used for propagation, the criteria used for selection of appropriate species as ornamental purposes were showed in this manuscript. At Kilis 7 Aralik University greenhouse, the propagation was based on two main methods cutting and seeding. For this application, we used the notes from the archive of botany department and another written evidence and also the fieldwork.

Results: We identified 40 families of different plants, with 88 species that are being represented by 13137 entities, that are being propagated through two main modes, sexual and asexual.

Conclusion/Discussion: We can affirm that there is not just one reproduction type used more than the other one, but the both proliferation methods are used in the same average. It is worthy to note that the current work does not only landscaping perspective but also especially biological aspects.

Key words: adaptation, ornamental plants, propagation, semi-arid region, Kilis, Turkey

ORAL PRESENTATION

EFFECT OF SALICYLIC AND GIBBERELLIC ACID ON CANOLA GROWTH UNDER SALINITY CONDITIONS

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Background: In agricultural production, one of the limiting factors on plant growth and yield is soil salinity. The plant growth regulators are of considerable importance in alleviating the negative effect of salt stress.

Objectives: This study was carried out to determine the effects of salicylic (SA) and gibberellic acid (GA3) on the growth and some physiological characters in canola (*Brassica napus* L.) under salinity conditions in greenhouse.

Material and Methods: For this purpose, a factorial experiment set up as completely randomized design was conducted with three levels of SA (0, 0.5 and 1 mM) and GA3 (0, 50 and 100 mg kg^{-1}) and four levels of NaCl (0, 50, 100 and 150 mM) with three replications. In the study, leaf area, plant height, electrolyte leakage, chlorophyll content, relative water content (RWC) and the loss of leaf turgor were investigated.

Results: Salt treatments reduced significantly all of the considered parameters, compared with the control, but chlorophyll content (SPAD units) of canola did not change with increasing salt levels. Salinity caused a significant reduction of 63 and 67% in plant height and leaf area, respectively, as compared to the control plants. On the contrary, electrolyte leakage was markedly increased (six fold) with increasing NaCl levels. Gibberellic acid increased significantly plant height and relative water content and reduced the loss of leaf turgor, without a significant improve in other parameters.

Conclusion: The results indicated that application of SA and GA3 to salinity stressed plants did not significantly affect canola vegetative growth. However, GA3 caused a partial decrease in the adverse effect of salinity.

Key Words: *Brassica napus* L, plant growth regulators, rapeseed, salt stress, turgor loss

ORAL PRESENTATION

EFFECTS OF *VERBASCUM SPECIOSUM* ON WOUND HEALING

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Abstract: *Verbascum* spp., of which 196 out of 232 species presented in the literature are endemic in Turkey flora, are one of the worldwide used medicinal plants. These species include various clinically important constituents including flavonoids, saponins, phenylethanoid, neolignan, iridoid and monoterpene glycosides. Apart from its antifungal activity, *V. speciosum* is a well-known herb used externally for treatment of wounds, cuts and skin disorders in the Black Sea region of Turkey. [1-3]

Preparation of Plant Material: *V. speciosum* (Istanbul University Science Faculty Herbarium, Istanbul, deposition number 21530) leafs were collected in 2014 from Trabzon-Akçaabat region at 100 m altitude.

The leaves were air dried at room temperature in a dark place and were thoroughly grounded. Powdered plant leafs (15 g) were subjected to methanol extraction in 500ml methanol using a soxhlet extractor for 48h at room temperature. The extract was filtered through Whatman filter paper (no:1) and methanol was evaporated by using a rotary evaporator (BÜCHI Labortechnic AG, Flawil, Switzerland) at 40 °C.

The concentrated material was lyophilized by a freeze dryer and stored at 4 °C until the animal experiments. Before starting *in vivo* experiment, the prepared extract was added to a vaseline-based cream at 5% and 10% (w/w) ratio.

Results: Although it was not confirmed by the histological studies, macroscopical analysis indicates that *V. speciosum* would be a potent wound healing agent. In addition, considering the long-term use of plant for the treatment of burn and cut wounds by local people, more detailed studies should be strictly conducted to arrange optimum dose and formulation to explore full wound healing potential of the plant.

Keywords: Plant extract, wound healing, *Verbascum*

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ORAL PRESENTATION

MEDICINAL PLANT *ORIGANUM* L. (LAMIACEAE) AND THEIR NUTLET MORPHOLOGY

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Objective/Purpose: The scanning electron microscopy (SEM) is useful instrument for analyzing the nutlet surfaces. In this study we have aimed to investigate nutlet surfaces of Turkish *Origanum* L.species in the light of new systematic developments by SEM. **Introduction:** *Origanum* L. (Lamiaceae, subfam: Nepetoideae, tribe: Mentheae, subtribe: Menthineae) is one of the well-known genera of Lamiaceae. It has been used as spice and herbal tea through folk medicine. It is utilized for relieving indigestion, diabetes, stomach ache and rheumatic pain. The species have antibacterial, antifungal and antioxidant activity. Some of them are used in cosmetic products. Carvacrol and thymol are the main constituents of the essential oil of *Origanum* species. Furthermore, linalool and p-cymene are common among the major components (1-5). The genus was reported to have 21 species in the revision conducted by Ietswaart in the Flora of Turkey (6). The species are classified into 8 sections. With additional studies, the number has reached to 23 species (26 taxa) and 5 hybrids, 18 of which are endemic (6-11). Mediterranean area is the main origin of the species. Likewise, endemic species are concentrated in Mediterranean area, in Turkey (6). **Material and Methods:** Nutlet surface of 30 taxa of *Origanum* were analyzed in 4 taxa of the sect. *Amaracus* (Gleditsch) Vogel.; 3 taxa of the sect. *Origanum*; 2 taxa of the sect. *Anatolicon* Benth.; 6 taxa of the sect. *Breviflamentum* Ietsw.; 1 taxon of the sect. *Longitubus* Ietsw.; 3 taxa in sect. *Chilocalyx* (Briq.) Ietsw. 1 taxon of the sect. *Majorana* (Mill.) Ietsw; 1 taxon of sect. *Prolaticorolla* Ietsw. and 7 hybrid taxa. Materials used for this study were collected from natural habitats and different localities in Turkey. Voucher specimens have been deposited in the Herbarium of the Faculty of Pharmacy, Istanbul University (ISTE). The nutlets were preliminarily observed using a light microscope to make sure that they were at normal size and maturity. For scanning electron microscopy (SEM) analysis, at least 5 samples were prepared. The samples of the nutlets were mounted on stubs and coated with gold, they were studied with a FEI Quanta 450 FEG-EDS scanning electron microscope after coated. Terminology of the nutlet ornementations follow presented based on Husain et al. 1990 (12). **Results:** Six main types in *Origanum* species can be distinguished based on surface ornamentation: type A: discoid pattern with some radiating ridges; the circles show broken wrinkles and central, shallow depressions; type B: discoid patterns with undulating ridges; type C: very shallow discoid pits, with smooth and at places poorly defined radiating ridges; type D: the irregular, shallow and patterned ridges with furrows; type E: high prominent ridges with deep furrows or tracts, type F: protuberance multicellular-protuberance pattern with circular or hexagonal outlines of variable thickness. **Conclusion / Discussion:** Consequently, these eight sections members have some distinctive nutlet ornamentation. Nutlet micromorphology provides support for separating the sections and some species. For example: discoid patterns with undulating ridges (type B) are found sect *Origanum* and *Anatolicon*; the irregular, shallow and patterned ridges with furrows (type D) are found sect. *Longitubus, Chilocalyx* and *Prolaticorolla*. Some taxa have remarkable nutlets ornemantation. For example, protuberance (type E): *O. majorana* L. and *O. onites* L., very shallow discoid pattern (type C): *O. husnucan-baseri* H.Duman, Aytac & A.Duran. discoid pattern with some radiating ridges (type A): *O.* x *sevcaniae* nothosp. nov. and high prominent ridges (type E): *O. aylinae* Dirmenci & Yazıcı. Type B is the most common surface feature **on *Origanum* species.** Besides that, micromorphological characters must be supported by distinctive morphological, molecular and biogeographical characters.

Keywords: *Origanum*, Lamiaceae, nutlet, micromorphology

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ORAL PRESENTATION

TARGET CELL TYPE DEPENDENT IMMUNE ACTIVITY OF PLANT EXTRACTS IN BOVINE RAISED UNDER DIFFERENT TECHNOLOGIES

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Objective / Purpose: Innate and adaptive immune responses, key to appropriate defense against diseases differ in their development dynamics and are both influenced by raising technologies in bovine. This study aimed to identify the differences in activity of plant extracts on phagocytosis and blast transformation of cells from bovine raised in extensive and semi-intensive systems.

Material and Methods: Blood samples from dairy cows raised extensively and semi-intensively were subject to *in vitro* testing for their phagocytic activity (carbon particle inclusion test) and blast transformation capacity (glucose consumption test). Alcoholic extracts of medicinal plants were used as potential stimulating agents. Stimulation indices (%) were calculated compared to a glucose control. The Excel program was used to process the data.

Results: The phagocytosis was highly enhanced by the *S. marianum* extract in semi-intensively raised when compared to the extensively raised cows (0.023±0.04 and 0.160±0.069, respectively). In the *in vitro* blast transformation test, *S. marianum* acted more stimulating in extensively than in the semi-intensively raised animals (55.22±11.10% and 50.56±9.82 respectively), with significant differences when compared to the other extracts ($p<0.0002$). All the plant extracts used were inhibiting in the blast transformation test, but to a lesser extent in semi-intensively raised animals. Correlation coefficients between the phagocytosis and blast transformation in the presence of *S. marianum* extract were non significant.

Conclusion / Discussion: The immune effects of various plant extracts were dependent on cell type (small phagocytes or lymphocytes/monocytes) and also on the raising system, allowing the choice of immune modulating compounds in dairy cows.

Keywords: ***in vitro,*** medicinal plants, immune cells types, raising system, dairy cows

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ORAL PRESENTATION

CHANGES ON ESSENTIAL OIL COMPOSITION DURING DAYTIME OF *OCIMUM BASILICUM* L. LEAVES AND FLOWERS

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Objective / Purpose: Chemical composition of the essential oils is mainly affected by genotype, environment, cultivation and growing conditions. Harvest time during the day is an important agricultural factor which effects many medicinal and aromatic plants. But there are limited studies about the diurnal variation of the essential oil components of *Ocimum basilicum*. Water-distilled essential oil of leaves and flowers of *Ocimum basilicum* L. from two different daytimes were analyzed by gas chromatography-flame ionization detector (GC-FID), gas chromatography/mass spectrometry (GC/MS).

Material and Methods: This study was carried out in the experimental field of Eskişehir Osmangazi University, Faculty of Agriculture, Department of Field Crops in 2010. In this study, the effect of different harvesting hours on the essential oil components of *Ocimum basilicum* L. grown under Eskisehir ecological conditions were determined. The experimental design was a randomized completely block design with three replications. The plants were harvested two times a day (08:00 and 14:00) and two times during the season (first and second harvest) at the begin of flowering stage.

Results: Forty-three components comprising 99.43% of the essential oil from leaves and flowers were identified. Main components of the essential oil were found to be linalool (55.70-72.90%), methyl chavicol (11.07-28.20%), T-cadinol (2.07-4.50%), 1,8-cineole (0.70-2.27), trans-β-bergamotene (0.80-3.00%) and germacrene-D (0.70-2.63%). The classification of essential oil components were; monoterpene hydrocarbons (0.02-0.51%), oxygenated monoterpenes (59.71-75.09%), sesquiterpene hydrocarbons (5.42-8.30%), oxygenated sesquiterpenes (2.90-6.48%), aromatic compounds (%12.74-30.23) and others (%0.00-0.24).

Conclusion / Discussion: The results indicated that there were statistical differences between the first and second harvests for main components like methyl chavicol and T-cadinol. Except oxygenated monoterpenes, all groups indicated statistical differences between the first and second harvest. Aromatic compounds, monoterpene and sesquiterpene hydrocarbons increased at the second harvest when the temperature decreased compared to the first harvest. Besides, statistical differences were found between the harvest times during the day for monoterpene hydrocarbons which was increased at 14:00 o'clock harvest. Main components were not affected from the harvest during the day. But further diurnal research should be conducted in more detailed harvest frequences.

Keywords: Basil, *Ocimum basilicum* L., harvest time, essential oil components

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ORAL PRESENTATION

NUTRIENT ASSESSMENT OF WILD EDIBLE FRUITS OF FAMILY ROSACEAE FROM PALAS VALLEY, DISTRICT KOHISTAN, NORTHERN PAKISTAN

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This study determined the nutritional composition of selected wild edible fruits of family *Rosaceae* including *Duchesnea indica* (Jacks.) Focke (Mock strawberry), *Rosa canina* L. (Dog rose) and *Prunus cornuta* (Wall. ex Royle) Steud. (Himalayan birdcherry) from Palas valley, District Kohistan, Northern Pakistan. Nutritional analysis included moisture content, crude protein content, crude fiber content, crude fat content, ash content, carbohydrates content and estimated energy in dried fruit pulp. The results revealed that there were adequate proportion of carbohydrates in *Rosa canina* (20.31 g/100g), *Duchesnea indica* (10.58 g/100g) and *Prunus cornuta* (6.43 g/100g). Proximate analysis showed that *Prunus cornuta* has sufficient amount of protein (6.93 g/100g), dietary fibers (4.76 g/100g) and lipids (16.53 g/100g) which can be a beneficial energy source for poor rural communities. It is stated that the analyzedfruits were found to be a potential source of carbohydrates, lipids, dietary fibers and proteins. The cultivation and conservation of such important wild edible underutilized fruits may help to elevate their use as an alternative and potential source of important nutrients and nutraceutical constituents.

Keywords: wild edible fruits, nutritional analysis, energy estimation

ORAL PRESENTATION

PHYSICOCHEMICAL EVALUATION OF FIG AND MULBERRY SEED'S COLD PRESSED OILS

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Objective / Purpose: The use of the herbal materials as the source of complementary medicine and nutritional supplements is becoming more important with the new trends and the scientific research. In this study, two rarely found seeds' cold pressed oils- fig (*Ficus caricae*) seed oil, mulberry (*Morus alba*) seed oil for the first time - have been studied to determine the physicochemical properties of these domestic seeds for different medicinal and supplementary applications.

Material and Methods: Ficus carica, Morus alba seeds were obtained from Aydın and Adıyaman regions in TURKEY. The oil was extracted by screw press under GMP conditions. Fatty acid and sterol compositions were determined by GC and the volatile oils were analysed with GCMS. Antioxidant effect of the oils was tested for their scavenging activity against DPPH, tocopherol compositions analysed by HPLC, total phenol, flavonoid and carotenoid quantities were determined spectrophotometrically. The oils also evaluated for free fatty acid content, refractive index, peroxide and p-anisidine value.

Results: The results showed that *Ficus carica* has 22.7% oil yield and was characterised by linolenic acid (41.27%), linoleic acid (30.06%), oleic acid (18.10%) in accordance with other studies [1,2] while Morus alba's composition contained linoleic acid (80.30%), palmitic acid (8.03%), oleic acid (7.17%) with the 21% oil yield. Fenchone, cymene, d-limonene, linalool, camphor components in volatile oil of F.carica and camphene, cymene, octenal, nonanal, dodecane components in M. alba's volatile oil found useful and important for aromatherapeutic aspects. Other quality parameters for fig seed and mulberry seed oil were found for refractive index (40 0C) 1.4721 and 1.4687, peroxide value (meq O2/kg oil) 2.2 and 2.6, free fatty acid (% oleic acid) 0.90 and 1.55, p-anisidine 2.22 and 0.55 respectively. α-β-γ-δ tocopherol content found for F.carica was 6.088, 0.18, 634, 18 mg kg-1 and for M. alba it is found 3.23, 6.72, 18.21, 258 mg kg-1 respectively. Scavenging activity against DPPH, total phenol, flavonoid and carotenoid quantities and sterol analyses are under the determination process.

Conclusion / Discussion: As a result, F. carica and M.alba oils can be a good raw material for the supplements with their high content of mono and polyunsaturated fatty acids, volatile oil components, sterol and tocopherol content. More studies need to be done for both of the oils, especially for Morus alba.

Keywords: *Ficus carica*, *Morus alba*, cold pressed oil

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ORAL PRESENTATION

IMMUNE-ENHANCING CAPACITY OF PEPPERMINT (*M. PIPERITA*) IN THE ENDANGERED DANUBE SALMON (*HUCHO HUCHO*)

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Objective / Purpose: The Danube Salmon (*Hucho hucho*) represents the flagship of the *Salmonidae* family. The species is severely fragmented within the Danube drainage, where most populations exclusively depend on (re)stocking since natural reproduction is very limited due to habitat alterations and flow regime changes. Appropriate immunity is essential in preserving the health of the fish, especially during restocking and adaptation to a new environment. Consequently, medicinal plants could be used as an immune-enhancing resource. This study aimed to evaluate the effects of peppermint (*M. piperita*) extract on cell-mediated immunity in Danube Salmon (*Hucho hucho*), depending on sex and compared to classical antigens.

Material and Methods: Blood was sampled on heparin during spawning season from a number of 30 adult huchens (males n=15; females n=15). The leukocyte blast transformation test for measuring the *in vitro* reactivity of mononuclear cells was performed. Blast transformation indices were calculated versus untreated controls, by a glucose consumption test (orto-toluidin method). Statistical significance of the results was evaluated by Student's t test.

Results: Results showed a significant ($p<0.001$) difference between the *in vitro* response to peppermint versus control for both males and females. The stimulation index (%) averaged 23.43±11.08 for males and 18.77±8.30 for females.

Conclusion / Discussion: The results indicated that gender was the main influential factor for the adaptive cell-mediated response in fish in presence of the alcoholic peppermint extract. However, the boosting effect of the extract could be used as a tool to improve the immune outcome of future restocking programs.

Keywords: Salmonids, Danube salmon, immune system, plant extract

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ORAL PRESENTATION

MOLECULAR CHARACTERIZATION AND CHEMICAL IDENTIFICATION OF *ORIGANUM* SP. ACCESSORY OF CRIFIC BY ISSR

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Objective / Purpose: Oregano with many different species and mainly collected from natural flora of Turkey is, very rich in genetic diversity and characterized by high morphological variability. *Origanum* subshrubs, spontaneous in many regions of the Mediterranean area, are increasingly becoming a popular cultivated herb for industrial purposes. Turkey is a gene center with an endemism rate of 44.2% *Lamiace* and 65.2% *Origanum* sp. That considered to be one of the largest oregano exporter in the World and supply 80% of the World demand alone. The flavor of these species is generally strong phenolic due to the presence of thymol, carvacrol or a mixture of the two as main compounds in their essential oil.

Material and Methods: Thirty local and hybride genotypes of *Oregano sp.* were evaluated to determine the similarities of the genotypes from three years old plantation in 2017, established in Haymana Ikizce Research and Experimental Farm of CRIFIC (Central Research Institute for Field Crops). Essential oil extraction was performed by hydro distillation. Identification of the essential oil components was made by GC and GC/MS. Eighty-one universal ISSR primers achieved by University of British Columbia were used to choose the primers which gave polymorphic bands. The scores were interpreted for clustering by using NTSYS-PC statistical program.

Results: Essential oil contents varied between 1.9-6.0% among the tested oregano genotypes. Carvacrol, thymol, ɣ-terpinene, cis-sabinene hydrate and beta-caryophyllene were the major essential oil components. Ninety polymorphic bands were obtained from seven primers out of eighty-one.

Conclusion / Discussion: A genetic relationship among the genotypes was established by means of the cluster diagram. Significant differences in genetic diversity were found among oregano genotypes. Such differences in genetic diversity of genotypes can be used in breeding programs and crossing works for oregano improvement.

Key Words: *Origanum vulgare* var. *hirtum*, hybride *Origanum* sp., genetic characterization, essential oil components, carvacrol, thymol

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ORAL PRESENTATION

THE *IN VIVO* GRAFT REJECTION IN EVALUATING THE IMMUNE ADJUVANT QUALITIES OF *HIPPOPHAE RHAMNOIDES* IN *AVES* AND *MAMMALIA*

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Objective/Purpose: Cell-mediated immune responses represent an important part of adaptive immune defence targeted by vaccination. Adjuvants furthermore enhance the systemic immunity, improving the antigen presentation and plants could be an appropriate source. This research was performed to investigate the local immune enhancing potential of *Hippohae* rhamnoides in two phylogenetically distant species, chickens and rabbits.

Material and Methods: The graft rejection intradermal test was used in immunologically mature broiler chickens (wattles) and adult male rabbits (lateral skin), using xenogeneic lymphocytes (sheep, 10^6cells/ml) injected separately or in combination with an oily sea-buckthorn fruit extract. The increased local responses were used to estimate the adjuvant qualities of the fruit extract and were statistically interpreted.

Results: There was a significant increase ($p<0.001$) after 24, 48 and 72 h in skin responses in rabbits but not in chickens. The results indicated a different pattern of local response dynamics in the two classes, with lower values and a constant decrease from 24 to 72 h in chickens (156.78 to 121.19%) and higher values and a constant increase in rabbits (160 to 248%) when compared to the initial wattle/skin thickness.

Conclusion / Discussion: The diversity of T-cell subpopulations in the two classes, *Aves* and *Mammalia*, supported the differences in the dynamics in xenogeneic lymphocyte rejection response in the studied species. The *Hippophae* extract had a lesser effect on the graft-rejection response in the longer term than in the short term in birds but not in rabbits, proving to be a stronger immune enhancer for the latter species.

Keywords: skin test, *Hippophae*, adjuvant, *Aves*, *Mammalia*,

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ORAL PRESENTATION

EFFECT OF LED LIGHT ON SEED GERMINATION OF BASIL

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Background: Light is one of the most important factors affecting seed germination. In recent years, there has been an increased attention focussing on the use of artificial lights as light-emitting diode (LED) to stimulate seed germination and plant growth.

Objectives: The objective of this study was to evaluate effect of exposure time and color temperature of LED on seed germination of basil (*Ocimum basilicum* L.)

Material and Methods: Basil seeds were subjected to three LED color temperatures (control, 3000 and 6500 K) and four different exposure times (0, 10, 15 and 20 h per day) in a growth chamber. The LEDs were used as a supplemental light source and placed horizontally 50 cm above the seeds inside the growth chamber.

Results: Exposure time and LED color temperatures considerably improved all germination properties studied, in comparison to dark conditions (the control), but decreased plumula length. The interaction effect of LED color temperature and exposure time was significant for germination rate. Germination time decreased by 12% and germination rate increased by 43% with LED treatment of 6500 K for 15 h per day. Plumula length decreased by 54% with increasing exposure time of LED, but radicle length increased 3-fold compare with the control.

Conclusion: Our data indicated that 6500 K LED treatment for 15 h per day notably promoted seed germination and shortened the mean germination time. In conclusion, the present results suggested that LEDs could be successfully used to improve seed germination of basil.

Keywords: Germination rate, LEDs, Light-emitting diode, Light exposure time, *Ocimum basilicum* L

ORAL PRESENTATION

PHENOLOGICAL AND AGRO MORPHOLOGICAL CHARACTERIZATION IN SOME PLANTS WITH LAMIACEAE FAMILY

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Objective: Three consecutive breeding periods of twenty six annual and perennial MAP (Medicinal and Aromatic Plants) species and subspecies belong to the *Lamiaceae* family had conducted in Ankara's ecological conditions, and the results of observations of the species' morphological characterizations were evaluated. Through this project, it was aimed to contribute to the improvement and MAP researches of the material characterization in accordance with IPGRI observations in National Gene Bank.

Materıals and Methods: This study was carried out for three years of periods in between 2015-2017, in the research center of Field Crops Central Research Institute in Ankara. Phenotypic and agromorphological observations as plant height (cm), flowering period (day), proliferation day (date), 50% first proliferation day (date), first blooming time and 50% blooming time (date), first seeding time (date), 50% seeding time (date) and first harvesting time (date) were collected from 24 perennial plants *(Lavandula angustifolia, Lavandula intermedia, Leonorus artemisia, Leonorus cardiaca, Marribium vulgare, Melissa officinalis, Mentha piperita, Mentha pulegium, Nepeta racemosa, Ocimum sanctum, Origanum majorana, Origanum onites, Origanum vulgare var. hirtum, Prunella vulgaris, Rosmarinus officinalis, Salvia azurea, Salvia officinalis, Salvia sclareae, Salvia viridis, Satureja spicigera, Sideritis perfoliata, Thymus cilicicus, Thymus citriodorus, Thymus vulgaris),* and 2 annual plants *(Ocimum basilicum, Satureja hortensis),* and species and subspecies of herbarium specimens were examined.

Results: In the end of the study, it was observed that plant height ranged from 18,8 cm to 130,2 cm, the time betweenfirst flowering and 50% flowering was 3 to 42 days, the time between first seeding and 50% seeding was 4 to 24 days. Whilst the flowering days of *Ocimum basilicum,* that is an annual plant, was 137 days, *Satureja hortensis* flowered in 127 days. The following data was collected from plants as: the first proliferation date is from 18 April to 30 July, first flowering date is from 1 May to 5 August, the first seeding is from 25 May to 21 August and the harvesting time is from 30 June to 7 November.

Dıscussions / Conclusıon: In developed countries, raw materials of industries, such as medicine, food and cosmetics, are provided from Turkish flora. However, uncontrolled picking of these plants causes gradually decrease of their population in their natural flora, and many of these plants disappear year by year. Therefore, cultivation and improvement of these plants have crutial importance in order to produce standard and high quality products in sufficient quantitiy. Detailed agronomic and cultural studies are needed in order to be able to produce in ecnomic meanings from the species studied in the scope of this research. Data banks should be formed where data related to these plants can be collected and accessed. On the other hand, the determination of the chemical content of these plants will gradually increase their value in production and marketing phases.

Keywords: MAP species and subspecies, phenologic and agromorphologic observations, *Lamiaceae* family, herbarium

ORAL PRESENTATION

HYPERICIN, THE BIOACTIVE COMPONENTS OF *Hypericum perforatum* IN CANCER TREATMENTS: ANTIPROLIFERATIVE, APOPTOGENIC AND CELLULAR DNA FRAGMENTATION ACTIVITIES OF HYPERICIN ON HUMAN CANCER CELLS

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Background and Objective: Historically *Hypericum perforatum* (St. John's wort) has been used for different medical applications, its antidepressant, antiviral, antibacterial, antiretroviral, antitumor etc. properties. Hypericin is one of the main constitute of *H. perforatum*, which is a well-known anti-depressant. Although, previous researches have been carried out to determine potential cytotoxic effects of hypericin, no detail researches have been revealed in details[1]. Hence, the aim of this study was to evaluate antiproliferative, apoptogenic and cellular DNA fragmentation activities of hypericin against different human tumor cell lines. **Material and Methods:** The aerial parts of the plant sample were collected from Kilis and Gaziantep provinces, located in South Eastern Region of Turkey. All the plant parts were dried at room temprature, and hypericin was isolated by HPLC analysis according to previously published protocols[2]. The cytotoxic, antiproliferative, apoptogenic and cellular DNA fragmentation effects of hypericin on the cervical cancer cell line (HeLa), human non-small lung cancer cell line (A549), human breast cancer cell line (MCF-7) were expressed as IC_{50} values, compared to the non-malignant HUVEC cells. Cell proliferation activities of hypericin were determined using the 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) assay as described previously[3,4]. Apoptosis was determined by using a commercial cellular DNA fragmentation ELISA, a photometric enzyme-linked immunosorbent assay. Briefly, cells were treated with different concentrations of hypericin (0-240µmol/L) at various time intervals (0, 24, and 48 h). All the experiments were repeated three times, and the data were represented as the mean ± SD. The significance of difference was evaluated by using the SPSS statistics software and $p<0.05$ was considered as statistically significant. **Results and Discussion:** The results obtained in this study showed that hypericin are able to induce growth inhibition and apoptosis as a concentration and time dependent manner. Regarding MTT results, dose-dependent cytotoxic and antiproliferative effects were determined towards all human malignant cell lines. The LD_{50} of the hypericin for 24h evaluated to be 25µmol/L, which was significantly lower when compared to HUVEC with the concentrations up to 240µmol/L of hypericin. Increasing hypericin concentration continued to decrease the growth rate of the HeLa, A546 and MCF-7 cells, while, hypericin at different concentration had no cytotoxic effects on the normal cell line. In addition, hypericin-induced apoptosis was observed almost in all the cultured human malignant cells, which rapidly exhibited sign of apoptotic cell death as detected by DNA fragmentation. The highest apoptosis level was found in HeLa cell lines treated with hypericin even at very low concentration. **Conclusion:** In conclusion, results of the present study show that hypericin has an enormous potential as an anticancer agent. Thus, hypericin at different concentrations can be used for the treatment of primary and secondary tumors in cancer treatment.

Keywords: Hypericin, *Hypericum perforatum*, anticancer agent, apoptosis, DNA fragmentation

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ORAL PRESENTATION

ESSENTIAL OIL YIELD AND COMPOSITIONS OF ENDEMIC MOUNTAIN TEA (*Sideritis libanotica* Labill. and *Sideritis bilgerana* P.H. Davis) CULTIVATED IN KONYA ECOLOGICAL CONDITIONS TURKEY

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Objective / Purpose: In this study, it was investigated essential oil yield and compositions of mountain tea (*Sideritis libanotica* Labill. and *Sideritis bilgerana* P.H. Davis) cultivated in Konya ecological conditions, Turkey.

Material and Methods: The mountain tea species were cultivated in Konya ecological contitions. The air-dried flowers of mountain tea species (*Sideritis* spp.) were subjected to hydrodistillation for 3 h using a Clevenger-type apparatus to produce essential oil. The GC-MS analysis was carried out with Agilent 7890 GC-MS system. The relative percentages of the separated compounds were calculated from total ion chromatograms. The identification of the oil components was based on the Wiley and NIST mass spectral library.

Results: The essential oil yield of cultivated *Sideritis libonitica* Labill. flowers was 0.20 % while the essential oil yield of *Sideritis bilgerana* P.H. Davis flowers was 0.15%. The highest essential oil components were determined as 19.82 % beta pinene, 14.60 % alpha pinene from *Sideritis bilgerana* P.H. Davis*;* 25.92 % hexadecanoic acid and 21.49% delta cadinene from *Sideritis libonitica* Labill.

Conclusion / Discussion: According to the results of this study, it was determined that significant differences between essential oil yield and components of cultivated the endemic mountain tea species in Konya ecological conditions were determined.

Keywords: Mountain tea, sideritis, essential oil, composition, endemic

ORAL PRESENTATION

DETERMINATION OF TOTAL PHENOL CONTENTS, ANTIBACTERIAL AND ANTIOXIDANT ACTIVITY OF SOME BRYOPHYTE SPECIES.

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Objective /Purpose: The Bryophyta section, which is more primitive than foliage and flowering plants, higher in evolutionary terms than algae and fungi. These are a diverse group of land plants that usually colonize habitats with moist or extremely variable conditions. Traditionally, because of their antimicrobial activity, mosses were used as a natural medicine in the some culture. The aim of this study was to examine in detail Total Phenol Contents, Antibacterial and Antioxidant Activity of *Plasteurhynchium striatum* (Spruce) M. Fleisch, *Palamocladium euchloron* (Bruch ex Müll. Hal.) Wijk & Margad.,, *Cratoneuron filicinum* (Hedw.) Spruce,, *Campyliadelphus chrysophylus* (Brid.) R.S. Chopra.

Material and Methods: Antibacterial activity of these four species was determined by microdilution method, antioxidant activity, DPPH (2,2 diphenyl 1, picryl hydrazyl) free radical scavenging activity and total phenolic content was also determined spectrophotometrically according to the Folin–Ciocalteu procedure and calculated as gallic acid equivalents (GAE). The bryophytes extracts were prepared in methanol, ethanol, chloroform, acetone and water.

Results: When these four antioxidant activities were compared with BHT (butylhydroxytoluene), BHA (butylhydroxyanisole) and ascorbic acid, the highest DPPH free radical scavenging activity was observed in about 65% *C. filicinum*. *P. euchloron* total phenolic content was also determined the highest extract value of 0,027±0,002 mg/g. *P. striatum* was found to have a content of 0,022 ± 0,002 mg / g, *C. chrysophyllus* 0,008 ± 0,001 mg / g and *C. filicinum* 0,0055 ± 0,0015 mg / g.

Conclusion / Discussion: The methanol extract of bryophytes was found to have significant antioxidant activity and phenolic contents. Microdilution method did not show any antibacterial effect of the tested extracts against the investigated microorganisms.

Keywords: Antimicrobial activity, bryophytes, antioxidant activity, total phenol content

ORAL PRESENTATION

ESSENTIAL OIL YIELD and COMPOSITIONS of SAGE (*Salvia officinalis* L.) CULTIVATED in DIFFERENT PROVINCE TURKEY

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Objective / Purpose: In this study, ıt was investigated essential oil yield and compositions of sage (*Salvia officinalis* L.) cultivated in different province Turkey (Elazıg, Karaman, Konya).

Material and Methods: The air-dried herb parts of sage (*Salvia officinalis* L.) were subjected to hydrodistillation for 3 h using a Clevenger-type apparatus to produce essential oil. The GC-MS analysis was carried out with Agilent 7890 GC-MS system. The relative percentages of the separated compounds were calculated from total ion chromatograms. The identification of the oil components was based on the Wiley and NIST mass spectral library.

Results: The sage production was determined as 1.7% in Konya, 1.6% in Karaman and 1.3% in Elazığ, respectively. The compositions of sage essential oil obtained from all three province was identified as major content alpha thujone, camphor and 1,8-cineole.The highest 1.8 cineole was 13.46% in Konya, 8.95% in Elazığ and 7.187% in Karaman.

Conclusion / Discussion: According to the results of this study, it was determined that significant differences between essential oil yield and components of sage (*Salvia officinalis* L.) produced in different provinces of our country were determined.

Keywords: Sage, *Salvia officinalis* L., essential oil, composition, population

ORAL PRESENTATION

AN ETHNOBOTANICAL RESEARCH IN ZONGULDAK CENTRAL AND ATTACHED DISTRICTS

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Objective / Purpose: In this study, we aimed to conduct an ethnobotanical study to detect the herbs people benefit from and use traditionally in their daily lives in Zonguldak central, attached town and villages.

Material and Methods: For this purpose, questionnaires were applied to the personnel of Bulent Ecevit University and also to the inpatients of BEU hospital and their companions starting from March 2017 till May 2017 for totally 10 days but on different days. A field survey were also performed to identify herbs spread within the city and its environment. During this study, 8 counties and 35 villages of Zonguldak were visited and the herbs already being used as household remedies were detected. The information about the traditional names of the plants, their usage, their important parts for treatment, the preparation of plants for treatment, their application, dosages and application duration were noted and reviewed.

Results: As a result, together with 64 families, 148 classes, 173 species and 10 subspecies a total of 183 taxons were obtained after the evaluation of herbal samples collected in Zonguldak city and its environment. As a result of the compilation of the questionnaires, it has been determined that plants used for health and food are represented by 57 family and 129 species. In addition to this, we detected 7 different mushroom species used for cooking.

Conclusion / Discussion: The herbs found in Zonguldak city and its environment were mostly being used as a nutrient as well as for the treatment of cold and flu, as a diuretic, for wound healing and to lose weight.

Keywords: Zonguldak, ethnobotany, plant flora

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ORAL PRESENTATION

ANTIFUNGAL ACTIVITIES OF CULTURED AND NATURALLY GROWING MARJORAM (*ORIGANUM MAJORANA* L.) ESSENTIAL OILS AND THEIR EFFECT ON SOME VIRULENCE FACTORS OF *C. ALBICANS*

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Objective /Purpose: *Origanum majorana* is an important traditional aromatic plant used traditionally as antiseptic and also used in culinary as spice. Although antimicrobial properties of marjoram essential oil (EO) is well known, and studied, any research paper has found about inhibition activity of virulence factors of *Candida albicans*. The aim of this study was to examine in detail antimicrobial activity of *O. majorana* EO from natural (OMN) and cultivated (OMC) samples and compare the components of the essential oils of these two plants. **Material and Methods:** The composition of EOs were analyzed by GC/MS. Quantitation of ergosterol content was determined to explain antimicrobial activity against seven bacteria and six fungi in addition to germ tube inhibition activity, effect on cellular surface hydrophobicity (CSH) and cell viability of *C. albicans*.

Results: The major compounds of the both EOs obtained from OMN and OMC was found to be carvacrol; 75.3% and 84%, respectively. Both essential oils showed best activity against *C. dubliniensis* MFBF 11098. Marjoram oils have some effect on cell viability of *C. albicans.* Also inhibition of germ tube formation was assessed considering that the yeast to hyphal transition is important for virulence of Candida. We tested the effect of OMC and OMN EOs against *C. albicans* in variety of hyphal inducing media and observed inhibition of filamentation in spider media where the transition is mediated by cAMP-dependent protein kinase pathway (cAMP-PKA). Majoram EO induced changes in CSH levels, factor associated with adhesion of *C.albicans* to host issue and prosthetic implants and is involved with pathogenicity. Our results indicate that below MIC value, Natural *O. majorana* EO is the best inducer for CSH levels by decreasing hydrophobicity from %25.1 to %10.44.

Conclusion / Discussion: Marjoram EO is a potential candidate for the development of alternative bioactive agents for pharmaceutical and food industry. To the best of our knowledge this is the first study to determine activity of *O. majorana* essential oil on *C. albicans* virulence factors.

Key words: antimicrobial activity, cell surface hydrophobicity, germ tube formation, *Origanum majorana*, essential oil.

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ORAL PRESENTATION

THE *IN VIVO* GRAFT REJECTION IN EVALUATING THE IMMUNE ADJUVANT QUALITIES OF *HIPPOPHAE RHAMNOIDES* IN *AVES* AND *MAMMALIA*

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Objective/Purpose: Cell-mediated immune responses represent an important part of adaptive immune defence targeted by vaccination. Adjuvants furthermore enhance the systemic immunity, improving the antigen presentation and plants could be an appropriate source. This research was performed to investigate the local immune enhancing potential of *Hippohae* rhamnoides in two phylogenetically distant species, chickens and rabbits.

Material and Methods: The graft rejection intradermal test was used in immunologically mature broiler chickens (wattles) and adult male rabbits (lateral skin), using xenogeneic lymphocytes (sheep, 10^6cells/ml) injected separately or in combination with an oily sea-buckthorn fruit extract. The increased local responses were used to estimate the adjuvant qualities of the fruit extract and were statistically interpreted.

Results: There was a significant increase ($p<0.001$) after 24, 48 and 72 h in skin responses in rabbits but not in chickens. The results indicated a different pattern of local response dynamics in the two classes, with lower values and a constant decrease from 24 to 72 h in chickens (156.78 to 121.19%) and higher values and a constant increase in rabbits (160 to 248%) when compared to the initial wattle/skin thickness.

Conclusion / Discussion: The diversity of T-cell subpopulations in the two classes, *Aves* and *Mammalia*, supported the differences in the dynamics in xenogeneic lymphocyte rejection response in the studied species. The *Hippophae* extract had a lesser effect on the graft-rejection response in the longer term than in the short term in birds but not in rabbits, proving to be a stronger immune enhancer for the latter species.

Keywords: skin test, *Hippophae*, adjuvant, *Aves, Mammalia,*

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ORAL PRESENTATION

EFFECT OF DIFFERENT CONCENTRATION OF COCONUT WATER ON RAM SPERM KINEMATIC PARAMETERS

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Objective / Purpose: Romania's shepherding heritage is widely recognized. Sheep, shepherding and transhumance are ubiquitous in Romania, as fundamental for Romanian identity and economy. An overwhelming percentage of the total sheep population consists of, or is linked to the vey old, hardy and resistant Turcana breed. Our aim is to improve growth rate, production and prolificity by maximizing the impact of high genetic value rams on local populations. The objective of our study was to evaluate the effect of two concentration of coconut water (*Cocos nucifera*) on the kinematic parameters of ram semen.

Material and Methods: Six ejaculates were collected from Turcana rams by electro-ejaculation. After microscopic analysis two aliquots per ejaculate were diluted with Tris based extender (Tris, Citric acid, Fructose, D-glucose) supplemented with 10% and 20% commercial coconut water. The control aliquots were diluted by unsupplemented Tris extender. After equilibration The kinematic parameters of semen was evaluated every 48 h. Data were analysed using GraphPad Prism 6 software (Manual Graph Pad Prism 5.0, GraphPad Software).

Results: Results were presented as means ± SEM. A value of $p < 0.05$ was considered statistically significant. The ram sperm parameters were significantly higher ($p<0.05$) in the 10% and 20% coconut supplemented groups compared with control group. Based on CASA analysis sperm motility, membrane integrity and acrosomal intactness were best preserved.

Conclusion / Discussion: This study evaluated the potential of natural, coconut water based extenders as an alternative to well established, commercial sperm mediums. Coconut water enriched media offer a safe and cost-effective improvement to classic/commercial extenders for ram semen preservation.

Keywords: Ram, CASA, semen, Coconut water, *Cocos nucifera*

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ORAL PRESENTATION

INVESTIGATION OF ROUTINE CONTENTS OF BUCKWHEAT (*Fagopyrum esculentum* Moench) CULTIVATED IN TURKEY

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Objective / Purpose: It was determined by the routine contents of herbs and seeds of buckwheat plant grown at Konya ecological conditions at five different planting times and different fertilizer doses (0, 10 and 20 kg / da DAP-18-46) for two years.

Material and Methods: Routine analyses were performed using an Agilent Technologies1200 series high pressure liquid chromatography (HPLC), including a binary pump, vacuum degasser, auto sampler, diode array detector, and coupled to an Agilent Technologies 1200 series Model VL single quadrupole mass spectrometer equipped with an multimode ionization interface.

Results: At different planting times; the amount of routine in herbs of buckwheat plant ranged from 2.15 to 2.99%, ranged from 2.27 to 2.73% at the applied fertilizer doses. Routine contents of buckwheat seeds were relatively low compared to herb plants and ranged from 0.031 to 0.071%.

Conclusion / Discussion: In this study, it was determined that the buckwheat (*Fagopyrum esculentum* Moench) grown at different planting times investigated significant differences in the routine contents of herbs and seeds.

Keywords: Buckwheat**,** *Fagopyrum esculentum* Moench, planting time, fertilizer, routine, herb, seed

ORAL PRESENTATION

ANTIOXIDANT CAPACITY AND PHENOLIC CONTENT OF SOME PLANT SPECIES

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Objective / Purpose: Some chronic diseases are associated with oxidative stress and antioxidants inhibit oxidative stress. In this study, we evaluated the total antioxidant capacity and total phenolic content of essential oils and aqueous extract of peppermint (*Mentha piperita*), linden (*Tilia cordata)* and olive leaf (*Olea europaea*) using UV/vis spectroscopy.

Material and Methods: The plant materials were coarsely ground before extraction. The essential oils were extracted using Clevenger apparatus. To detemine antioxidative capacity expressed as trolox equivalent, the samples were analysed by the spectrophotometric assay using 1,1-Diphenyl-2-picrylhydrazyl (DPPH) radical. The total phenolic content expressed as gallic acid equivalent was determined by the Folin-Ciocalteu assay.

Results: The essential oil of linden showed the highest antioxidative capacity (0.085 ± 0.002 mmol/L). The essential oils of peppermint and olive leaf indicated antioxidant effect, while their aqueous extracts containing hydrophilic components exhibited no antioxidant activity. The essential oil of linden indicated higher phenolic content compared to peppermint and olive leaf.

Conclusion / Discussion: It can be concluded that the essential oils of linden, peppermint and olive leaf have antioxidant capacity. These essential oils may offer potential for developing new therapeutic agents.

Keywords: antioxidative capacity, total phenolic content, essential oils, *Mentha piperita, Tilia cordata*

ORAL PRESENTATION

MODULATION OF GABAERGIC SYSTEM VIA INHIBITION OF GABA-DEGRADING ENZYMES BY FOOD EXTRACTS

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Objective / Purpose: γ-Amino butyric acid (GABA), a major neurotransmitter in the adult brain, is formed from glutamate by glutamat decarboxylase and metabolized by GABA-degrading enzymes; the GABA-transaminase (GABA-T) and succinat semialdehyde dehydrogenase (SSADH). The GABaergic system is a target for various groups of medications, among others for sedatives, anxiolytics, muscle relaxants, antidepressants and antiepileptics. Several foods or food ingredients are able to affect the GABAergic system by the inhibition of GABA degrading enzymes. The aim of this work was to examine the effect of aqueous extracts of food plants on the GABA-degrading enzymes.

Material and Methods: Peppermint leaves (*Mentha piperita L.*), thyme leaves (*Thymus vulgaris L.*), black tea leaves (*Camallia sinensis*) and cinnamon powder (*Cinnamomum zeylanicum*) were obtained in crushed form from a local pharmacy and used directly. Roasted coffee beans (*Coffea arabica* L.) were finely ground before extraction. The inhibition of the GABA-degrading enzymes by aqueous extracts from these foods was investigated using a microplate spectrophotometer.

Results: It was shown that all tested food extracts caused a dose-dependent inhibition of GABA-degrading enzymes. The aqueous extract of black tea showed the strongest inhibitory effect with an IC_{50}-value (half maximal inhibitory concentration) of 0,013 (0.011-0.015) mg/mL.

Conclusion / Discussion: It can be concluded that the tested food extracts can inhibit at low concentration the GABA-degrading enzymes. The food extracts may be able to increase GABA concentration by inhibition of GABA-degrading enzymes.

Keywords: γ-Amino butyric acid, GABA-transaminase, enzyme inhibition, *Camallia sinensis*

ORAL PRESENTATION

A STUDY on ESSENTIAL OIL YIELD AND COMPONENTS OF DRYED AND FRESH FOLIAGE OF PEPPERMINT (*Mentha piperita* L.) CULTIVATED in TURKEY

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Objective / Purpose: In the study, essential oil yield and its components dryed and fresh foliage obtained from peppermint [*Mentha piperita* L. (Lamiaceae)] cultivated in Konya ecological conditions were investigated.

Material and Methods: The air-dried and fresh foliage of peppermint were subjected to hydrodistillation for 3 h using a Clevenger-type apparatus to produce essential oil. The GC-MS analysis was carried out with Agilent 7890 GC-MS system. The relative percentages of the separated compounds were calculated from total ion chromatograms. The identification of the oil components was based on the Wiley and NIST mass spectral library.

Results: The yield of essential oil from dryed and fresh peppermint foliage was determined to be 3.2 % and 2.9 %, respectively. The major essential oil components of dryed and fresh foliage peppermint oil were determined as mentone (50.80 %), mentol (34.55 %) and mentone (48.18 %), mentol (21.77), respectively.

Conclusion / Discussion: According to the results of this study, it was determined that significant differences between essential oil yield and components of the dryed and fresh foliage peppermint (*Mentha piperita* L.) cultivated Konya ecological conditions, Turkey.

Keywords: Peppermint, *Mentha piperita* L., essential oil, component, menton, mentol

ORAL PRESENTATION

ADULTERATION IN COMMERCIAL OREGANO

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Objective / Purpose: In Turkey who provides 90% of the world's oregano production and exports, different genus and species that contain timol and carvacrol in their essential oils which are found in the Labiatae family are used as thyme. Despite the existence of 37 taxa [1], which are traded among them, *Origanum* species are the most produced, used and exported species. *Origanum* species have been used as oregano in Anatolia since the 7th century BC [2]. In this study, it was aimed to determine other plants which intentionally or unknowingly participated in the species belonging to the family of Labiatae which constituted the drugs which were traded under the name of "oregano". **Material and Methods:** Many foreign taxa were distinguished from the specimens obtained from individuals and organizations (collectors, cooperatives, intermediary firms, markets, herbalists, exporting firms) in every step of oregano trade. These plant fragments, which are very small and broken, were selected and separated one by one from the powdered drugs, and the taxa definitively diagnosed were identified. The diagnosis of some specimens that were incomplete enough to be assigned in any way was left at the family or genus level. **Results:** It was determined which species belong to the plants mixed into the thyme in domestic and foreign trade. The names of these specimens were determined; *Cistus creticus* L., *Cistus salviifolius* L., *Phlomis* sp., *Rhus coriaria* L., *Salvia tomentosa* Miller, *Inula viscosa* (L.) Aiton, *Ballota cristata* P.H. Davis, *B. saxatilis* Sieber ex J. & C. Presl ssp. *brachyodonta* (Boiss.) Davis & Doroszenko, *B. saxatilis* Sieber ex J. & C. Presl ssp. *saxatilis*, *Calamintha nepeta* (L.) Savi ssp. *nepeta, Cyclotrichium origanifolium* (Labill.) Manden. & Scheng., *Micromeria myrtifolia* Boiss. & Hohen, *Teucrium polium* L. Without a specific aim, the taxa that were incidentally intermingled while collecting were also detected. Families belong to them; Aceraceae, Aspidiaceae, Aspleniaceae, Boraginaceae, Campanulaceae, Caryophyllaceae, Cistaceae, Convolvulaceae, Compositae, Cruciferae, Cupresaceae, Dipsacaeae, Fagaceae, Geraniaceae, Gramineae, Labiatae, Leguminosae, Liliaceae, Malvaceae, Pinaceae, Plantaginaceae, Polygonaceae, Primulaceae, Rhamnaceae, Rosaceae, Rubiaceae, Scrophulariaceae, Umbelliferae and Verbenaceae. **Conclusion / Discussion:** Thyme, savory and oregano spices are expressed in Turkish in one word: kekik. This name is used in scientific publications and products on the market for *Thymus serpyllum* and *Thymus vulgaris* species in Latin. So some oregano importers abroad has wrote in their promotion materials that they import *Thymus vulgaris* from Turkey. This is not true. Because these two *Thymus* species is not native plants in Turkey. Instead of these species that are not found in our country, companies have been found to supply with acute leaved kekik species such as *Satureja*. Kekik imported from abroad is also taken cheaply and mixed into the material to be exported as *Thymus vulgaris*. In addition, the *Thymus* taxa do not have a wide range of trade in and out of the country, as they are consumed locally in the areas where they grow. Mixtures are made according to the demand from the foreign country, not according to the exporter's own opinion. There is a wide range of products and prices as pure as 90% mixing. In recent years, as news has appeared about the oregano adulteration in the UK, EU countries and the USA this issue has been seriously carried on by the consumer-based organizations abroad and now foreign companies have begun to demand better quality and pure products.

Keywords: adulteration, Labiatae, oregano, savory, thyme

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ORAL PRESENTATION

DETERMINATION AND COMPARISATION OF PHENOLIC COMPONENTS OF LEAVES, BULBS AND ROOTS OF LEUCOJUM AESTIVUM L. GROWN IN SAKARYA AND BAFRA REGION

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Objective / Purpose: *Leucojum aestivum* L. is naturally grown in mostly North Anatolia, Marmara Region and forest areas around Konya, Samsun and Erzurum. It contains high amounts of alkaloids (galanthamine, tazettin, lycorin, lectin, etc.) contained in the Amaryllidaceae family. This is the only species of *Leucojum aestivum* L. that grows in our country. It is used both as an ornamental plant and as a medical aromatic plant.

Material and Methods: Plants were collected from natural area in Sakarya region but in Bafra, plants were collected in plantation area as well. Firstly, root, leaf and bulb samples were dried separately under room conditions. After that, methanolic extracts of plants were prepared. The residual extracts of methanol were evaporated until dry and then concentrated in a rotary evaporator at 40 ºC and the residue was finally weighed and dissolved in methanol for HPLC analysis. We measured only 7 phenolic substances using HPLC. RP-HPLC was used to analyze 7 phenolic acids, p-hydroxybenzoic, vanillic, p-coumaric, sinapic, benzoic acid, syringaldehyde and quercetin.

Results: Comparison of the individual phenolic compounds contents identified vanilic acid mg/g (0.72-25.20) as the main phenolic component in leaves, bulbs and roots of *Leucojum aestivum* L. Besides vanilic acid, syringaldehyde mg/g (1.51-4.02) was identified from leaves of Leucojum aestivum in plantation sample and roots of *Leucojum aestivum* L. which grown in Sakarya and benzoic acid mg/g (2.90-12.74) identified from leaves and roots of *Leucojum aestivum* L. which grown in Sakarya and Bafra samples. However, no p-hydroxybenzoic, p-coumaric, sinapic and quercetin were detected in the analysis.

Conclusion / Discussion: Our data indicated that the methanolic extracts of *Leucojum aestivum L.* as the sources of vanilic acid.

Keywords: phenolics, vanilic acid, *Leucojum aestivum* L.

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ORAL PRESENTATION

PHENOLIC COMPOUNDS ACCUMULATION DURING ALTERNATION IN *Olea europaea L.*

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Objective / Purpose: The leaves, fruits and fruit oil of the olive tree contain significant amounts of bioactive and phenolic compounds. Oleuropein, hydroxytyrosol, catechin, chlorogenic acids, p-coumaric acid, caffeic acid, 3-hydroxcinnamic acid are some of the important compounds. The amount of these substances varies according to factors such as tree age, fruit load, cultivar, harvest time, biotic and abiotic stress conditions, processing, and storage status of the crop. Alternation is one of the important physiological problems in some fruit species. Bioactive molecules such as phenolics may act as signal molecules during on and off –year of the plant species. Some studies on understanding on mechanism of alternation regarding with phenolics have been reported. It is believed that the first chemical signal comes from the embryo, and then the flowering is regulated by the bioactive substances synthesized in the biochemical structure of the leaves. In this study, the roles of oleuropein, hydroxytyrosol, catechin, chlorogenic acids, p-coumaric acid, caffeic acid, 3-hydroxycinnamic acid synthesized in olive leaves were discussed.

Conclusion / Discussion: The chlorogenic acid and p-coumaric acid contents are higher in on-year than off-year. The increase and decrease in the amounts of bioactive substances such as oleuropein, hydroxytyrosol, catechin, chlorogenic acids, p-coumaric acid, caffeic acid, 3-hydroxycinnamic acid in olive leaves are important in defining the alternation physiology of olives.

Keywords: *Olea europaea* L., olive leaves, bioactive substances, alternation

ORAL PRESENTATION

DETERMINATION OF NUTRITIVE VALUE AND MINERAL ELEMENTS ANALYSIS OF *STACHYS LAVANDULIFOLIA* VAHL. VAR. *LAVANDULIFOLIA* GROWING IN THE EASTERN ANATOLIA

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The genus *Stachys* (Lamiaceae) is represented by about 300 species found in the world. Turkey is one of the richest countries in *Stachys* diversity being represented by 83 species with a level of 48% endemism. In this study, *S. lavandulifolia* vahl. were collected from Alacabük mountain of Tatvan in Eastern Anatolia. *S. lavandulifolia* Vahl. subsp. *lavandulifolia*, known as "dağ çayı, tüylü çay", is widely consumed in Anatolia as herbal tea. *Stachys* species is one of the oldest medicinal plants that are used both for pharmaceutical purposes and in folk medicine; It is used for the treatment of gastrointestinal and respiratory disorders, and is known as an appetizer, carminative, stimulant, digestive, diuretic, and throat pain reliever. Wild plants gathered from nature are cheaper food and important for human health. Thus, in the present study nutritional value and mineral composition of used parts of selected *Stachys lavandulifolia* Vahl. var. lavandulifolia was investigated.

In laboratory analysis, dry matter, total ash, % N, crude protein, crude fiber and pH were examined as nutritional value. Useful minerals (Ca, Cu, Fe, K, Mg, Mn, Na, P, S and Zn) and heavy metals (Cd, Co, Cr and Pb) that hazardous elements for livings were also determined. The crude fiber, ash, pH and total nitrogen content of the plants identified as 38.40 %, 7.00 %, 6.53 % and 1.31%, respectively. Mineral analysis showed that the wild plants' samples contained considerably high amounts of potassium (17.46 g kg^{-1}), phosphorus (4.70 g kg^{-1}), calcium (17.25 g kg^{-1}), magnesium (2.47 g kg^{-1}), iron (241.37 mg kg^{-1}), manganese (22.95 mg kg^{-1}) and zinc (18.56 mg kg^{-1}). This work contributed to the nutritional properties of some wild plants, and the results may be useful for the evaluation of dietary information.

Key words: Nutrient content, Wild plant, *Stachys lavandulifolia*, East Anatolia

ORAL PRESENTATION

ALLELOPATHIC EFFECT OF SOME ESSENTIAL OIL AND HYDROSOLS ON REDROOT PIGWEED (*AMARANTHUS RETROFLEXUS* L.)

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Objective: Allelopathy refers to chemical effect of a plant direct or indirect on germination, growth or development of neighboring plants. Allelopathy can be considered as a component of biological control that reduces the development of other plants. The aim of this study carried out between 2017-2018 was to determine the effect of Greek sage (*Salvia fruticosa* Miller), basil (*Ocimum basilicum* L.), Dragonhead (*Dracocephalum moldavica* L.), spearmint (*Menta spicata* L.), sage (*Salvia officinalis* L.), lemon balm (*Melissa officinalis* L.), Oregano (*Origanum onites* L.) and *Thymus kotschyanus* Boiss. et Hohen. on the germination of redroot pigweed (*Amaranthus retroflexus* L.) which causes significant yield loss in agricultural production.

Material and Methods: Essential oil (9, 18, 36 µL/petri) and hydrosols (50, 75, 100%) of aromatic plants were applied to determine their inhibition effects on seed germination of *A. retroflexus.* The experimental design for *in vitro* was a randomized design with five replications.

Results: It has been shown that germination rate was decreasing by the increased concentration of essential oil and hydrosols of tested plant species. Also, total germination inhibition of A. *retroflexus* depended on the essential oil doses; the rate ranged from -2,9 to 85%. The highest effect between essential oils was seen in spearmint with 7% germination rate.

Conclusion: It could be considered as an important solution which would contribute in Integrated Weed Management of *A. retroflexus* by using it with different concentrations of essential oil and hydrosols of aromatic plants.

Keywords: Allelopathy, Weed Management, *Amaranthus retroflexus, Aromatic plants*

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ORAL PRESENTATION

ADAPTATION OF STINGING NETTLE (*URTICA DIOICA* L.) IN ÖDEMİŞ ECOLOGICAL CONDITIONS

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Objective / Purpose: *Urtica dioica* L. is a perennial dioecious plant and a widespread species throughout the world. It is an invasive in many countries and spreads in Europe, North Africa, Western Asia, Siberia and America. The genus name of *Urtica* comes *"urere"* meaning "to burn" because of stinging hairs and the name of "*dioica"* means "two houses" because the plant contains either male or female flowers. Generally, prefers waste places, moist riparian edges, valleys, degraded areas, field and road sides. In Turkey has spread up to 2000 m prefers as similar habitats. It is known as nettles, dalgans. The plant contains many valuable chemical compounds like phytosterols, saponins, flavanoids, tannins, proteins and amino acids and also has been used as food, fiber, paint, manure and cosmetics. *U. dioica* has been reported to have various pharmacological activities like antibacterial, antioxidant, analgesic, anti- inflammatory, antiviral, immunomodulatory, hepatoprotective, anti- colitis and anticancer effects. This study was conducted to determine the adaptation of *Urtica dioica*, in Odemis, Izmir ecological conditions during 2016 vegetation period.

Material and Methods: Stinging nettle seeds were sown to the field in October. Parcels were planned in five rows of 3 m length with 60 cm between rows and 60 cm between row spacing with four replications and the plants were harvested at florescence stage. Plant height, number of branches, fresh herb yield and dry herb yield were identified.

Results: The mean value of the plant height was 38.95±7.71 cm, fresh herb yield 143.85±74.14 gr/plant, dry herb yield 26.45±13.07 gr/plant.

Conclusion / Discussion: This preliminary study has shown that nettle plants can be grown under Ödemiş ecological conditions. It is considered that agronomic studies such as different fertilizer doses and sowing frequency should be done in the future studies.

Keywords: Plant height, number of branches, fresh herb yield, dry herb yield

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ORAL PRESENTATION

DETERMINATION OF MINERAL COMPOSITION, TOTAL PHENOLIC CONTENT AND ANTIOXIDANT CAPACITY OF SOME EDIBLE PLANTS USED IN EASTERN ANATOLIA

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Background and Objective: Wild edible plants have a crucial importance in the long human history. Although these plants have been used in rural areas up to now, most of them were lost their position in modern recipes. However, their high nutritional value and useful effects on human health have been reported in recent scientific reports[1,2]. In this context, some wild edible plant commonly used in Eastern Anatolia of Turkey were screened by their mineral compositions, total phenolic contents and antioxidant capacities

Material and Methods: Plant materials (*Cyclotrichium origanifolium*, *Ornithogalum nabonense***,** *Satureja hortensis, Rosmarinus officinalis, Althaea officinalis Cetarach officinarum, Achilla millefolium, Ocimum basillicum*) were collected from Van province of Turkey in 2017. They were botanically identified and their specimens were kept at Yuzuncu Yil University. After cleaning the materials were dried under shade in well ventilated laboratories and kept in small plastic bags until laboratory analysis. Mineral [heavy metal (Cd, Co, Cr, Mo, Ni and Pb), macro (Ca, K, Mg, P and S) and micro (B, Cu, Fe, Mn and Zn) elements] compositions of the plant samples were determined by ICP-AES. Total phenolic content of the plant extracts were determined by spectrophotometrically. Antioxidant effects of the plant extracts were tested for their scavenging activity against DPPH.

Results and Discussion: According to mineral compositions analysis results of the plant samples, the lowest heavy metal compositions were determined in *A. millefolium* samples. However; other plants were also low heavy metal contents according to WHO limits[3,4]. Among the analyzed plant samples, *O. basilicum* and *S. hortensis* had the highest macro element contents. According to results, *O. basilicum* were rich in manganese and zinc; *Achilla millefolium* samples had the highest copper; iron content was the highest in *R. officinalis* and *S. hortensis* had the highest boron content. It could be stated that analyzed plant samples were rich in useful macro and micro mineral contents and low in hazardous heavy metals when compared to former reports[2,3]. Total phenolic content of the analyzed plant samples changed between 34.8 – 88.7 mg GAE/100g. The highest content was determined in the *R. officinalis*. The highest antioxidant capacity was determined in the *C. origanifolium* among the analyzed plant samples' extracts,

Conclusion: Analysis results of the different wild edible plant samples that have been commonly used in Eastern Anatolia showed that wild edible plants have good quantity of useful mineral composition and low hazardous heavy metals for human health. They had also high polyphenol content and antioxidant capacity. Regarding their natural habitat and high mineral and bioactive compound capacity, it could be stated that wild edible plant should be put in the daily diets and modern recipes.

Keywords: Antioxidant capacity, heavy metal, minerals, total phenolic content, wild edible plant

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ORAL PRESENTATION

EFFECTS OF METHYL JASMONATE AND SALICYLIC ACID ON PRODUCTION OF CAMPHOR AND PHENOLIC COMPOUNDS IN CELL SUSPENSION CULTURE OF ENDEMIC TURKISH YARROW (*ACHILLEA GYPSICOLA*) SPECIES

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Background: Elicitors have been widely used as biotic and/or abiotic stimulants in triggering the production of valuable secondary metabolites in plant cell and tissue cultures.

Objective: The present study was aimed to enhance of the production of camphor and phenolic compounds using methyl jasmonate (MeJA) and salicylic acid (SA) elicitors in cell suspension culture of endemic Turkish yarrow species, *Achillea gypsicola*.

Material and Methods: The cell suspension cultures used in the study were obtained from the calluses derived from in vitro plantlets propagated from the mature yarrow seeds. Various concentrations (0, 10, 50 and 100 µM) of methyl jasmonate and salicylic acid were applied to eight-day-old cell cultures. The cell suspensions subjected to several doses of methyl jasmonate and salicylic acid were harvested three times, at one day interval. The content of camphor and phenolic compounds were determined using Headspace-GC-MS and spectrophotometer and cell number, cell viability and cell dry weight were also recorded.

Results: The application of increasing doses of MeJA and SA significantly enhanced the accumulation of secondary metabolites, cell number and cell dry weight. The highest amount of camphor accumulation occurred in cells harvested on the 3rd day by 100 µM MeJA (0.3449 µg/g) and 50 µM SA (0.3816 µg/g) solutions. Moreover, in both MeJA and SA applications, 100 µM solution produced the highest cell dry weight. Increasing concentrations of MeJA resulted in a significant decrease in total anthocyanin content, as compared to the initial culture. The total anthocyanin content, however, significantly increased about 29% with the use of 50 µM SA.

Conclusion: The present study demonstrated that methyl jasmonate and salicylic acid could effectively be used as potent elicitors to enhance the production of camphor and phenolic compounds in cell suspension cultures of endemic Turkish yarrow species, *Achillea gypsicola*.

Keywords: Abiotic stress, Bioactive compounds, Elicitor, Secondary metabolites

ORAL PRESENTATION

NUTRITIONAL VALUE OF ACORN COFFEES PREPARED FROM *QUERCUS COCCIFERA* FRUITS

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Background and Objective: Acorns are of wild edible fruits for humans and important feed source for animals especially in rural districts throughout Europe and minor Asia. All the parts of the acorns have been also used as medicinal purposes in folk medicine. Another special use of the acorn is herbal hot drink as a coffee substitute. As an herbal hot drink, acorn acorn coffee has a special importance in also Ottoman Palace Culture during the history. Addition to other herbal coffee, some chemical properties and biological activities have been studied and published by our research group[1,2]. In the present work, nutritional values of acorn coffees were determined the results were compared to true coffee (*Coffee arabica* and *Coffee robusta*).

Material and Methods: In the present work, raw acorns and two type of acorn coffee were used as materials. Acorns were collected from wild *Quercus coccifera* L. tree and shrubs in November 2017 in Kilis province rurals. After harvests, acorns were cleaned from other parts, dried, shelled and kept in plastic bags until laboratory analysis. Two type of acorn coffees were prepared by boiled (boiling water removed), then roasted and ground, and only roasted and ground. In the samples, dry matter, ash, protein, fatty oil contetn and its fatty acids compositions were determined.

Results and Discussion: Giving pleasure and different taste to consumers, herbal coffees, as functional drinks, are of important food and health sources for humans. Thus, their nutritional value for daily diets and their effects on human health should be clarified. In this study, raw acorn and processed acorn coffees were evaluated for their nutritional value. According to results, nutritional items and their values of raw acorn and two types of acorn coffees were determined as follows; dry matter (91,91 – 97,05 %), ash (0,74 – 1,70 %), crude protein (2,52 – 3,28 %) and fatty oil (2,17 – 2,81 %). The main fatty acids and contents of the fatty oil were oleic acid (55,146 – 60,990 %), linoleic acid (17,054 – 23,421 %) and palmitic acid (15,414 – 15,822 %). When these results are evaluated and compared with true coffee (raw and roasted)[3], it could be said that acorn coffee with good nutritive combination is of valuable drinkable food source.

Conclusion: Having natural characteristics, valuable chemical and bioactive composition with distinguished aroma, acorn coffee could be thought as a functional hot drink. Acorn coffee could also be suggested as a healthy drink with low fatty oil content rich in unsaturated fatty acids, higher dry matter with useful minerals and moderate protein content in reasonable consumption rates.

Keywords: Antioxidant capacity, heavy metal, minerals, total phenolic content, wild edible plant

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ORAL PRESENTATION

IN VITRO ANTICOLINESTERASE ACTIVITIES AND ANTIOXIDANT INHIBITION POTENTIALS OF AQUEOUS AND ETHANOLIC EXTRACTS FROM C*linopodium serpyllifolium* subsp. *serpyllifolium* (*Lamiaceae*) WITH TOTAL PHENOLIC AND FLAVONOID CONTENTS

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Background and Objective: *Clinopodium serpyllifolium* subsp. *serpyllifolium* (*Lamiaceae*) is an endemic-medicinal plant which is commonly used for treatment of irritated skin, mastitis- and prostatitis-related swelling, and inflammation, due to contain a number of triterpenes and triterpenoid saponins as well as some other bioactive substances. From this point-of-view, the aim of this study was to evaluate total polyphenolic contents, neuroprotective and enzyme inhibitory effects of the ethanol and water extracts from *C. serpyllifolium* subsp. *serpyllifolium.*

Material and Methods: The plant was collected in the blooming season from Gaziantep province, South-Eastern part of Turkey. To prepare the extracts, air dried and powdered samples (40g) obtained from the stem and flower parts were individually extracted with 250 ml ethanol and water by maceration. Then, the extracts were freeze-dried, and stored at +4°C until analyzed. Antioxidant activity was analyzed by using DPPH free radical scavenging and ferric reducing antioxidant power (FRAP) assays [1,2]. Neuroprotective activities of the extracts on AChE and BChE were evaluated according to the method of our previous research [3]. In parallel to the experiments, total phenolic and flavonoid contents of the extracts were also determined as spectrophotometrically. All the assays were performed in triplicate, and the results were expressed as mean ± SD, $p<0.05$ was considered to be significant.

Results and Discussion: As a result of extraction yields of the ethanol and water extracts of the stem and flower parts were determined as 2.32%, 2.79%, 8.59%, and 0.42% (w/w), respectively. Extraction performed with water, stem of the plant gave the maximum extract yield (8.59%), while, the lowest extract yield was measured with water extract from the flower part (0.42%). According to the results of total phenol and flavonoid quantities, flower extracts possessed higher polyphenolic contents, comparing the stem extracts. Ethanol extract prepared from the flower parts were found the highest amount of total phenol (368.11±2.02 mg/g extract as GAE), while water extract prepared from stem parts possessed the lowest amount of total phenol (206.62±1.28 mg/g extract as GAE). In antioxidant assays, all the extracts obtained from stem and flower parts of *C. serpyllifolium* subsp. *serpyllifolium* exhibited quite strong scavenging activities on DPPH and FRAP. Scavenging activity of the extracts on DPPH were found to be in the range of 70.86±1.07 - 92.14±2.03 mg TEs/g extract, $p<0.05$. In DPPH and FRAP assays, the water extract from the stem showed the weakest antioxidant activity, whereas, the ethanol extract from the flower showed the strongest antioxidant activity. A strong correlation was determined between the phytochemical contents, antioxidants capacity, and enzyme inhibitory effects of the extracts. Cholinesterase inhibitory activity assays on AChE and BChE enzymes were resulted in the superiority of the ethanol extracts obtained from the flower parts. To the best of our knowledge, neuroprotective activities of this plant have not previously reported elsewhere, in this way this research could be assumed as the first report for the literature.

Conclusion: Consequently, these results provide evidence that aerial part of the plant could be used as an agent in the treatment of Alzheimer's disease for their inhibitory activity on the AChE and BChE enzymes, as well as in the treatment of cancer for their rich antioxidant capacity.

Keywords: *C. serpyllifolium* subsp. *serpyllifolium*, neuroprotective, polyphenolic content, antioxidant, enzyme inhibition.

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ORAL PRESENTATION

STORAGE STABILITY OF OLIVE LEAF EXTRACT RICH IN OLEUROPEIN: EFFECT OF LIGHT

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Objective / Purpose: Oleuropein is the major bioactive compound, found in extracts of olive oil processes by-products. Oleuropein enters in the many medical industries because of its pharmacologic and health-promoting properties, which can be summarized in antiallergic, anticancer, anticarcinogenic, anti-inflammatory, antimicrobial, antioxidant, analgesic and platelet aggregation inhibition [1]. In the current study, we examined the effect of light irradiation on the stability of Oleuropein content in olive leaf extract.

Material and Methods: The microwave-assisted extraction method was employed to prepare the olive leaf extracts. Based on colorimetric oxidation/reduction reaction, UV- spectrophotometry was used to measure the concentration of bioactive contents and antioxidant activity (AA) for the extracts. And also chromatographically and periodically, the decreasing of oleuropein concentration was recorded to investigate the effect of light irradiation.

Results: The concentration of oleuropein under UV-C light was relatively stable for 130 days.

Conclusion / Discussion: Oleuropein degraded at a fast rate, where the concentration of used solvent playing a basic role in the proposed mechanism since the presence of water in the high percentage increases dramatically the rate of appearance of hydrolyzed forms of Oleuropein release like hydroxytyrosol.

Keywords: Oleuropein, Stability, UV-C light, Chromatography, UV- spectrophotometry, Microwave-assisted Extraction

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POSTER PRESENTATIONS

POSTER PRESENTATION

ANTIMICROBIAL ACTIVITIES OF ARISTOLOCHIA TRIANGULARIS CHAM.

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Objective / Purpose: The Aristolochiaceae family introduces several genus and species distributed throughout the world. Important numerically and medicinally, numerous species of Aristolochia are used in folk medicine. Aristolochia triangularis Cham. has its origin in the Brazilian territory, belonging to the Cerrado and the Atlantic Forest Biomes. Also popularly known as "cipó-mil-homens", "angelicó" and "calungo", in folk medicine there are reports of its use in indigenous culture, where it was used in religious rituals and had curative powers. This specie is used as anthelmintic, sedative, emenagoga, anti-inflammatory, antirheumatic and antiseptic. The aim of this study was to evaluate the fractions and compounds isolated from A. triagunlaris Cham. against a collection of bacteria and fungi. **Material and Methods:** The dried powdered rhizomes and stems of A. triangularis were exhaustively extracted with MeOH at room temperature to obtain a crude extract (ME). This extract was dissolved in H2O and MeOH and acidified with 2M HCl to pH 2. The acidic solution was extracted with Et2O to yield the acid ether fraction (AEF). The aqueous solution was basified with NH4OH, and extracted with Et2O to yield the basic ether fraction (BEF), followed by EtOAc to yield the basic acetate fraction (BAF). The final aqueous solution was frozen and freeze-dried to yield an aqueous fraction (AF). A portion of AEF was applied to chromatographic column to afford three compounds. The structures of them were established using HRESIMS, spectroscopic methods and comparison with literature data. A. triangularis extract, fractions and isolates were investigated against a collection of bacteria and fungi using the broth micro dilution method. **Results:** The most significant bacterial inhibitory effect of A. triangularis fractions was observed with acid ether fraction (AEF) against Bacillus cereus, Salmonella typhimurium, Shigella sonnei, Enterobacter aerogenes (MIC50 values of 15.6 $\mu g.mL^{-1}$). Three secondary metabolites were isolated from AEF, one sesquiterpene and two diterpenes: nerolidol, ent-Kaur-16-en-19-al and kaur-16-en-19-oic acid. All isolated compounds were active against the tested bacteria. The MIC values obtained ranged from < 1,5 to 100 $\mu g.mL^{-1}$. In general, diterpenes were more active in the bacteria assays than nerolidol. ent-Kaur-16-en-19-al displayed good antimicrobial activity against Staphylococcus aureus, Salmonella typhimurium and Enterobacter aerogenes, with MIC50= 12.5 $\mu g.mL^{-1}$, while kaur-16-en-19-oic acid showed exceptional antimicrobial activity against Staphylococcus aureus, Bacillus cereus, Salmonella typhimurium and Enterobacter aerogenes (MIC50= 3.1 µg.mL-1) and against Shigella sonnei (MIC50 < 1,5 µg.mL-1). All compounds and fractions showed moderate to weak activity against the tested fungi, with MIC values between 50.0 and 500 $\mu g.mL^{-1}$. **Conclusion/ Discussion:** In general, the isolated natural compounds may be classified as compounds with potential as antibacterial/antifungal agents. The MIC values of the extract, fractions, ent-Kaur-16-en-19-al and kaur-16-en-19-oic acid indicate that, at least in part, these compounds were responsible for the antimicrobial activity observed.

Keywords: Aristolochiaceae; Aristolochia triangularis; antimicrobial activity.

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POSTER PRESENTATION

PROLYL OLIGOPEPTIDASE AND ACETYLCHOLINESTERASE INHIBITORY EFFECTS OF *VALERIANA POLYSTACHYA* SMITH SECONDARY METABOLITES

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Objective / Purpose: *Valeriana* genus (Valerianaceae) contains about 200 species, many of which are used in the preparation of phytomedicines, for traditional animal health care, and sold as a dietary supplement [1-4]. Some of the species have been used as mild sedative, anxiolytic, sleep inductor, diuretic, to treat gastrointestinal and skin disorders, migraine, cramp and rheumatic pain. Taking into account the CNS effects and that until now very little is knownabout the chemical composition of *V. polystachya* Smith distributed by Argentina and Southern Brazil, we report the phytochemical analysis and, for the first time, the evaluation of extracts and fourisolated compounds from *V. polystachya* native from Brazil as AChE and POP inhibitors.

Material and Methods: The **dried** powdered roots and rhizomes of *V.polystachya* were extracted by maceration with *n*-hexane (HexE-*r.t.* extract) followed by ethanol 95% (EE-*r.t.* extract). The residual solid material was resubmited to ethanol 95% extraction at reflux temperature to obtain the EE-△extract. Chromatographic purification of *n*-hexane extract (HexE-*r.t.*) afforded four compounds. The extracts and isolated compounds were tested for cholinesterase inhibitory activity using Ellman's method [5]. POP activity assay was determined in 96-well microplates following the fluorimetric method described by Toide et al [6].

Results: All tested extracts at a concentration of 200 µg/mL showed weak cholinesterase inhibition (< 20% AChE inhibition). In contrast, HexE-*r.t.* and EE-△ extracts showed 91 and 85% of POP inhibition, respectively. Thus, HexE-*r.t.*extract was chosen to fractionation to investigate which compounds could be responsible by the observed activity against POP. Purification of the HexE-*r.t.* afforded four compounds: sitostenone,valtrate, IVHD-valtrateand ursolic acid. The POP assay performed indicated that valtrate and ursolic acid are exceptional inhibitors of this enzyme, showing high POP inhibitory activity (IC_{50}< 8 µM).

Conclusion/ Discussion: Our results show that the high POP inhibitory activity observed of the *V. polystachya*extracts is associated with the presence of the valepotriate*valtrate* and the pentacyclictriterpene*ursolic acid.*

Keywords: *Valerianapolystachya*, proliloligopeptidase, acetylcholinesterase, valtrate, ursolic acid.

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POSTER PRESENTATION

ANTIMICROBIAL ACTIVITY OF *DISCARIA FEBRIFUGA* MART

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Objetive/:Purpose: The present study reports the antimicrobial activity of *Discaria americana* and of cyclopeptide alkaloids (**1**-**5**) isolated from its methanol root bark extract, against a panel of Gram positive, Gram negative bacteria, and fungi.

Material and Methods: The crude neutral methanol extract, acid and basic fractions prepared from this extract, pure compounds isolated from these fractions, were investigated *in vitro* for antimicrobial activities against four Gram-positive bacteria: *Staphylococcus aureus*, *Bacillus subtillis*, *Bacillus cereus*, *Enterococcus* spp, seven Gram-negative bacteria: *Shigella sonnei*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Enterobacter aerogenes*, *Enterobacter cloacae*, *Burkholderia cepacia*, *Salmonella typhimurium*, and five yeasts: *Saccharomyces cerevisiae*, *Candida albicans*, *Candida tropicalis*, *Cryptococcus neoformans*, and *Cryptococcus gatti*

Results: Our results indicated that extracts and the cyclopeptide alkaloids (**1**-**5**) isolated from the methanol root bark extract of *Discaria americana* (Rhamnaceae) had a notable antimicrobial activity against a panel of Gram positive, Gram negative bacteria, and fungi. When evaluated against the positive bacteria *Enterococcus* spp., discarine B (**3**) proved to be the most active alkaloid with a MIC/MLC 0.77/1.55 μg mL^{-1}, near the most active antibiotic levofloxacin (MIC/MLC 0.77/0.77 μg mL^{-1}). Moreover, discarine-C (**4**) was the more active alkaloid against the Gram negative bacteria *Salmonella typhimurium*, with a MIC/MLC 3.1/6.2 μg mL^{-1}, comparable to the antibiotic azithromycin (MIC/MLC of 3.1/6.2 μg mL^{-1}). The tested fungi showed less sensitivity against alkaloids **1**-**5**. Discarine C (**4)** was the most active against *Cryptococcus neoformans* (MIC/MLC of 6.25/25 μg mL^{-1}).

Conclusion/Discussion: Extracts and five 14-membered cyclopeptide alkaloids isolated from *Discaria febrifuga* (Rhamnaceae) showed promising antibacterial activity, making this class of metabolites of scientific interest.

Keywords: *Discaria americana* Gillies ex Hook, Rhamnaceae, Cyclopeptide alkaloids**,** antimicrobial activity.

POSTER PRESENTATION

AWARENESS OF MEDICINAL AND AROMATIC PLANTS IN THE WESTERN BLACK SEA REGION

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In our research, the level of awareness about medicinal and aromatic plants in different professions groups (farmers, civil servants, workers, retired, students and unemployed) and education levels were examined through direct interviews in Western Black Sea Region (Düzce, Sakarya, Zonguldak, Bartın). By using the Neyman method, 77 people were investigated, based on the Likert scale to measure awareness levels, and the results were evaluated by SPSS method. As a result of our research, 24.7% of them prefer medicinal and aromatic plants when they are sick, while 81.8% think that medicinal and aromatic plants are organic. 66.2 %agree that organic certification is required for medicinal and aromatic plants. 63.6% of inadequate education is remarkable when the problems are expressed. At the rate of 5.2% is TV and 15.6% is for newspapers are used for information acquisition. According to the study, it was concluded that the level of awareness of the medicinal and aromatic plants in the Western Black Sea region is not sufficient, and starting from school programs, it is necessary to raise awareness of the public by means of non-formal education, magazines and courses besides TV and newspaper.

Keywords: Western Black Sea Region, medicinal and aromatic plants, awareness

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POSTER PRESENTATION

CAN MEDICINAL AND AROMATIC PLANTS BE AN ALTERNATIVE TO HAZELNUT IN THE WESTERN BLACK SEA REGION?

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In this study, it was investigated whether medicinal and aromatic plants can be an alternative to hazelnut cultivation, by direct interview method on 154 people living in the Western Black Sea Region (Düzce, Sakarya, Zonguldak and Bartın), which produces hazelnut by 27% of Turkey. 154 students were surveyed by using Neyman method. Likert scale was used to measure whether the medicinal and aromatic plants could be alternative to hazelnuts and the results were evaluated by SPSS method. In our study, 154 people with different professions (farmers, civil servants, workers, retired, students and unemployed), different educational levels (literacy, primary education, secondary education, high school and university) and different income levels were included in the survey. As a result of the study, 97.4% (including 92.2% of those who grow hazelnuts) want to grow medicinal and aromatic plants as an alternative to hazelnuts. 97.4% of medicinal and aromatic plants are considering to grow linden and black sesame. There are also people, at a rate of 81.8%, who think that medicinal and aromatic plants are organic and 66.2% of them also think that organic certification should be obtained for cultivation. 24.7% of them use medicinal and aromatic plants as an alternative to medicines when they are sick. As a result, medicinal and aromatic plants are important in our lives as an alternative to medicines. Considering the importance of alternative plants in the future, it is seen that in the Western Black Sea Region, even if at limited number, there is a tendency towards medical and aromatic plant farming besides hazelnut farming.

Keywords: medicinal and aromatic plants, Western Black Sea Region, hazelnut, alternative

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POSTER PRESENTATION

NEUROPROTECTIVE EFFECT OF BOSWELLIC RESIN AGAINST NEURONAL LOSS AND NERVOUS DISORDERS INDUCED BY LEAD: (EXPERIMENTAL STUDY IN MICE)

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In these recent decades, the effects of industrialization broke the existing balance between nature and humans. The sudden and massive use of heavy metals including lead has gradually led to the emergence of new risks, non-evaluated, which include neurological disorders. Therapeutic solutions were highlighted, but these treatments did not show a satisfactory resolution because of the low yield efficiency in addition to the side effects may give rise to new anomalies.

The objective of this study was to evaluate the in vivo protective effect of the Boswellic resin on chronic intoxication induced by lead acetate in Swiss mice.

Methods: four mice groups were treated differently, the intoxicated group received the lead acetate(100ppm) oraly as the treated intoxicated that received more the boswellic resin extract (200mg/kg). The control treated received only the treatment and the control only fresh water.

Results: After chronic exposure of mice to lead with the aqueous extract of boswellic resin administrated orally, the result has shown remarkable correction of neurobehavioral disorders, biochemical and at body weight change. A significant improvement in the behavior of mice poisoned by lead ,treated with the boswellic resin developed by behavioral tests as the forced swimming test, locomotor activity, anxiety and stress test comparatively by poisoned mice. In the liver, the absence of alterations in mice treated intoxicated reflected by a decrease in transaminase levels, comparatively to intoxicated mice. At the biochemical level, a regulation in calcium levels in the treated mice was relevant. The atomic absorption spectroscopy AAS results indicated a decrease of lead concentration in brain for the treated intoxicated group. **Conclusion:** Finally, we can conclude that the oral administration of Boswellia resin reduces the risk of chronic lead poisoning.

Key words: Chronic Toxicity, Boswellic resin, mice, neurodegeneration, AAS.

POSTER PRESENTATION

QUANTITATIVE ANALYSIS OF COLCHICINE IN *COLCHICUM PUSILLUM* SIEBER EXTRACT BY HPLC*

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Objective / Purpose: "*Colchicum*" species are rich in alkaloids especially colchicine. *Colchicum pusillum*, growing widespread in Northern Cyprus, is blooming in autumn as *Colchicum autumnale* which is a medicinally important species. In addition, *C. pusillum* flowers and leaves can be seen at the same time, which is a very rare condition. The aim of this study is to determine the concentration of colchicine in EtOH extracts of both the flower and the bulb parts by HPLC.

Material and Method: In this study, *Colchicum pusillum* has been collected from the heights of Guzelyurt, Northern Cyprus. For quantitave analysis of colchicine in both flowers and bulbs by HPLC, 10 g of powdered flowers and bulbs were seperately extracted into EtOH by Soxhlet apparatus until the color of the extracts was clear. HPLC analyses were realized using a reversed-phase column (i.e., ACE C8, 3.9 mm ID × 30, 5 μm) and a gradient mobile phase consisting of HPLC-grade water (solvent A) and MeOH (solvent B) as follows: Solvent B 5% (v/v) (0 min) → 100% (20 min)→100% (23 min)→5% (25 min). Column temperature was maintained at 25°C, the flow rate was 1.0 mL min^{-1} and the injection volume was 25 μL. The analyte was monitored using an online diode-array detector (DAD) at 245 nm.

Results: The yield of the total EtOH extracts were calculated. Flower extract yield was 6.9 %, while bulb extract yield was 6.5 % (w/w). Limits of detection (LOD) and quantitation (LOQ) of the proposed HPLC method were 1.5 and 5.0 mg L^{-1}, respectively. The calibration graph showed a good linearity with a coefficient of determination (R^2) of 0.995 within a linear dynamic range (LDR) of 5.0 to 45.0 mg L^{-1} and percentage relative standard deviation (%RSD) lower than 4.1%. The concentrations of colchicine in *C. pussilum* flower and bulb extracts were found as 0.18±0.007 and 0.24±0.010% (g/g), respectively.

Conclusion / Discussion: *Colchicum pusillum* is a dwarf bulb and is the only widespread growing *Colchicum* species in Northern Cyprus. Unlike many *Colchicum* species, leaves and flowers are seen on the same time on the plant. There is not much work done on *Colchicum pusillum* and because of this reason, our research group has started to investigate this plant. In this presentation the colchicine content was calculated in *Colchicum* bulbs and aerial parts, which were collected in November 2016. A simple, rapid and efficient HPLC method was proposed for the determination of colchicine in *C. pusillum* flower and bulb extracts. The colchicine content was found for the bulbs 0.239% (g/g) and for the aerial parts 0.175% (g/g).

Keywords: *Colchicum pusillum*, Colchicine, HPLC, Northern Cyprus.

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POSTER PRESENTATION

PRELIMINARY PHYTOCHEMICAL AND BIOLOGICAL SCREENING ON LIBYAN *CRATAEGUS PALLASII* GRISEB. AND CYPRIOT *CRATAEGUS AZAROLUS* L.

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Objective: *Crataegus pallasii* Griseb. growing in Libya and *C. azarolus* L. growing in Northern Cyprus are the uninvestigated species of the genus *Crataegus*. Therefore a preliminary qualitative phytochemical analysis of the water and methanol extracts of powdered flowers and leaves of *Crataegus pallasii* and *C. azarolus* were performed to detect the presence of phenolic compounds. Furthermore, a biological study is done to assess the effect of the crude ethanolic extract on the human venous tissue. **Materials and methods:** *Crataegus pallasii* samples were brought from Attar in July 2016 in the old city of Tripoli / Libya. Whereas *Crataegus azarolus* was collected from Cengiz Köy in Lefke in Northern Cyprus in April 2017. For phytochemical screening water and methanol extracts were investigated for secondary metabolites [1]. Hydroalcoholic extract for each 100g of *C. pallasii* and *C.azarolus* flowers and leaves were prepared by percolation with a yield of 20.46% and 26.37% respectively. To investigate endothelium capacity of vessels, after pre-contraction with Phenylephrine (1–10 μM), acetylcholine is applied as a concentration-dependent manner (0.01-100 μM).The relaxations induced by *Crataegus* extract or Acetylcholine are calculated as a percentage of pre-contraction levels.
Results: The preliminary phytochemical screening revealed the presence of flavonoids, saponins, tannins, in both water and methanolic extracts. Pre-contraction levels obtained with Phenylephrine (1–10 μM) is 3.22±1.03 gram. The maximal relaxation (E_{max}) induced by *Crataegus* Cyprus or Tripoli is %9.5±4.4. The endothelium capacity of SV preparations is %4.2±2.5.

Conclusion: Both *Crataegus* species flowers and leaves are rich in phenolic compounds and their HPTLC analysis are still going on. Fingerprint chromatograms of these *Crataegus* species are compared with the German originated *Crataegus* phytomedicine (Crataegutt^{R}). Biological activity of the crude ethanolic extract of *Crataegus* samples on the human venous tissue are determined and compared.

Keywords: *Crataegus pallasii*, *Crataegus azarolus*, phytochemical screening, venous tissue

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POSTER PRESENTATION

NATURAL AGENTS AS A NATURAL WAY IN THE PREVENTION AND TREATMENT OF CANCER: DIETARY PHYTOCHEMICALS INTAKE CHANGE MicroRNAs PROFILE IN CARCINOGENESIS

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MicroRNAs (miRNAs) are RNA molecules that are in the length of 18-24 nucleotides, single stranded, and small, not encode proteins and prevented in the evolution stage. MiRNAs have an important role not only in regulation of transcriptional and post-transcriptional gene expression but also in regulation in main functions in cancer like; cell development, cell growth, cell differentiation, metastasis, angiogenesis and apoptosis control. Based on their role in tumorigenesis, miRNAs are described as 'oncogenic' or 'tumor suppressor' [1,2].

Medicinal plants contain bioactive components that act like natural anti-cancer agents; 3-carbinol, sulfora-phane, water-soluble vitamins, diallyl disulfide, 3,3'-dicyclohexylcarbinol, catechins, lycopene, resveratrol, curcumin, berberine, alkaloids including mitomycin C, camptothecin, topotecan, trabectedin, matrine, honokiol, isoflavonoids, dinocondylmethane, epigallocatechin-3-gallate and hesperidin etc[1,3]. As the expression levels of tumor suppressor miRNAs are induced through bioactive compounds, the expression levels of oncogenic miRNAs are suppressed or silenced. For this reason, dietary intake of natural bioactive compounds from plants has critical importance in the regulation of cancer-related miRNAs. Nowadays, there is a growing interest in the use of natural compounds as an alternative treatment for cancer [1,2]. For this reason, the effect of dietary intake of natural components on miRNA regulation is tested in vivo and in vitro methods. Natural products and / or bioactive compounds obtained from medical plants that regulate the regulation of miRNAs, found to have no side effects in dietary intake, can be accepted as a new therapeutic agent for the treatment of cancer. Thus, it is hoped that these new strategies would prevent tumor recurrence and resistance towards conventional therapies, leading to improvement in the overall response and survival of cancer patients.

Keywords: MicroRNAs, carcinogenesis, natural products, nutri-epigenetics, medicinal plants.

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POSTER PRESENTATION

AMELIORATIVE EFFECT OF CERATONIA SILIQUA L. EXTRACT ON CU, ZN-SUPEROXİDE DISMUTASE EXPRESSION IN TESTIS TISSUE

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Objective / Purpose: The present study was undertaken to determine whether acute treatment with aqueous extract of carob (Ceratonia siliqua L.) (CS) protects against cisplatin-induced DNA damage, oxidative stress and testicular injuries in adult male rats. Cisplatin (CP), an effective anticancer agent, carries the risk of impairing testicular function leading to infertility.

Material and Methods: Rats were divided into six groups (n = 7). Group I (control), group II (CP single dose one day). Group III and Group IV received 100-200 mg/kg CS 14 days. Group V and Group VI (CP + 100 and CP + 200mg/kg CS). Blood and tissue samples were collected at the end of 14 days. Total antioxidant status (TAS) and total oxidant status (TOS) levels were determined. Finally, serum levels of reproductive hormones, including testosterone (T), Luteinizing Hormone (LH), and Follicle Stimulating Hormone (FSH) as the pivotal endocrine factors controlling testicular functions, and histopathological changes of testis tissue were examined using two different staining methods (hematoxylin-eosin (H&E) and Tunnel).

Results: Activity assay of antioxidant enzyme, superoxide dismutase (SOD) and Western blot analysis using an anti-Copper/Zinc (Cu/Zn) SOD antibody showed a high SOD activity and Cu/Zn SOD protein concentration. Immunohistochemistry showed a strong expression for Cu/Zn SOD in testis tissue. CP treatment reduced serum T, LH and FSH.

Conclusion / Discussion: The results demonstrated that CS treatment in CP-induced testicular toxicity augments the antioxidants defense mechanism, reverted the level of fertility hormones, suppressed the histomorphological alterations and DNA damages and thus provides the evidence that it may have a therapeutic role in free radical mediated diseases.

Key words: *Ceratonia siliqua*, Cu/Zn SOD, Cisplatin, Testis

POSTER PRESENTATION

HISTOPATHOLOGIC FEATURES OF THE EPIDIDYMIS AND IN ADULT MALE RATS EXPOSED TO RADIATION AFTER TREATMENT WITH AMIFOSTINE

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Objective / Purpose: Amifostine is a potent scavenger of reactive oxygen species that is used for the protection during therapy with radioactive. The purpose of this study was to evaluate histopathologically and biochemically whether amifositine administration prior to irradiation would have a long-term protective effect on epididymis tissue in an experimental rat model.

Material and Methods: Thirty-two adult male rats were equally divided into four groups. Control group; No RT nor amifostine was given, Amifostine group; 200 mg\kg amifostine interperitoneally (i.p) administered per day for 3 days, RT-Saline group; 4 Gy/day local irradiation to the testes for 3 days (total 12 Gy) and RT-Amifostine group; 4 Gy/day local irradiation to the testes for 3 days (total 12 Gy), with 200 mg/kg amifostine i.p. administered 30 min before each irradiation fraction, in. At 4 weeks after treatment, the rats were sacrificed for histological and biochemical examinations. Tissue damage was evaluated histopathologically using Crossman modified Mallory's Triple staining and periodic acid Schiff (PAS). Malondialdehyde (MDA) level and superoxide dismutase (SOD) activity were measured in tissue samples.

Results: The present study observed that following RT administration, the expression of 8-deoxyguanosine (8-OHdG) increased in epididymis. In vivo, amifostine pretreatment alleviated tissue injury, which was paralleled by increased superoxide dismutase (SOD) and reduced malondialdehyde (MDA).

Conclusion / Discussion: Our results indicate that i.p administration of amifostine 30 min before RT, protected against tissue injury and oxidative stress via scavenging ROS. Furthermore, amifostin protects germinal epithelial cells of adult epididymis from DNA damage and from apoptosis documented by caspase-3.

Keywords: Radiotherapy, Amifostine, Epididymis, Oxidative Stress

POSTER PRESENTATION

INVESTIGATION OF ANTICANCER ACTIVITIES OF *RANUNCULUS CONSTANTINOPOLITANUS (DC.) D'URV* METANOL EXTRACTS IN MDA-MB-231 BREAST CANCER CELLS

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Objective: *Ranunculus* (Ranunculaceae) is a widespread and temperate genus, represented by about 84 species in the flora of Turkey (1-3). Various parts of the plants of the *Ranunculus* species, including roots, herbs, and flowers, have been used extensively in traditional medicine in Turkey to treat a variety of illnesses, such as constipation, rheumatism, hemorroids, edema, abcesses, jaundice and cancer (4-7). In this study; it is aimed to investigate anticancer activity in the MDA-MB-231 breast cancer cell line and L-929 healthy adipose tissue cell line (mouse) of flowers, body, leaf, and seed methanol extracts of *Ranunculus constantinopolitanus (DC.) D'URV*. **Materials and Methods:** Methanol extracts from flowers, body, leaf and seed of *Ranunculus constantinopolitanus (DC.) D'URV*. were prepared. The effects of the extracts on cell viability were determined by 3- (4,5-dimethylthiazol-2-yl) -2,5-diphenyltetrazolium bromide (MTT) method MDA-MB-231 breast cancer cells and L-929 cell line were incubated for 96-well plates (100,000 cells / well) with different concentrations of extracts. MTT method was applied when incubation times were completed. The results were analyzed by the GraphPad Prism6 to determine the concentration values (IC50) of the extracts causing 50% mortality in MDA-MB-231 breast cancer cells and L-929. Quantitative measurement of cell death was performed with Hoechst 33258 (HO; Sigma) / propidium iodide (PI; Sigma) staining, which allowed for apoptosis to distinguish necrosis. **Results:** According to our experimental results, when the flower, body, leaf and seed methanol extracts of *Ranunculus constantinopolitanus (DC.) D'URV*. were compared with the L-929 cell, it was found that MDA-MB-231 cell line viability significantly decreased with time and dose. **Conclusion:** As a result; flowers, body, leaf and seed methanol extracts of *Ranunculus constantinopolitanus(DC.) D'URV* showed cytotoxic effects by reducing MDA-MB-231 breast cancer cell line viability.

Keywords: *Ranunculus constantinopolitanus(DC.) D'URV*, Prostate cancer, MDA-MB-231, Hoechst 33258, Propidium iodide

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POSTER PRESENTATION

ECONOMICALLY SIGNIFICANT TREES AND SHRUBS OF ABSHERON

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The article analyzes the natural and cultural dendroflora of Absheron, in which 87 families, 230 genus, 660 species of trees and shrubs were found. Studying the taxonomy of the floristic composition and the economic significance of the natural and cultural trees and shrubs of Absheron, their species were grouped according to 5 using categories. Most of the studies were related to essential oils and medicinal plants of which 369 species (55.7%) are medicinal plants, 121 species (18.3%) are ethereal oil, 83 species (12.7%) are melliferous, 70 species (10.6%) are cosmetic and 71 species (10.8%) are food products. Examining the plants by family, genus and species it became clear that on the Absheron peninsula prevailed ethereal-oil and medicinal herbs among them species included in the families: *Rutaceae, Lauraceae, Labiatae, Umbelliferae, Myrtus.* Studying the antimicrobial properties of the ethereal oil extracts of these species in the phytotherapy laboratory are studied their application in the economy. By studing found that these plants also have decorative properties such as in forests, parks, in prevention of environmental pollution, as well as the preservation of genefund, by increasing of biodiversity and the restoration of ecological balances.

Keywords: Trees, shrubs, phytoncide, essential oils, cosmetology, antimicrobial properties, melliferous, food, phytotherapy, medicinal herbs.

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POSTER PRESENTATION

THE AFFECTS ON CLIMATE CHANGES ON PLANTS BIODIVERSITY IN ABSHERON PENINSULA

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In this article are studied the effects of climate change on plant biodiversity in the Republic of Azerbaijan, Baku, Absheron peninsula, its problems and solution ways. As in many places of the world, climate changes has been analyzed in the Republic of Azerbaijan, including the Absheron Peninsula, the capital of the country Baku city. As a result of researches the annual temperature in the area increased by 1.1-1.3 degrees, the amount of rainfalls decreased by 15-84 mm, climate changes in seasons affected to water and forest resources and human health and caused to ecological balance. It has affected the interaction of the environment, forestry and agriculture, water resources and land. In the study, the comparative analysis of dendroflora of Baku and Absheron peninsula in 1939-2017 has been analyzed correlations of the environment to vegetation cover and dendrochronological analysis were carried out. It has been discovered that for the first time in 1939 A.A. Grosheim (1948) researched that there were 4 trees, 20 shrub plants analyzed in Absheron Peninsula flora with dry subtropical climate conditions, in which has been p[ublished the 3 Volumes of Dendrofloraflora by 1954-1964. It showed to be existing 435 species of trees and shrubs in the country's flora. This increase is the result of climate change and anthropogenic factors that occur in nature. We analyzed the composition of tree and bushes introductions in Baku city Absheron peninsula in 2014-2017, grouped according to APG-4 system. It has been found out that 87 families, 230 genuses and 660 species of plants have been discovered in natural and cultural conditions. It should be noted that there are existing Rosaceae (in 131 species), Fabaceae (in 43 species), Oleaceae (in 24 species), Jupressaceae (in 29 species), Myrtaceae (in 18 species), Aceraceae (in 17 species), Caprifoliaceae (in 16 species), Pinaceae (in 8 species), Anacardiaceae (in 13 species), Moraceae (in 10 species), Fagaceae (in 13 species), Caesalpiniaceae (in 12 species), Celtidaceae (in 8 species), Berberidaceae (in 11 species). The genus and species belonging to these families are found in the natural and cultural dendrofora of Absheron peninsula. In the analysis of higher taxonomic indicators in the composition of introducents has been discovered that Gymnospermae is belonging to a total of 71 species and Angiospermae is belonging to 589 species. Gymnospermae consists of 10.8 % of the total species and Angiospermae consists of 89.2%.

The vital forms of tree and shrub vegetations were studied and it is found 313 species (47.4%) of trees introducents, 313 species (47.4%) shrubs, 34 species (5.2%) ivies. Researched species grouped into floristic zones and it has been found 192 species (27.2%) are belonging to Europe, 350 species (49.6%) are belonging to Asia, 116 species (16.4%) are belonging to America, 23 species (3.2%) are belonging to Africa and 25 species (3.5%) are belonging to Australia flora species. There are analyzed trees and shrub introducents and they were grouped into 3 ecotypes: 345 species (52.1%) of mezofits, 301 species (45.8%) of xerofits, 14 species (2.1%) of hydrophytes have been discovered growing in natural and cultural environment. It is also constitutes by anthropogenic factors affecting the area over the years and climate volatility as a result of the impact on plant biodiversity the climate of the Absheron peninsula is more similar to climate conditions of Europe, Asian countries. Conducted dendrochronic analysis shows that, Climate change observed in Absheron peninsula and global warming these areas are not crossed the amount of rainfall has decreased, artificial irrigation increased by more than 5 times Absherpn Peninsula is a dry subtropical zone poor subtropical climatic conditions.The ways of solving problems in the research work are also reflected.

Key words: Climate change, plant biodiversity, Absheron peninsula, systematics, dendrochronology, taxonomy, vital forms, ecological analysis, introductory

POSTER PRESENTATION

IN VITRO EVALUATION OF *H.TRIQUETRIFOLIUM* AND *P.HARMALA* EXTRACTS EFFICACY IN: APOPTOSIS INDUCTION AND CELL CYCLE ARREST OF COLON CANCER CELL LINE

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Objective: Based on knowledge from traditional Greco-Arab herbal medicine, this *in vitro* study aims to investigate the role of apoptosis, cell cycle modulation and cell cycle arrest in the observed *Peganum harmala* and *Hypericum triquetrifolium* extracts- induced cytostatic effects in colon cancer cell line HCT-116.

Material and Methods: water extracts of *Peganum harmala and Hypericum triquetrifolium*, was prepared by boiling 10 gram of each medicinal plant in one liter of distilled water for 10 min. Cytotoxicity test of the two extracts on HCT-116, MCF-7 and MCF-10 cell lines, was done using MTT and LDH leakage assays. Apoptosis detection was carried out by, Annexin V-Cy3 Apoptosis Detection Kit (abcam) and the caspase 3 assay, Colorimetric (Sigma-Aldrich). Cell Cycle was determined by FUCCI (Premo FUCCI Cell Cycle Sensor, BacMam 2.0) assay then by FACS analysis.

Results: Here we investigated the effects of on the viability of HCT-116 cells. We observed that *H.triquetrifolium* induced cell death via an apoptotic process by Annexxin V-Cy3 assay , as also confirmed by the analysis of caspase-3 activity, suggesting that *H.triquetrifolium* induced apoptosis of human colon cancer cells is mediated primarily through the caspase-dependent pathway. RT-PCR analysis revealed that *P.harmala* and *H.triquetrifolium* extracts had no effect on mRNA levels of Apaf-1 and NOXA. Moreover, we clearly demonstrated that *H.*triquetrifolium did affect the cell cycle progression machinery in HCT-116 cells.

Conclusion and Discussion: The treatment with *P.harmala* resulted in significant reduction in cell viability and a slight induction of apoptosis. Moreover, we found a significant accumulation of cells in G2-M phase in HCT-116 cells treaded with *P.harmala*. These results suggest that *H.triquetrifolium* seems to be a potent therapeutic agent for colon cancer inhibition.

Keywords: *Peganum harmala, Hypericum triquetrifolium,* apoptosis, cell cycle

POSTER PRESENTATION

PHOTOCHEMICAL PROPERTIES OF FLAVONOIDS EXTRACTED FROM *Galanthus elwesii* Hook

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Objective / Purpose: The Turkish Giant Snowdrop, the second most common snowdrop in cultivation, has a long traditional use in folk medicines as it contains some alkaloids and phenolics. The objective of this study is to determine photochemical properties of flavonoid extracts obtained *Galanthus elwesii* Hook, the Turkish Giant Snowdrop.

Material and Methods: The plant material was grown in Amasya province of Turkey during autumn-winter growing period in 2016-2017. The plant material were taken from four organs (root, leaf, flower, and bulb) at three growing stages (at the beginning of flowering, after flowering, and fruit ripening). The dried-powder samples were extracted in the ethanol solution for 72 hours. In the extracts, certain flavonoids such as vanillic acid, p-coumaric acid, syringic acid and ferulic acid were monitored. Photochemical properties of flavonoid extracts and their effects on absorbsion and emulsion were determined using Liquide Chromatography system with Schimadzu diode array detector and Uv-Vis and florescence spectrometer [1].

Results: In *Galanthus elwesii* extracts, the highest amount of flavonoid was detected in the bulb while the lowest flavonoid content was detected in the root. Essentially, the energy gap (ΔE) between the HOMO and LUMO were varied depending on the growing stage. We calculated molar absorptivity value through Beer-Lambert law on the all extracts. Excitation and emission spectra are obtained via Varian-Carry Eclipse Florescence spectrometer in same concentration of the Uv-Vis extracts.

Conclusion / Discussion: Our results showed that flavonoid amount of *Galanthus elwesii* Hook might be considerably vary based on plant part and growing stage with the bulb showing higher flavonoid than the other plant parts. Photochemical properties were also comparable to flavonoid content and plant part.

Keywords: Fluorescence and Uv-vis spectroscopy, syringic acid, Turkish giant snowdrop, vanillic acid.

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POSTER PRESENTATION

IN VITRO ANTI-INFLAMATORY AND ANTIOXIDANT ACTIVITIES OF HYDRO-ALCOHOLIC EXTRACT OF *PELARGONIUM PELTATUM*

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Objective/ Purpose: According to the literature and also the results obtained in the previous studies we did on several types of extracts of *Pelargonium species*, we decided that the *in vitro* evaluation of the antioxidant potential and the anti-inflammatory activity are worth to be published. One of the most promising leaf extract is the hydro-alcoholic extract of *Pelargonium peltatum*.

Material and Methods: The antioxidant activity was evaluated using three assays based on different mechanisms: investigation of ferrous ion-chelating capacity, determination of free radical scavenging capacity to diphenyl-picrylhydrazyl (DPPH) and the superoxide anion radical scavenging capacity. The anti-inflammatory potential was assessed using the erythrocyte membrane stability test.

Results: The results confirm the data available in the literature in terms of linearity between the concentration of antioxidant compounds present in the reaction medium and the antioxidant activity. The EC50 values (μg/mL) obtained depending by the test were: 10.06 ±0.62 μg/mL for DPH scavenging test, 9.59 ± 0.11 μg/mL for iron-chelating test, and 40.06±0.87 μg/mL for the superoxide anion radical scavenging test. *P. peltatum* extract at 5 mg/mL has the ability to increase the stability of the erythrocyte membrane up to 99.81±0.37 %.

Conclusion / Discussion: It is widely accepted that oxidative stress causes damage at the cellular level by accelerating cellular aging mechanisms extrapolated to the entire body. Therefore, the active compounds which have antioxidant effects have increasingly caught researchers' interest in recent years. Inflammation is a pathological process whose evolution involves the presence of enzymes, pro-inflammatory chemical mediators, extravasation of fluids, cell migration, tissue damage, but also tissue recovery processes. Thus, our data indicated that the hydro-alcoholic extract of *Pelargonium peltatum* has a promising potential in reducing the damages in oxidative stress and also in increasing the stability of erythrocyte membrane.

Keywords: oxidative stress, anti-inflammatory effect, *Pelargonium peltatum*, DPPH, erythrocyte membrane, antioxidant

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POSTER PRESENTATION

APPLICATION OF DECREASED CONCENTRATIONS OF DDVP ON *ARCHIPS ROSANA* (LINNAUEUS, 1758) (LEPIDOPTERA: TORTRICIDAE) ADULTS

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Objective / Purpose: *Archips rosana* (Linnaeus, 1758) (Lepidoptera: Tortricidae) is an important pest species cause various levels of economic losses in different Rosaceae species, and possess an economic threat on food crops, including apples, almonds, cherries, pears, raspberries, and strawberries. DDVP 550 EC® Bayer is an organophosphate insecticide that is used against to control of *A. rosana* and other harmful insects in Turkey. It is aimed to investigate mortality ratio after exposed with DDVP 550 EC® on adult *A. rosana.*

Material and Methods: Commercial form of pesticide, DDVP 550 EC® (2,2-Dichloroethenyl dimethylphosphate) was used as test substance at recommended dose (r.d.) (1100 µm), and half of r.d., and 1.10^{-1}, 1.10^{-2}, 1.10^{-3} fold diluted concentrations in laboratory conditions. Mortality ratios were determined after 7 and 12 days.

Results: The results showed that diluted concentrations of DDVP 550 EC® are still effective on adult forms of *A. rosana.* 100 fold diluted concentration (1.10^{-2} r.d.) application induced 100% mortality at 7th day. 1000 fold diluted concentration (1.10^{-3} r.d.) induced 45% mortality at 7th day and 100% mortality at 12th day.

Conclusion / Discussion: The results demonstrated that DDVP 550 EC® has a high lethal effect on *A. rosana* adults. It is important to observe lower effective doses of pesticides for Pest Management assessments.

Keywords: Rosaceae, DDVP, *Archips rosana*, mortality, LD_{50}

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POSTER PRESENTATION

DETERMINATION OF LD_{50} OF DDVP 550 EC ON *ARCHIPS ROSANA* (LINNAEUS, 1758) (LEPIDOPTERA: TORTRICIDAE) ADULTS

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Objective / Purpose: European leafroller (ELR) pest *Archips rosana* (Lepidoptera: Tortricidae) feds on large variety rose family (Rosaceae) in Thrace region. **Dichlorvos** or 2,2-dichlorovinyl dimethyl phosphate (commonly abbreviated as **DDVP**) is an **organophosphate**, widely used as an **insecticide** to control of *A. rosana* and other pests in agriculture. It is aimed to investigate mortality ratio after exposed with diluted concentrations of DDVP 550 EC® Bayer on adult forms of *A. rosana*.

Material and Methods: Commercial form of pesticide, DDVP 550 EC® Bayer (2,2-Dichloroethenyl dimethylphosphate) was used as test substance at recommended dose (r.d.) (1100 µm), and half of r.d. and 1.10^{-4}, 1.10^{-5}, 1.10^{-6}, 1.10^{-7} fold diluted concentrations of record in laboratory conditions. After a single dose application mortality ratios and LD_{50} values were determined after 7, 12 and 15 days.

Results: Application of half of recomended concentration on *A. rosana* adults induced 100% mortality in 7 days. More diluted concentrations of this pesticide has also lethal effect on pest. 10^{-4} fold diluted concentrations of r.d. induced mortality more than 50 % at 15th day application. In the present study it was found LD_{50} concentrations of DDVP 550 EC® for adults forms of *A. rosana* were 12,642 (9,062-21,962), 1.922, 0.894 for 7, 12 and 15 days respectively.

Conclusion / Discussion: The effective concentration of pesticide use might be decreased for to save environment and side effects on Rosaceae family.

Keywords: Rosaceae, DDVP, *Archips rosana*, mortality, LD_{50}

References:

[1] Aydogdu, M., Gökalp F. D., & Güner U. (2017). Determination of Acute Toxicity of Isoldesis on European Leafroller (ELR) Archips rosana (Linnaeus, 1758) (Lepidoptera: Tortricidae). MESMAP-3, 13-16 April Girne-Kıbrıs, 245.

POSTER PRESENTATION

TOXICITY OF DDVP 550 EC ON PUPAE STAGE OF *ARCHIPS ROSANA* (LINNAEUS, 1758) (LEPIDOPTERA: TORTRICIDAE)

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Objective / Purpose: The rose tortrix, *Archips rosana* (Linnaeus, 1758), is a moth of the family Tortricidae (Lepidoptera) and plays an important role in plant protection due to a large number of harmful species and frequent occurrence on different cultivations. DDVP 550 EC® Bayer (common name is dichlorvos; 97.5% chemical grade 2,2-dichlorvinyl dimethyl phosphate) is an organophosphate insecticide that is used against of *A. rosana* and other pests. It is aimed to investigate mortality ratio after exposed with DDVP 550 EC® on pupae stage of *A. rosana*.

Material and Methods: Commercial form of insecticide DDVP 550 EC® was used as test substance at recommended dose (r.d.) (1100 µm), and half of r.d. and 1.10^{-3}, 1.10^{-4}, 1.10^{-5} fold diluted concentrations of record in laboratory conditions. We dipped *A. rosana* pupae in test solutions for 1 s, placed them in clean petri dishes with clean rosa leaves, and kept them under identical laboratory conditions [25 ± 2°C, 70% RH and a photoperiod of 16:8 h (L:D)]. After a single dose application mortality ratios were determined after 7, 12 and 15 days.

Results: Although mortality was not seen after 7, 12 and 15 days in control group, diluted concentrations of DDVP 550 EC® induced mortality at100%. Pupae of *A. rosana* reached 100% mortality after ½ r.d. at 7th day, 1.10^{-3} r.d. at 12th day, 1.10^{-4} and 1.10^{-5} at 15th day applications. The results showed that mortality ratios were decrease by decrease of pesticide concentrations, but mortality ratios were increased by time increase.

Conclusion / Discussion: The effective concentration of pesticide use might be decreased for to save environment and side effects on Rosaceae family.

Keywords: *Archips rosana*, Lepidoptera, Rosaceae, DDVP, mortality

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[1] Aydogdu, M., Gökalp F. D., & Güner U. (2017). Determination of Acute Toxicity of Isoldesis on European Leafroller (ELR) *Archips rosana* (Linnaeus, 1758) (Lepidoptera: Tortricidae). *MESMAP-3, 13-16 April Girne-Kıbrıs*, 245.

POSTER PRESENTATION

REDUCTION OF RECOMMENDED DOSE VALUE OF DDVP 550 EC ON *ARCHIPS ROSANA* (LINNAUEUS, 1758) (LEPIDOPTERA: TORTRICIDAE)

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Objective / Purpose: The European leafroller (ELR) *Archips rosana* (Linnaeus, 1758) is native to the Palearctic region, but it is distributed all over the world. The rose tortrix is a moth of the family Tortricidae (Lepidoptera). This species plays an important role in plant protection due to a large number of harmful species and frequent occurrence on different cultivations. Organophosphate insecticide DDVP 550 EC® (common name is dichlorvos; 97.5% chemical grade 2,2-dichlorvinyl dimethyl phosphate) used against of *A. rosana* and other pests in agriculture. It is aimed to investigate mortality ratio after exposed with DDVP 550 EC® on pupae *A. rosana.*

Material and Methods: Commercial form of pesticide DDVP 550 EC® was used as test substance at recommended dose (r.d.) (1100 µm), and half of r.d. and 1.10^{-1}, 1.10^{-2} fold diluted concentrations of r.d. in laboratory conditions. After a single dose application mortality ratios were determined after 7 and 15 days.

Results: Pupae of Rosaceae pest *A. rosana* reached 100% mortality after r.d. and half of r.d. application at 7th day. Pupae mortality was observed 100% after and 100 fold (1.10^{-2} r.d.) diluted concentration application after 12th day.

Conclusion / Discussion: DDVP is extremely effective on *A. rosana*'s pupae period. Lethal effect of insecticide on the pupae was observed at low doses (1.10^{-1}, 1.10^{-2} of r.d.) up to 12 days.

Keywords: DDVP, Rosaceae, *Archips rosana*, mortality, Pupa

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POSTER PRESENTATION

METHOD OF OBSERVING THE EFFECT OF THE RECOMMENDED DOSES ON FAMILY ROSACEAE PEST LARVAE

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Objective / Purpose: Insecticides are widely used in agricultural to prevent control target pests and other plant pathogens in an effort to reduce or eliminate yield losses and maintain high product quality. Many of the adverse effects of pesticides on the environment depend on the interactions between the physicochemical properties and other factors. In this study, it is aimed to define the method used to determine effective doses on larvae of pest *Archips rosana* (Rosaceae).

Material and Methods: The studies were carried out in Rosaceae orchards in Edirne province (north-western Turkey). A total of 1200 larvae were collected in selected study areas, and the larvae were reared in Petri dishes on artificial diet. Larvae were also collected in several instars during the course of spring-summer and were reared individually in Petri dishes. Cherry leaves from unsprayed plants, washed air dried, made 5cm diameters discs, and dipped in test solutions for 10 sec and allowed to dry. The solutions were prepared according to recommended dose (r.d.) used in agricultural areas, and diluted concentrations of this r.d. Test leaves were placed in large Petri dishes (10 cm diameter) 5th instar stage of larvae (10 specimen) was maintained in these petri dishes containing exposed leaves and honey –water (1:1 ratio) absorbed on cotton pieces and kept under laboratory conditions at 25 ± 2°C, 16:8 hours Light: Dark cycle and 70% relative humidity. Mortality ratios were calculated after 24, 48, 712 and 96 hours.

Results: Mortality values were calculated based on larval deaths at the experimental stage. In many studies using this method, a high mortality rate was observed even at doses much lower than the recommended doses. In most cases, the recommended dose was affected not only pests but also beneficial organisms (parasitic wasps).

Conclusion / Discussion: The use of pesticides under the recommended dose (R.d.) may be important for the survival of beneficial organisms. A pesticide applied under the recommended dose (r.d.) is more sufficient to kill target organisms. New application methods can help reduce these problems.

Keywords: Insecticide, larvae, *Archips rosana*, recommended dose

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POSTER PRESENTATION

THE CHEMICAL INVESTIGATION OF *ACHILLEA TERETIFOLIA, A. SETACEA* AND *A. SCHISCHKINII* USING GS-MS/FID

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Objective / Purpose: *Achillea* L. (Asteraceae) is a widely distributed medicinal plant in the world and represented by 140 species in the world. *Achillea* L. species are commonly used in Turkish Traditional Medicine for the treatment of wounds, bleedings, headache, inflammation, pains, spasmodic diseases, flatulence and dyspepsia and hemorrhoids for years.

Material and Methods: The dried aerial parts of three *Achillea* species were cut into small pieces and subjected to hydro- distillation with water for 4 h, using a Clevenger-type apparatus to produce essential oils which were dried over anhydrous sodium sulphate and stored at +4°C until required. The essential oils were diluted by dichloromethane (1:3, v/v) before the GC run. Identification of the compounds was based on the comparison of their retention times and mass spectra with those obtained from authentic samples and/or the NIST and Wiley spectra as well as the literature data.

Results: The essential oil contents of Achillea teretifolia, A. setacea and A. schischkiii were determined at 85.96%, 87.74% and 93.94%, respectively. (18.87%) and p-Cymene (12.86%) of the major components of A. teretifolia, β-Eudesmol (29.17%) and Bisabolon oxide (26.39%) for A. setacea species and β-Eudesmol (39.59%) and Eucalyptol (18.83%) for *A. scischkinii* species determined, respectively.

Keywords: *Achillea teretifolia, A. setacea and A. schischkinii*, GS-MS/FID.

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POSTER PRESENTATION

IN VITRO PROPAGATION OF DAMASK ROSE (*ROSA DAMASCENA* MILL.)

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Objective / Purpose: *Rosa damascena* Mill. called damask rose or oil rose, is the most economically important rose species among other fragrant rose species cultured in the world and its essential oil was used in perfumery, cosmetic, pharmaceutical and food industries due to having for intense and pungent scent [1]. *In vitro* micropropagation of rose species **has been of great importance in recent years** as an alternative method to traditional propagation [2]. This study was carried to determine the efficient and cost effective protocol for the *in vitro* propagation on *Rosa damascena*.

Material and Methods: Shoots derived from 1.5 cm long single node explants in Murashige and Skoog (MS) medium [3] were cultured in liquid- modified MS media with higher levels of magnesium, calcium and iron supplemented with BA (1, 1.5 and 2 mg/l), NAA (0 and 0.1 mg/l) and 30 g/l sucrose for shoot proliferation. Shoots were sub-cultured 3 times in these media. After evaluated in terms of shoots number per explant and shoot length, shoots were transferred to ½ MS medium containing 2 mg/l IBA, 30 g/l sucrose and 162 mg/l phloroglucinol for 7 days in the dark. Then shoots were transferred two different liquid rooting media (½ MS and ½ modified MS) under16 h photoperiod. Two months later plants were evaluated for rooting rate, root number, plant length and plant weight.

Results: In this study, all of the investigated parameters were affected by the media. The highest shoot number per explant and shoot length were obtained from the medium supplemented with 2 mg/l BA while the lowest values were recorded in medium containing the composition of 1 mg/l BA and 0.1 mg/l NAA. On the other hand ½ MS medium was more successful than the ½ strength of modified MS medium during the rooting phase. Not only higher rooting rate (71.11%) but also higher root numbers (5.22) were obtained from the ½ MS medium compared to ½ modified MS medium. Besides ½ MS medium gave the maximum values in terms of plant weight and plant weight.

Conclusion / Discussion: As a result of this research, liquid media may be used in the micropropagation of *Rosa damascena* as an efficient and cost effective application.

Keywords: *Rosa damascena*, shoot proliferation, rooting, *in vitro*.

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POSTER PRESENTATION

VOLATILE OIL YIELD AND COMPOSITION OF *SIDERITIS SYRIACA* SUBSP. *NUSAIRIENSIS* (POST) HUB.-MOR. DISTRIBUTED IN THE FLORA OF TURKEY

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Objective / Purpose: The genus *Sideritis*, belongs to the family of *Lamiaceae*, are a group of plants known as common names "ironwort" and "mountain tea" in the world or local names "dag çayi" and "yayla çayi" in Turkey. *Sideritis* genus is represented by 46 species and 53 taxa altogether, 39 of which endemic in Turkey. The bioactivity of the *Sideritis* species has a great potential for human health because of its biological, antibacterial and antioxidant activities [1,2,3]. In this research, volatile oil yield and compounds of *Sideritis syriaca* subsp. *nusairiensis* (Post) Hub.-Mor. which is extensively collected wild in Turkey's southern and southeastern regions were identified.

Material and Methods: The aerial parts of *Sideritis syriaca* subsp. *nusairiensis* (Post) Hub.-Mor. were collected in the flowering season from the Bolkar Mountain (Aktoprak/Niğde/Turkey), on September, 2017, an altitude 1300-1400 m. After cutting of the fower stalks when in full bloom were dried under shade. The volatile oil was isolated by hydrodistillation from the dried herbs with a Clevenger-type apparatus. The volatile oil distilled was analysed by GC-FID/MS to determine the volatile compounds. Identification of compounds was carried out with the help of retention times of standard substances by composition of mass spectra with the data given in the Wiley, Nist, Tutor library.

Results: The volatile oil yield of *Sideritis syriaca* subsp. *nusairiensis* was 0.05% (v/w). A total of 22 compounds, representing over 99% of the volatile oil, were identified by the GC-MS analyses. The volatile oil was found rich in monoterpene hydrocarbons comprising mainly α-pinene (23.62 %), β-pinene (30.73%), and dl-limonene (7.69%), and **sesquiterpene**s comprising mainly (E)-β-farnesene (9.00 %) and δ-cadinene (3.06%). The compound classes of the volatiles were monoterpene hydrocarbons (68 %), sesquiterpene hydrocarbons (19.59%), oxygenated monoterpenes (6.38%), oxygenated sesquiterpenes (2.04%), aliphatic hydrocarbons (1.69%), aromatic alcohols (1.40%), and acyclic monoterpenes (0.90%).

Conclusion / Discussion: The monoterpene hydrocarbons comprising mainly α-pinene, β-pinene, and dl-limonene, and **sesquiterpene**s comprising mainly (E)-β-farnesene and δ-cadinene were characteristic for the volatile oil of *Sideritis syriaca* subsp. *nusairiensis*, and these compounds will be possible chemotaxonomical markers of this species.

Keywords: *Sideritis syriaca* subsp. *nusairiensis*, Turkey's flora, volatile compounds

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POSTER PRESENTATION

THE EFFECTS OF LEDS WITH DIFFERENT COLOURS ON THE GROWTH, NICOTINE AND PHENOLIC PRODUCTION IN *IN VITRO* PLANTS OF *NICOTIANA TABACUM* L.

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Objective / Purpose: Tobacco (*Nicotiana tabacum* L.) is an annual-grown herbaceous plant from the *Solanaceae* family. It is covered in the category of industrial, medicinal and aromatic plants. Shamans and indigenous tribes have used tobacco leaves or soap for many years for wound care [1]. *Nicotiana tabacum* L. is the most cultivated species among more than 60 tobacco species [2]. Light-emitting diodes (LEDs) offer many advantages in agricultural production as they are in daily life. Their small size, durability, long lifetime, cool emitting temperature, and the option to select specific wavelengths for a targeted plant response make LEDs more suitable for plant-based uses than many other light sources [3-6]. The aim of this study is to determine the effects of LEDs with different colours on the growth, nicotine and phenolic content of in *in vitro* plants of tobacco.

Material and Methods: *In vitro* plants obtained from seeds were cultured in MS medium for 28 days under LEDs with different colours (white, red, blue, combination of red and blue). After harvest, changes in the shoot length, shoot weight, leaf number, total chlorophyll, nicotine and total phenolic contents in plants were determined according to LEDs applications.

Results: At the end of the study, it was determined that physical and biochemical parameters were changed according to the applications of LEDs with different colours. The highest shoot length was obtained from the plants under red LEDs while the maximum values in the shoot weight and the leaf number in plants grown under white LEDs. The most of total chlorophyll content was found in plants cultivated in the combination of red and blue LEDs. Not only blue LEDs but also combination of red and blue LEDS gave the best results in phenolic content. Nicotine, the most important compound in tobacco, also changed according to the colours of the LEDs. The lowest nicotine was found in plants grown under red LEDs while the highest nicotine content was found in plants under combination of red and blue LEDs.

Conclusion / Discussion: These results obtained from the study demonstrate that supplemental light quality affected plant growth and chemical structure of *in vitro* tobacco plants. Based on this study, it appears that the combination of red and blue LEDs resulted in many positive effects on nicotine and phenolic contents.

Keywords: *Nicotiana tabacum*, LEDs, growth, nicotine, total phenolics.

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POSTER PRESENTATION

CHEMOENDOCRINE METRONOMIC TREATMENT OF METASTATIC ESTROGEN RECEPTOR-POSITIVE BREAST CANCER WITH *TAXUS BACCATA* L. DERIVED AND OTHER CYTOSTATIC AGENTS IN COMBINATION WITH AROMATASE INHIBITORS

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Objective / Purpose: The achievements of the modern medicine resulted in an increased survival of metastatic breast cancer patients. However, intense chemotherapies including conventional cytostatic agents (anthracycline antibiotics etc.) can induce life-threatening side effects (cardiotoxicity etc.) that restrict their application. In contrast, plant-derived agents, such as taxanes, obtained semisynthetically from *Taxus baccata* L., are highly efficient and less toxic natural cytostatic agents. Metronomic therapy is a contemporary method developed as administration of low doses of cytostatic agents that in combination with low doses of other anticancer drugs can induce long lasting tumor dormancy with minimal side effects. We aimed to investigate the efficacy of metronomic therapy, including a *Taxus baccata* derived agent (paclitaxel) or other cytostatic drug (capecitabine) in combination with an aromatase inhibitor (AI, anastrozole), in the treatment of ER/PR-positive breast cancer.

Materials and Methods: All plant-derived and other anticancer agents were of commercial origin. The primary systemic treatment of estrogen/progesterone receptors (ER/PR)-positive breast cancer consisted of paclitaxel (80 mg/m^2), i.v. infusion once every 7 days for 3 weeks, followed by a week rest (a cycle) plus anastrozole (1 mg daily). This therapy was followed by treatment with capecitabine (2x1.5 g daily) for every two weeks, followed by a week rest, plus anastrozole (1 mg daily) (*protocol 1*, 3 months). Maintenance therapy included capecitabine (3x0.5 g daily) for every 2 weeks, followed by 1-week rest, plus anastrozole (1 mg daily) (*protocol 2*). For a long period, this treatment can be modified to include capecitabine (1g once daily) plus anastrozole (1 mg daily) without interruption (*protocol 3*). In case of individual side effects (erythema, heart flutter etc.), a week rest in every cycle of capecitabine treatment can be also introduced in the protocol 3. Xgeva (denosumab, 120 mg) subcutaneous injection was administered once every 4 weeks for bone metastases treatment.

Results: The patient (74 years old) was initially diagnosed with advanced ER/PR-positive breast cancer (pT4bpN2Mx), lung and bone metastases. After palliative mastectomy, a primary systemic treatment with paclitaxel plus anastrozole was administered for 3 weeks (a cycle). This treatment should consider possible glucose intolerance due to premedication with antiallergic agent dexamethasone. Anastrozole was applied as AI because in this case letrozole induced occasional heart flutter. The chemoendocrine metronomic therapy using taxane plus anastrozole (for 3 weeks) was followed by capecitabine plus anastrozole treatment (*protocol 1*, 3 months). AI is given without interruption. After that, a PET-CT scanner observation registered no metastases in the lungs, lymph nodes and other organs, the progression of bone metastases was countered. The tumor marker CA 15-3 level was reduced from 57 to 34 U/ml (ref. 0-31 U/ml), blood count showed complete disease remission. The maintenance therapy (*protocol 2*) was carried out for 2 years and was continued to maintain the disease remission by metronomic doses of capecitabine plus anastrozole (*protocol 3*).

Conclusion / Discussion: Chemoendocrine metronomic therapy, including *Taxus baccata*-derived taxanes plus AI (anastrozole), followed by low doses of a cytostatic agent (capecitabine) plus AI is a highly efficient approach for successful treatment of metastatic ER/PR-positive breast cancer.

Keywords: *Taxus baccata* L., taxanes, aromatase inhibitors, capecitabine, chemoendocrine therapy

POSTER PRESENTATION

JUNIPERUS L. REPRESENTATIVES AS NEW SOURCES OF THE ANTICANCER DRUG PRECURSOR PODOPHYLLOTOXIN

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Objective / Purpose: The plant kingdom is an invaluable source of anticancer chemotypes. Podophyllotoxin (PPT) is a precursor for the synthesis of efficient anticancer drugs etoposide, teniposide etc. Natural sources of PPT are *Podophyllum peltatum* L. and *Podophyllum hexandrum* Royle, however they are considered as endangered species because of their difficult cultivation and intensive exploitation. This research is aimed at identification of new anticancer *Juniperus* L. representatives, which activity correlates with their PPT content. Junipers are evergreen species producing significant quantity of plant material all the year. In response to demands of the clinical practice in prevention of the harmful action of chemotherapeutical agents on healthy tissues, we evaluated also the effects of efficient antioxidants on the anticancer activity of juniper extracts.

Material and Methods: *Juniperus* representatives were received from the Arnold Arboretum, Harvard University, USA, and from the Balkan Peninsula region. Podophyllotoxin identification in the extracts was carried out by UHPLC/HRMS. The antiproliferative activity of cytostatic agents was evaluated by statistical analysis of their IC_{50} values, calculated from the dose-response curves of MTT-assays after treatment of NB4 acute promyelocytic leukemia cells with juniper extracts or podophyllotoxin in the presence or absence of antioxidant *Rhodiola rosea* L. extract at a concentration of 30 microgram/ml (corresponding to its DPPH-scavenging concentration SC_{50}).

Results: In the group of studied junipers, the leaves extract of *J. virginiana* 'Glauca', *J. virginiana* 'Canaertii' and *J. scopulorum* 'Moon light' demonstrated best antiproliferative activities, confirmed by their IC_{50} values (0.2-0.3 microgram/ml in NB4 APL cells). Podophyllotoxin was identified as anticancer compound in the studied juniper extracts. Combination of cytostatic and antioxidant principles in the treatment of leukemia cells revealed maintenance of high antiproliferative activity of the cytotoxic juniper extracts in the presence of antioxidant *Rh. rosea* extract.

Conclusion / Discussion: *J. virginiana* 'Glauca', *J. virginiana* 'Canaertii' and *J. scopulorum* 'Moon light' are potential new natural crops for production of PPT and potential therapeutic anticancer extracts. Combination of cytostatic and antioxidant principles in the anticancer treatment is aimed at prevention of the healthy tissues from the harmful action of cytotoxic agents during intense chemotherapies. Optimization of the extraction yields and PPT quantification in efficient anticancer *Juniperus* representatives are envisaged in the near future.

Acknowledgements: The work is performed within the Bulgarian Science Fund contract DN 07/25 (2016); contract 37-2016 of the Arnold Arboretum, Harvard University, USA with gratitude to Dr. Michael Dosmann and Dr. Faye Rossin; '*Erasmus plus'* agreement (2016-2020) between the Bulgarian Academy of Sciences and the Medical University of Lublin, Poland.

Keywords: *Juniperus* L., podophyllotoxin, *Rhodiola rosea* L., UPLC/HRMS

POSTER PRESENTATION

MOLECULAR AND PALLINOGICAL INVESTIGATIONS ON *NEPETA* × *TMOLEA* (LAMIACEAE) AND ITS PARENTS

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Objective / Purpose: In this study, we have aimed to investigate pollen characters using a light microscope (LM) and DNA sequence differentiation of a hybrid taxon of *Nepeta* L. and its parents. **Introduction:** *Nepeta* L. (catmint) is one of the largest (ca. 300 spp.) and economically important genera in the Nepetoideae and known as "kedi nanesi" in Turkey. *Nepeta* species are widely distributed in Eurasia, North Africa, North and Central America and the Canary Islands. South western Asia and the western Himalayas have the greatest diversity and species richness of this genus (1-4). *Nepeta* species are widely used in folk medicine because of their antispasmodic, expectorant, diuretic, antiseptic, antitussive and antiasthmatic activities. One of the most famous and used is *Nepeta cataria* (Catnip), and it has a long history of use as a tea in Europe before real tea was imported from the orient. The flowering tips of the plant have also been used as a sedative drug (5-6). Some of the *Nepeta* species are used by bees as a source of pollen and nectar (7). There are 33 species (38 taxa) in the revision performed by Hedge, in the Flora of Turkey, and later two species were added to these numbers. Species number increased to 35 (40 taxa, 19 of them are endemic) in total. In this study, the hybrid taxa, *Nepeta* × *tmolea* Boiss. and its putative parents *N. nuda* L. ssp. *nuda* and *N. visdica* Boiss. which naturally grown in Turkey are investigated regarding molecular and palynological characters. **Material and Methods:** DNA isolations were done using silica gel-dried fresh leaf materials using plant DNA isolation kits. Nuclear ITS DNA region and *trn*L-F DNA region from chloroplast genome were investigated in this study. ITS1 and ITS4 primers and trnLc and trnLf primers were used to amplify nrITS and cpDNA regions, respectively. Obtained DNA sequences were edited using Sequencher and aligned using ClustalW. Differences among the samples were analysed via BioEdit. Pollen grains for examination by LM were prepared according to the Erdtman (E) and/or Wodehouse method (8). Polar axis (P), equatorial axis (E), colpus length (Clg) and width (Clt), apocolpium diameter, exine thickness and mesocolpium were measured on the pollen grains. Results were expressed as mean ± standard deviations. The measured polar axis and equatorial diameter were based on at least 30 samples and other characters on approximately 20 under the LM. All of the measurements were done using CARNOY 2.0 (9). **Results:** When the nrITS sequences of *Nepeta* × *tmolea* and its parents are compared, *N.* × *tmolea* has 9 single nucleotide polymorphisms (SNP). These SNPs also separate its parents from each other. *N.* × *tmolea* has some intermediate characters between its parents such as leaf size, indumentum density and our DNA data contributes with the morphological characters. According to trnL-F data, *N.* × *tmolea* has three SNPs differing from its parents, one seven-nucleotides-insertion and one six-nucleotides-deletion. These insertion and deletion regions are very important to define its phylogenetic positions and inheritance cpDNA genome. *N. viscida* has approximately 36.00 µ in polar axis and 32.10 µ in equatorial axis. Colpi length is 28.83 ± 1.25 µ, and colpus width is 4.20 ± 0.20 µ. Mesocolpium size of *N. viscida* is 11.27 ± 1.79 µ. Polar axis and equatorial axis of *N. nuda* subsp. *nuda* are 32.00 ± 4.20 µ and 26.50 ± 2.76 µ, respectively. Colpus length of *N. nuda* subsp. *nuda* is 21.25 ± 1.44 µ, and mesocolpium size is 11.89 ± 0.11 µ. *N. viscida* and *N. nuda* subsp. *nuda* have bireticulate exine ornamentation. As the morphological characters of *N.* × *tmolea* are in an intermediate form between its parents. The pollen characters also show intermediate form. *N.* × *tmolea* has some unmatured pollen grains, and pollen viability is not same as much as its parents. **Conclusion / Discussion:** DNA sequences, especially nrITS data, have been using by many scientists to discover the phylogenetic position and relationship of numerous species in the literature. In this study, nrITS gave information about SNPs and *trn*L-F was used to specify the maternal and paternal species of *N.* × *tmolea*. Pollen characters of *N.* × *tmolea* are investigated in detail for the first time in this study. Pollen features are very important issues to identify the relationship between the hybrid and its parents, and also these characters can be used to specify which specimens are hybrid which of them are species (10-12).

Keywords: *Nepeta*, hybrid, Lamiaceae, pollen, nrITS, *trn*L-F

Acknowledgements: This study was supported by the Balıkesir University Research Foundation Centre (project number: 2017/144).

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POSTER PRESENTATION

HPLC-MS AND NMR ANALYSES OF MAQUI (*ARISTOTELIA CHILENSIS* (MOLINA) STUNTZ) BERRY EXTRACT

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Objective / Purpose: Maqui (*Aristotelia chilensis* (Molina) Stuntz) is a plant of the Elaeocarpaceae family widespread in Chile and Argentina. This shrubby plant produces edible berries characterized by high content of bioactive molecules, such as anthocyanins, known for their antioxidant and anti-inflammatory properties [1]. This research aimed to optimize the extraction method to obtain a maqui berry extract (MBE) rich in anthocyanin, using the Design of Experiments approach.

Material and Methods: Design of Experiments was applied in order to optimize the Maqui S/L extraction method, starting from a commercial powder of dehydrated maqui berries. For this purpose, a multi-methodological approach, which consists of the combination of targeted RP-HPLC-PDA-ESI-MSn and untargeted NMR spectroscopy, was employed.

Results: Five compounds (malvidin glucoside, citric acid, caffeoylglucaric acid, and other) were identified for the first time thanks to HPLC-MS/MS analysis in MBE. NMR analysis allowed the identification of six organic acids (i.e. formic acid, gallic acid, quinic acid, malic acid, succinic acid and shikimic acid), GABA, choline and trigonelline.

Conclusion / Discussion: The obtained data underline that the combination of HPLC-MS and NMR resulted to be useful to obtain a complete picture of the phytochemical profile of MBE.

Keywords: Maqui berry extract; Design of experiments; Phytochemical profile

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POSTER PRESENTATION

PHYSICOCHEMICAL AND PHYTOCHEMICAL EVALUATION OF *RUTA CHALEPENSIS* IN THE REGION OF TIARET (ALGERIA)

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The aim of this study was to present the wild grown *Ruta chalepensis* which remains unexploited in our country despite its useful biological and pharmacological effects. This research deals with the physicochemical composition and phytochemical profile of this plant which was harvested in the region of Feidja (Tiaret). According to the recorded physicochemical results, it was be found that *Ruta chalepensis* leaves are slightly acid; pH = 6.14 ± 0.01 and have a significant electrical conductivity of 4.36 ms / cm with a dry matter of 14.9 % ±0.1. The results of biochemical analyzes of lipids, fibers and pectin were 6.02% ± 0.03, 5.35% ± 0.18 and 3.52% ± 0.25 respectively. The carbohydrate content was 3.8% for total sugars and 1.97% for reducing sugars.

The determination of total phenolic compounds content using Folin Ciocalteu reagent gave an amount of 1.57 mg GAE / g extract. The obtained antioxidant activity of the methanol leaves extract expressed by ferric reducing power (FRAP test) was 0.064 mg AAE / g extract. Phytochemical screening of methanol leaves extract revealed the presence of flavonoids, alkaloids, terpenoids and tannins.

Keywords: *Ruta chalepensis*, Physicochemical, Phytochemical, Antioxidant.

POSTER PRESENTATION

AN ETHNOBOTANY STUDY IN ENEZ TOWN FROM EDİRNE

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Purpose: The aim of this study is to determine the local and Latin names, the parts used, forms and purposes of utilization of the plants used by local people in villages of Enez.

Material and Methods: The study is executed in March-October in the years of 2013-2015 in villages of Enez and surrounding villages. Interviews were carried out face-to-face with the community. In this study, 10 villages of Enez province were visited and interviews were performed with 18 persons in total. The identification of the plant species those determined to be in use was based on "Flora of Turkey and East Aegean Islands" (Davis, 1965-1988; Güner et al. 2012). The plant samples identified are kept in Faculty of Pharmacy.

Results: In this study, it was specified that 79 taxa of plants including in 35 families be in use. According to the determinations, 32 of these utilized taxa were used for medical, 39 taxa for food and 8 taxa for different purposes. The scientific names of the plants, local names, families, usable parts and forms of utilization were listed alphabetically in the tables.

Conclusion: There is no study performed in that area of research before about the local names and ethnobotanical properties of the plants.

Keywords: Edirne, Enez, ethnobotany, Turkey

Acknowledgement: I wish to express our gratitude to all the villagers of Enez and province, who have collaborated in the realization of this study. The study was carried out with the support of Trakya University (project 2013/22).

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POSTER PRESENTATION

COMPOSITION OF THE ESSENTIAL OIL OF *HYPERICUM LANUGINOSUM* LAM. Var. *LANUGINOSUM* LAM.

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Purpose: The genus Hypericum is represented in the Flora of Turkey by 94 taxa (1-4). Hypericum species are commonly used in folk medicine for the treatment of gastric ailments, including peptic ulcers, burns, bruises, swelling, inflammation and anxiety as well as bacterial and viral infections (5,6). The aim of this study is to illuminate the composition of the essential oil of aerial parts of *Hypericum lanuginosum* Lam. var. *lanuginosum* Lam. (Hypericaceae) collected from Tokat.

Material and Method: The essential oil from air-dried aerial parts of the plant was isolated by hydrodistillation using a Clevenger apparatus. Chemical composition of the oil was investigated using GC-FID and GC-MS techniques.

Results: Germacrene D (13.6%), *β*-elemene (12.2%), *α*–selinene (6.2%), *β*-selinene (5.7%), *α*-pinene (5.6%) and bicyclogermacrene (5.3%) were found as main compounds in the essential oil of the aerial parts of the plant.

Conclusion/Discussion: In a previous study, the major components were reported spathulenol (17.3%), caryophyllene oxide (13.1%), *α*-pinene (11.7%) and undecane (6.2%) in the essential oil of aerial parts of the plant (7).

Key words: *Hypericum lanuginosum* var. *lanuginosum*, Hypericaceae, essential oil, GC-FID, GC-MS

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POSTER PRESENTATION

CEMICAL COMPOUNDS OF *HAPLOPHYLLUM THESIOIDES* ESSENTIAL OIL

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Purpose: Turkey is one of the richest countries in terms of *Haplophyllum* genus. The genus is recognized in the Flora of Turkey by 17 taxa (1,2). The aim of this study is to evaluate the essential oil components of the essential oil of aerial parts of *Haplophyllum thesioides* (Fisch ex DC.) G. Don. (Rutaceae) collected from Tokat.

Material and Method: The essential oil from air-dried aerial parts of the plant was isolated by hydrodistillation using a Clevenger type apparatus. Chemical composition of the oil was investigated using GC-FID and GC-MS techniques.

Results: Germacrene D (36.1%), *δ*-cadinene (5.8%), hexadecanoic acid (4.0%), *γ*-muurolene (3.9%) and alloaromadendrene (3.6%) were found as main compounds in the essential oil of *H. thesioides*.

Conclusion/Discussion: In literature, chemical components of essential oil investigations on different species of *Haplophyllum* namely; *H. tuberculatum*, *H. magalanthum* and *H. myrtifolium* and *H. robustum* (3-6). This is the first report on the essential oil composition of *H. thesioides.*

Key words: *Haplophyllum theisoides*, Rutaceae, essential oil, GC-FID, GC-MS

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POSTER PRESENTATION

ESSENTIAL OIL COMPOSITION AND ANTICANDIDAL ACTIVITY OF *TEUCRIUM POLIUM*

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Objective / Purpose: *Teucrium polium* L. (Lamiaceae) is one of the 300 species of the genus *Teucrium* from Lamiaceae family most of which are found in the dry and stony places of the hills and deserts of Mediterranean countries, South Western Asia, Europe and North Africa [1]. It is a wild-growing flowering medicinal plant whose species have been used for over 2000 years in traditional medicine due to its diuretic, diaphoretic, tonic, antipyretic, antispasmodic and cholagogic properties [2]. During the past 40 years, different classes of compounds have been isolated from various parts of *T. polium* of which the main groups are terpenoids, flavonoids and iridoids. It has been found that these compounds possess a broad spectrum of pharmacological effects including antioxidant, anticancer, antiinflammatory, hypoglycemic, hepatoprotective, hypolipidemic, antibacterial and antifungal [3]. The aim of the present work was to get a better knowledge of the volatiles of *T. polium.*

Material and Methods: Plant material was collected from Turkey, Antalya, Beycik, 01.10.2017. The volatile compounds obtained by hydrodistillation of aerial parts of *T. polium* were analyzed by GC/MS. Anticandidal assay was performed according to CLSI M27-A2 reference protocol. Amphotericin-B (Sigma-Aldrich) and Ketoconazole (Sigma-Aldrich) were used as standard antifungals [4].

Results: According to GC/MS results, T-Cadinol (21 %), α-Cadinol (8.8 %), α-Pinene (8.7 %) and Germcrene-B (8.7 %) were found as major constituents of the essential oil. All tested pathogenes inhibited by the oil between the concentrations of 0,06 to 0,25 mg/mL (MIC).

Conclusion / Discussion: Essential oil of *T. polium* demonstrated moderate antimicrobial effects against *Candida* species when compared to standard agents.

Keywords: Essential oil, Lamiaceae, *Teucrium polium.*

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POSTER PRESENTATION

CHEMICAL COMPOSITIONS AND ANTIMICROBIAL ACTIVITY OF *PRUNELLA VULGARIS*

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Objective / Purpose: The popular medicinal plant *Prunella vulgaris* L.,(Lamiaceae) is a perennial and an edible herbaceous plant which is widely distributed in the temperate zone and tropical mountains of Europe and Asia. It is known as 'heal-all' or 'self-heal', has therapeutical applications in alleviating sore throats, reducing fever, and accelerating wound healing [1]. Due to its medicinal and industrial importance, the demand for *P. vulgaris* has increased steadily in recent years. Phytochemical studies indicate that *P. vulgaris* contains oleanolic, betulinic, ursolic, 2α,3α- dihydroxyurs-12-en-28-oic and 2α,3α-ursolic acids, triterpenoids, flavonoids, tannins and anionic polysaccharide prunelline [2]. In the present work, chemical composition of the methanolic extract (ME) and infusion (INF) of *P. vulgaris* were investigated. In addition, antimicrobial activities were also examined.

Material and Methods: The aerial parts of *P. vulgaris* was collected in July 2017 from Beşikderesi, Eskişehir (Turkey). The ME and 5% INF of *P. vulgaris* were prepared. Their volatile compounds were trapped with Headspace Solid Phase Micro Extraction (HS-SPME) and analyzed by Gas Chromatography-Mass Spectrometry (GC/MS). ME and INF were examined for antimicrobial activity by the microdilution broth susceptibility assay against *Staphyloccoccus aureus* ATCC 6538, *Pseudomonas aeruginosa* **ATCC 27853**, *Escherichia coli* NRRL B-3008, *Streptococcus pyogenes* ATCC 13615 *and Candida albicans* ATCC 90028.

Results: Hexanal (23.1%), ionol (10.7%), (Z)-3-hexenal (3.2%) and 3,5-octodien-2-one were found as main compounds of the aerial parts of *P. vulgaris* INF. The ME of *P. vulgaris* were characterized with α-fenchone (11.1%), hexanal (8.2%), 3,5-octadien-2-one (4.7%), methyl benzoate (4.5%) and selina-4,11-diene (3.1%). The INF showed weak antimicrobial activity (Minimum Inhibitory Concentration (MIC)) against all tested microorganisms. The ME showed weak antimicrobial effects *E. coli*, *S. aureus* and ***P. aeruginosa***; *S. pyogenes* (20 mg/mL) and *C. albicans* (15 mg/mL) were observed.

Conclusion / Discussion: In conclusion, using HP-SPME-GC-MS, it was possible to quantify different volatile compounds like as hexanal, α-fenchone in *P. vulgaris* which belong to different chemical classes. Among the tested microorganisims, *S. pyogenes* and *C. albicans* were found to be more sensitive to the ME.

Keywords: *Prunella vulgaris*, HS-SPME, volatile compound, antimicrobial activity.

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POSTER PRESENTATION

ANTICONVULSANT AND RELATED NEUROPHARMACOLOGICAL EFFECTS OF METHANOL AND AQUEOUS EXTRACT OF *ANACYCLUS PYRETHRUM* ROOTS IN MICE

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Purpose: *Anacyclus pyrethrum* roots are reported to have good medicinal values in the traditional Moroccan medicine, especially against brain disorders, such as epilepsy, and against pain and inflammation. The objective of the present study is to test methanolic (MEAPR) and aqueous (AEAPR) root *anacyclus pyrethrum* extracts against some neurological troubles like convulsion, anxiety and depression on animal's mice models.

Material and methods: *Anacyclus pyrethrum* (L.) Link (Asteraceae) was harvested in June in a wild region at 2600m High in Atlas Mountains of Morocco. The anticonvulsant potential of MEAPR and AEAPR, provided at 50g/l in drinking water, was assessed in the Kainic Acid-Induced seizures experimental model. Anxiolytic-like effects of both extracts on behavioral paradigms of anxiety were also evaluated by using elevated plus maze and open field tests on mice. Moreover, antidepressant-like effects of MEAPR and AEAPR at 125mg/kg, 250mg/kg, and 500 mg/kg doses per os, were determined using tail suspension and splash tests.

Results: Seizure scores in the *Anacyclus pyrethrum* groups were significantly lower than those in the control group. The pretreatment with MEAPR and AEAPR decreases, significantly, the frequency of wet dogs shake; and increases, considerably, the latent period between the injection of the KA and the appearance of the seizures as compared to the control group. These behavioral results were confirmed by the immunohistochemical study on the hippocampus. Additionally, significant antidepressant-like effects were observed on mice pretreated with the AEAPR and MEAPR extract. Moreover, the MEAPR and AEAPR treated mice exhibited anxiolytic-like activity on all of the anxiety models used. The extract increases the number of entries and the time spent in open arm, as well as increasing the time of central entries and the time spent in the open field.

Conclusion and discussion: These results suggest that *Anacyclus pyrethrum* exhibits anticonvulsant, antidepressant and antioxyolitic properties on the models employed. Further studies are required to identify their active ingredients that may affect seizure threshold, mood, or anxiety.

Keywords: Anticonvulsant, antidepressant, anxiolytic, mice, *Anacyclus pyrethrum*

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POSTER PRESENTATION

HYPOLIPIDEMIC POTENTIAL STUDY OF HERBAL TEA FROM *NELUMBO NUCIFERA* GAERTN.

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Objective / Purpose: *Nelumbo nucifera* Gaertn. leaves is used in traditional thai herbal medicine for long term treating heart diseases and diabetes mellitus. Moreover, other previous research have revealed that it can reduce blood lipids, blood sugar, and weight. The purpose of this study was to investigate the effect of herbal tea from *Nelumbo nucifera* Gaertn. leaves extract, stamen and petal on blood lipid profiles of pre-dyslipidemia and healthy in a Thai population.

Materials and Methods: 20 participants have been divided into 2 groups: pre-dyslipidemia group (PDG, total cholesterol 200 - 240 mg/dl, n = 10) and healthy group (HG, n = 10). Participants in both groups consumed one bag of herbal tea once daily for 90 days.

Results: The interesting results revealed that the herbal tea decreased the level of systolic blood pressure (SBP), diastolic blood pressure (DBP), heart rate (HR), fasting blood sugar (FBS), blood urea nitrogen (BUN), creatinine (Cr), cholesterol, high density lipoprotein (HDL-C), low density lipoprotein (LDL-C), Serum Glutamic Oxaloacetic Transferase (SGOT), Serum Glutamic Pyruvate Transferase (SGPT) in participants of the PDG when compared with the HG. Administration of herbal tea produced a significant improvement in the clinical results by lowering DBP, FBS, BUN, LDL-C and SGPT level ($p < 0.1$).

Conclusion / Discussion: These findings indicated that the decreasing of blood lipids in high risk of high blood lipid levels are medically valuable and doesn't have any effect on healthy volunteers.

Key words: *Nelumbo nucifera* leave extract, pre-dyslipidemia, blood lipids

References:

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POSTER PRESENTATION

STUDY OF INHIBITORY EFFECT OF EXTRACTS OF *ZIZYPHUS LOTUS* AND *ASPHODELUS MICROCARPUS* ON THE FORMATION OF URINARY CRYSTALS AGGREGATE OF CALCIUM OXALATE TYPE IN VITRO

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Introdution: The major lithogenic factor in all chemical varieties lithiasis, is the supersaturation of urine with solutes in the calculi composition. The supersaturation due to the increase of the concentration of urine in lithogenic solutes, such as oxalate and calcium lithiasis oxalocalcique predominant variety lithiasis observed in the industrialized countries. Crystallization in vitro studies provide accurate kinetic and thermodynamic conditions for the formation and growth of crystalline species and the influence of various natural and chemicals on these processes, as well as the crystal aggregation.

Material and Methods: The number and size of aggregates formed in the study without inhibitor or inhibitor is determined using a polarized optical microscope and Fourier transformed infrared spectrophotometer

Results: Our results showed a significant inhibitory power for the plant *Ziziphus lotus* especially on the aggregate size of the crystals. The best percentage inhibition (74.13%) was obtained recorded with the concentration of 3 g per 100 ml. As regards the second plant *Asphodelus microcarpus*, adding the extract prepared with the concentration 1 g per 100 ml resulted in a decrease in the number of crystal aggregates formed with a percentage of inhibition 44.76%.

Conclusion: The inhibitory effect of the plant extracts tested in this experiment, in decoction, generally reveals a fairly significant inhibition from low concentrations, either by reducing the number or size of the aggregates formed during crystallization. This result was confirmed by microscopy and FTIR.

Keywords: Inhibition, crystallization, *Ziziphus lotus*, *Asphodelus microcarpus*, extract, stones.

POSTER PRESENTATION

SOME MEDICINAL PLANTS USED AS FOLK MEDICINE FOR COLON CANCER

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Objective/Purpose: The increasingly popular folk medicine, which is rapidly advancing despite the technological advances, is nowadays the alternative method of medicine called as traditional medicine. These methods, which are used in many diseases such as allergy, weakness, spasm pain, cold, immun system deterioration, have been very effective in cancer treatment and prevention of cancer. Some studies have shown that some plants reduce the risk of cancer and others, which shortens the duration of treatment, also reduce the complications that occur during the course of the treatment. This work is being done to compile and present existing information.

Materıal and Method: When studies and articles made in the last 10 years on the subject were examined, 25 of the plants on which most cancer researches were carried out were determined. Among these plants, photographs of plants which are used extensively among the public are given and their therapeutic effects are compared with each other.

Findings/Results and Discussion: According to the results of the literature research; colon cancer and plant relationship; *Rheum ribes, Ranunculales, Echinacea, Linum usitatissimum, Punica granatum L., Cornus mas, Vaccinium myrtillus* were found to be protective against colon cancer in particular. In addition to colon cancer, the indicated plants were also found to be effective in some other types of cancer. *Rheum ribes* in stomach and lung cancer, brain tumor; *Ranunculales* in lung cancer, liver cancers, leukemia, lymphoma and breast cancer; In *Echinacea's* pancreatic cancer; *Linum usitatissimum* in pancreatic and breast cancer; *Punica granatum* L. in breast and prostate cancer; *Cornus mas'* ın lungs, head and neck, liver, breast, prostate, food borne and soft tissue cancers; *Vaccinium myrtillus* has been found to be protective against cervical and liver cancer.

Keywords: Colon cancer, Folk plant

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POSTER PRESENTATION

SOME MEDICINAL PLANTS USED AS FOLK MEDICINE FOR DERMATOLOGICAL DISEASES IN EUROPEAN TURKEY

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Objective / Purpose: Most of the medicinal plants have been used for dermatological diseases such as burn diseases, hair loss, acne, injuries and haemorrhoids as folk medicine. In according to this, this paper includes some traditional medicinal plants which are used for dermatological diseases in European Turkey.

Material and Methods: In this presentation the photographs of some of the plants, locations of them in European Turkey and information about how they could be used for dermatological diseases as folk medicines, plant parts which were used for treatment, preparations, therapeutic effects, using dosages were given.

Results: The evaluation of relevant data in literature revealed that, *Carduus nutans* L. subsp. *leiophyllus* (Petr.) Stoj. & Stef, *Centaurea solstitialis* L., *Ecballium elaterium* (L.) A. Rich, *Quercus cerris* var. *cerris*, *Hypericum perforatum* L., *Rumex acetosella* L., *Rosa canina* L., *Urtica dioica* L. were used for haemorrhoids while *Galium rotundifolium* L., *Anthemis cretica* L., *Matricaria chamomilla* L. var. *recutita* (L.) Grierson and *Urtica dioica* L. were used for hair loss. In addition to this, it was seen that some plants *Urtica urens* L. and *Hypericum perforatum* L. were used for burn diseases. For acne *Urtica dioica* L. was used while for injuries *Plantago major* L. subsp. *intermedia*, *Cotinus coggyria* Scop and *Hypericum perforatum* L. were used.

Conclusion /Discussion: In spite of the well-developed medicinal facilities, the local people still use folk medicines for the treatment of dermatological diseases. It is important to document the valuable information because the transmission of knowledge from the old to the new generation.

Keywords: European Turkey, dermatological diseases, traditional medicinal plants

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POSTER PRESENTATION

IDENTIFICATION OF THE ANTI-ANGIOGENIC POTENTIAL OF *EUPHORBIA RESINIFERA A. BERGER* EXTRACTS USING THE CHICK EMBRYO CHORIOALLANTOIC MEMBRANE ASSAY

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Background/objective: The flowering plants of the spurge family (*Euphorbiaceae*) are world widely recognized as medical herbs to cure multiple types of cancer. Morocco hosts a variegation of Euphorbia species. The peculiar microclimate of the Middle and High Atlas of Morocco exclusively grows the Moroccan mound (*Euphorbia resinifera A. Berger*) a species endemic to these limestone mountains. While *Euphorbia officinalis* is well blended into Moroccan folklore remedies to alleviate uterine cancer, local populations do not use the Moroccan mound to treat cancer. Solid tumors trigger angiogenesis to sustain their expansion. Angiogenesis is the process by which new blood vessels are derived from a pre-existing vascular network. During tumorigenesis, the endothelial cells lining blood vessels switch from quiescence and proliferate to initiate the branching of new blood vessels that will provide the nutrients and oxygen necessary for tumor growth. If angiogenesis is inhibited, tumor growth may be blocked. Hence, anti-angiogenic molecules often display anti-cancer properties.
However, neither the anti-angiogenic nor the anti-cancer potentials of the Moroccan mound have been investigated although these properties are well documented in other Euphorbia species. Hence, we sought to investigate for the first time the anti-angiogenic properties of various extracts derived from Morocco's endemic species *Euphorbia resinifera A. Berger.*

Methods: We used the well-established chick embryo chorioallantoic membrane assay to screen several extracts of *Euphorbia resinifera A. Berger* for their anti-angiogenic potential on the vascular density of avian chorioallantoic membranes.

Results: After validation of the test using Diclofenac and □-choriogonatropin known for their respective negative and positive modulator effect on angiogenesis we evaluated various fractions extracted from *Euphorbia resinifera A. Berger*. Diclofenac displayed a dose-response effect when used at 0.5 µg/g of egg and 5 µg/g of egg with a vessel density of 45.26% and 57.2% respectively. □-choriogonadotropin induced angiogenesis by a factor 1.77 when used at 0.05 µg/g of egg and 2.22 when used at 0.5 µg/g of egg. The F fraction derived from *Euphorbia resinifera A. Berger* specifically displayed anti-angiogenic properties. Indeed, when eggs where treated with 0.5 µg/g of egg or 5 µg/g of egg of the F fraction, we observed an inhibition in blood vessel density in the chorioallantoic membrane of 60.89% and 75.72% respectively.

Conclusion: While the latex of *Euphorbia resinifera A. Berger* is a known carcinogen, we report for the first time the anti-angiogenic potential of the F fraction of *Euphorbia resinifera A. Berger.* We will further decipher the bioactive compound(s) contained in *Euphorbia resinifera A. Berger* responsible for the anti-angiogenic effect observed.

Keywords: Angiogenesis, Cancer, *Euphorbia resinifera A. Berger*

POSTER PRESENTATION

ANALYSIS OF ESSENTIAL OIL COMPOSITIONS OF *MENTHA PULEGIUM* IN TURKEY

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Objective / Purpose: Mentha L. (Lamiaceae) is a genus of aromatic perennial herbs and one of the most important sources of essential oil production. The members of this genus are used as perfumery, cosmetics and food industries thanks to their different aroma. The aim of this study was to determine the essential oil composition of Mentha pulegium L. by solid phase micro-extraction/gas chromatography/mass spectrometry (SPME-GC-MS).

Material and Methods: The Mentha pulegium plant was collected from natural habitat. The samples were analyzed on a Shimadzu QP2010 ULTRA FID GC–MS system. The SPME parameters including fiber type DVB-CAR-PDMS 50/30 mm and PDMS-DVB 65 mm were analyzed for essential oil composition of Mentha pulegium.

Results: The essential oil compositions were identified in Mentha pulegium by SPME-GC/MS analysis using two different fibers. Totally 177 compound were separated and identified from the studied mint samples. The major constituents of the investigated taxa were Isopulegol (18.64%), 2-isopropyl-5-methylhex-2-enal (11.11%), 5-Allyl-4-[1-(p-aminophenyl) ethylidene hydrazono]-6 methyl-2 phenyl (8.79%), in fiber type DVB-CAR-PDMS 50/30 mm and 2- isopropyl-5-methylhex-2-enal (24.13%), Cyclohexanone, 5-methyl-2-(1-methylethyl)-cis (12.33%), Cis piperitone oxide (9.93%) in fiber type PDMS-DVB 65.

Conclusion / Discussion: The chemical composition of the essential oil of the taxa had been reported before, but there is not any data related to SPME/GC-MS which is one of the sensitive and selective methods based on the literature.

Keywords: Essential oil, Mentha, SPME-GC-MS, Turkey.

POSTER PRESENTATION

THE EFFECTS OF THE SIDERITIS ÖZTÜRKII EXTRACT ON THE EXPRESSION LEVELS OF SOME APOPTOTIC GENES

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Objective / Purpose: The genus Sideritis (Lamiaceae) is represented by more than 150 species and annual or perennial plants. Many studies have been conducted to elucidate the chemical composition and pharmacological activities of plants of the genus. Sideritis öztürkii Aytac & Aksoy is an endemic plant to Turkey and used as herbal tea and folk medicine in central Anatolia. The objective of this study is to reveal the apoptotic effects of different extracts derived from Sideritis öztürkii on DLD-1 colorectal cancer cell line via Real Time PCR technique.

Material and Methods: In line with this objective, DLD-1 colorectal cells were grown under the required conditions for RNA extraction. To determine the apoptotic effects of extracts, the IC50 doses of Sideritis extracts were applied and RNA extractions were performed. After RNA extraction was performed followed by cDNA synthesis. The expression levels of apoptotic gene regions were evaluated via Real Time PCR. PCR amplifications were performed using Biorad CFX Connect system.

Results: As a result, it has been found that the Sideritis extracts applied have different effects on apoptotic gene expression levels. When the results obtained from PCR were considered as a whole, it was seen that Sideritis extracts up regulated the expressions levels of pro-apoptotic gene (APAF, BAX, TP53, HRK and casp3) and down regulated anti-apoptotic gene (BCL-2) in DLD-1 cells. In addition, leaf methanol extract was found to be more effective than aqueous extract in terms of apoptosis induction.

Conclusion / Discussion: In conclusion, the obtained results indicate that Sideritis öztürkii leaf and flower extracts have apoptosis inducing activity on colorectal cancer cell line DLD-1. This study is pioneering study for future studies and our studies will continue for determine the active phytochemicals in the extracts content.

Keywords: DLD-1, endemic, Turkey.

POSTER PRESENTATION

STUDY OF ANTIBACTERIAL PROPERTIES OF *CORIANDRUM SATIVUM* SEEDS EXTRACTED THROUGH MACERATION AND DIGESTION METHODS AGAINST FIVE PATHOGENIC BACTERIA *IN VITRO*

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Objective / Purpose: Natural products and traditional medicines have their incomparable advantages in modern medicine when used to develop new drugs. In this study the maceration and digestion methods were utilized for aqueous and methanolic extraction of seeds of the coriander. The objective of this study to determine anti-bacterial effects of Coriandrum sativum seed extracts on five pathogenic bacteria.

Material and Methods: For this purpose, both of the aqueous and methanolic extracts of coriander seeds were prepared by maceration and digestion methods. The following concentrations (20, 40, 80, 160 and 320 mg/ml) of each aqueous and methanolic extracts were applied. The experiment of current study involved five clinical multidrug-resistant bacterial isolates which were diagnosed from specimen collected in pediatric hospital of Kirkuk city. Under excessive aseptic conditions, the antibacterial specialties of coriandrum extracts toward examined bacteria were observed on the authority of agar well diffusion technique.

Results: The extracts were showed significant antibacterial activity against Staphylococcus aureus, Escherichia coli, Pseudomonas aerogenosa, Klebsiella pneumonia and Acenitobacter baumanii respectively.

Conclusion / Discussion: The existing investigation proposed that the aqueous and methanolic extracts of C. sativum seeds prepared by maceration and digestion methods had the comprehensive range antibacterial action toward the employed bacterial isolates. The present research displays the presence of the biologically potent chemical in coriander may validate their extensive usage in traditional medicine.

Keywords: Coriander, Maceration, Digestion, Antibacterial activity

POSTER PRESENTATION

SOME MEDICINAL AND AROMATIC PLANTS AND THEIR USAGE IN ANAMUR DISTRICT OF MERSİN

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Objective / Purpose: This research has been performed on the traditional use of some medical and aromatic plants of Anamur city. The research area is in the C4 square according to the Grid system in the flora of Turkey. As a result of the examination, almost all of the villages and plateus of Anamur were visited and researched. Plant specimens were collected from the area between 2016 and 2018. Old people from villages talked to survey and told how they are using these plants as medicine. A number of human races and tribes have settled here during different periods bringing in different cultures and customs1. As a result of this we come across a great accumulation of knowledge of traditional medicine in the country. Species belonging to this study were listed with their local and Latin names. **Material and Methods:** Developing countries are rich in medicinal and aromatic plants (MAPs) but, due to diffi culty in accessing effi cient extraction technologies, value addition to this rich bioresource is diffi cult. Turkey is one of the countries with richest plant diversity in the Mediterranean. Botany, pharmacy, chemistry, archeology, and other disciplines have contributed a lot towards the searching of new drug plants (Drews, 2000). The plant materials are usually sold as dried bunches open or pre-packed mixtures or as fresh preparations. ecommendation of the herbalists2..Villagers generally boil these plants in water. The information about herbal medicine is gathered from at least two interviewers. **Results:** This research underlines the ethnobotanical richness of the region. Rosa canina, Rosmarinus officinalis, Origanum vulgare L., Teucrium sp. L., Sideritis spp.,Anthemis sp.,Lavandula stoechas, Mentha sp., Helychrisum sp., Laurus nobilis, Hypericum sp.,Verbascum sp., Urtica sp., are used for making tea in the villages of the research area.The local people of Anamur ('yoruk') use Helichyrsum stoechas and Hypericum perforatum,Ophrys sp. for stomachalgia, Myrtus communis for obesity, *Capparis spinosa*, *Portulaca oleraceae*, *Crocus* sp., *Juglans regia* for salad, pickle and jam.

Apiaceae fam., C4 Mersin, Anamur, Eryngium maritimum L., Mamure Kalesi, seaside, 2m., 20.08.2017, Şen: used for cough. Fabaceae fam., C4 Mersin, Anamur, Anagyris foetida L., Ören antik kenti,20m., 05.02.2017, Şen 1111.Akdeniz elementi Medit.,Ph.: used for wounds but poisinous. Fabaceae fam., C4 Mersin, Anamur Spartium junceum L., Yukarıkükür köyü, yolkenarı, 900m, 28.05.2017,Şen 1312.Medit., Ph.
Asteraceae fam., C4 Mersin, Anamur Acanthus hirsutus Boiss., Halkalı yolu, Abies ormanı, 1200m., 19.05.2017,Şen 1243. Styracaceae fam., C4 Mersin, Anamur Styriax officinalis L., Abanoz, rocky places,1500 m., 19.05.2017,Şen 1266.Ph. Smilacaceae fam., C4 Mersin, Anamur Smilax aspera L., Ovabaşı köyü, Pinus forest, 60m.,21.05.2017, Şen 1292.Medit., Ch. Liliaceae fam., C4 Mersin, Anamur, Urginea maritima (L.) Baker, Çarıklar village, rocky Stones ,50 m., 25.09.2016,Şen 1069. Medit. Crp. Orchidaceae fam., Orchis anatolica Boiss. , Ovabaşı köyü, Pinus forest, 35m., 05.03.2017, Şen 1113. Verbenaceae fam., Vitex agnus-castus L., Ören antik kenti, roadside,10m., 05.08.2016, Şen 1055. Medit., Ph. Lamiaceae fam. Satureja thymbra L. , Gömmece mevkii, Kaşpazarı plateus,rocky places, 1900m.,28.06.2017,Şen 1705. Medit., Ch. Lamiaceae fam. Phlomis armeniaca Willd., Abanoz plateus, roadside,1500m., 19.05.2017, Şen 1265. İran Turan elementi Anacardiaceae fam., Pistacia terebinthus L. Subsp. Palaestina (Boiss.) Engl., Ovabaşı,open area,35m.,21.05.2017,Şen 1290. Rhamnaceae fam., Paliurus spina-christi MILLER, Ovabaşı,Pinus forest,45m., 21.05.2017,Şen 1291. Caprifoliaceae fam. Valeriana dioscoridis Sm.,Ören , rocky places, 10m., 05.02.2017, Şen 1110. Capparaceae fam., Capparis spinosa L. var. spinosa, Ören antik kenti, roadside,15m., 05.03.2017, Şen 1114. Geraniaceae fam., Biebersteinia orphanidis Boiss., Elbalak plateus, Elbalak mosque, rocky places,2000m.,14.05.2017, Şen 1511.*** new location

Conclusion / Discussion: Our data indicated that the fruit extract from Quercus coccifera emerged as the sources of possible cholinesterase inhibitors and deserves future studies. We found many plant from the region used for such some treatments as; anti-diabetic, anti-depressant, cardiotonic, diuretic, headache, indigestion, toothache. Also there are some species used as tea especially from Lamiaceae family.

Keywords: Ethnobotany, flora, medicinal and aromatic plant.

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POSTER PRESENTATION

MEDICINAL PLANTS CONSUMED AS HERBAL TEA GROWING IN ÇAMLIK VILLAGE

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Objective / Purpose: Turkey is very rich in terms of medicinal and aromatic plants. In recent years, the demand in teas made of medicinal and aromatic plants has been increasing steadily. Çamlık is a village in the district of Bucak, Burdur province. This study aims at identifying the medicinal plants that naturally grow in the village Çamlık and consumed as tea.

Material and Methods: Çamlık village is located in C3 square according to Grid system. Çamlık village was visited in 2016-2017 and interviews were held with local people. Some of the plant samples were collected from natural areas while some others were provided by local people and identified according to "Flora of Turkey and East Aegean Islands"[1,2]. In the study, the Latin name, family, local name, usable part, method of use and purpose of use of these tea plants were recorded.

Results: As a result of this work, 35 plant taxa from 18 families were identified. It was also identified that local people use herbal teas for diabetes, cold and flu, gastro-intestinal diseases, gynaecological diseases, urinary diseases, depression, painkiller, appetizing and hypertension.

Conclusion / Discussion: In this study, the medicinal plants that are naturally found and used as tea in the village Çamlık were studied. Lamiaceae, Asteraceae and Rosaceae were the main plant families that comprised of medicinally important plant species. As a result of this study, 35 plant taxa within 18 families were identified and it was found out that taxa from Lamiaceae family are the most commonly consumed medicinal plants as herbal tea.

Keywords: Çamlık village, ethnobotany, herbal tea, medicinal plants, Turkey

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POSTER PRESENTATION

HEADSPACE VOLATILES OF *ALLIUM SUBHIRSUTUM* L.

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Objective / Purpose: *Allium subhirsutum* L. from the Amaryllidaceae family is a plant species widespread around the Mediterranean region from Spain and the Canary Islands to Turkey and Palestine. The *A.subhirsutum* is called the regional name 'tüylü körmen,köremen' or called 'yabani sarımsak'. *Allium* is represented by a single species in Turkey is a Mediterranean elements. We collected the plant material needed for this study from İçmeler district of Marmaris district of Mugla province.

Material and Methods: *Allium subhirsutum* SPME-Red Room temperature-30 min. in A.subhirsutum sample using *headspace* -SPME procedure the fibres used in this study were coated with polydimethylsiloxane (PDMS, 100µm) (supplied by Supelco Bellefonte, USA), was used with a sampling time of 30min. Thermal desorption at 250ºC during 10 min For the GC/MS Analysis The GC/MS analysis was carried out with an Agilent 5975 GC-MSD system. Innowax FSC column (60 m x 0.25 mm, 0.25 mm film thickness) was used with He as carrier gas. GC oven temperature was kept at 60°C for 10 min and programmed to 220°C at a rate of 4°C/min, and kept constant at 220°C for 10 min and then programmed to 240°C at a rate of 1°C/min, at splitless mode. MS were taken at 70 eV. Mass range was from m/z 35 to 450.

Results and Discussion Headspace volatiles of crushed bulbs of *A.subhirsutum* were analyzed by gas chromatography/ mass spectrometry. The volatiles were trapped by SPME in a dynamic headspace set up. Volatiles of crushed bulbs of *A.subhirsutum* were trapped on an HS-SPME (Red fiber). Main components were found to be allyl methyl disulfide (41.0%), diallyl disulfide (20.7%) and dimethyl sulfide (15.3%).

Keywords: Amaryllidaceae, *Allium subhirtusum* L., Phytochemistry, GC-MS, Headspace volatiles. (HS-SPME,GC-MS)

References :
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POSTER PRESENTATION

DETERMINATION OF PHENOLIC PROFILE AND ANTIOXIDANT ACTIVITY OF *ROSMARİNUS OFFICINALIS* L. (LAMIACEAE) SPECIES FROM TURKEY

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Objective / Purpose: Rosemary (*Rosmarinus officinalis* L.) from the Lamiacae (Labiatae) family is an important medicinal and aromatic plant species which is a purple flowering, thin-leaved, always green. This species called with different names such as hasalbal, kuşdili ve akpüren in Turkish . *R. officinalis* is an important species due to it is essential oils and phenolics. The leaves of rosemary (*R. officinalis* L.) are very common in medicine. Rosemary is used for the treatment of food and medicinal treatment in ancient Romans and Greece, and nowadays many fields such as cosmetics, aromatherapy, pharmacy and food are used. According to the information obtained in the study of Ethnobotanic and Ethnopharmacognosic Investigations in Sarıcakaya (Eskişehir) Districts and Villages, rosemary plant was stimulated by the public and used to prevent external hair loss, soap making and debilitating. *R. officinalis* type is represented with one taxon in Turkey *R.officinalis* dried plant parts are used as spice and herb tea in Turkey.

Material and Methods: Dried herbal drug, collected plant material from the district of Sarıcakaya in Eskişehir 2016, was macerated with MeOH 70%. After the evaporation and lyophilization steps, the extract was analyzed by ABsciex 3200 Q trap LC-MS / MS system.

Results and Discussion: In LC-MS/MS analysis on Rosmarinic acid was found as major compound. Salvianolic acid derivatives also found in the extract. DPPH radical scavenging inhibition at 0,1mg/ml concentration was determined as 70.9 % for *Rosmarinus* extract which was similar with standard Gallic acid (69.5 %), Beta carotene blanching assay results were obtained as 27.1 % for *Rosmarinus* extract while gallic acid standard was demonstrated: 67.3% Trolox Equivalent antioxidant Capacity (TEAC) results were determined 0.21 mM for Rosmarinus extract, 2.38 mM. for positive control Gallic acid:

Keywords: *Rosmarinus officinalis* , Lamiaceae, Phenolic profile, Antioxidant activity.

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POSTER PRESENTATION

DETERMINATION OF PHENOLIC PROFILE AND ANTIOXIDANT ACTIVITY OF *SALVIA SCLAREA* L. (LAMIACEAE) SPECIES FROM TURKEY

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Objective: *Salvia* L. is an important genus of the Lamiaceae family comprises of approximately 900 species and represented in Turkey by 94 taxa belonging to 89 species with 50% endemism. *Salvia* are used in herbal remedy for the treatment of stomach aches, colds and sore throats as herbal tea. The purpose of this study was to define the antioxidant activity and phenolic profile of *Salvia sclarea*.

Material and Methods: In this study, S*alvia sclarea* L. was collected during to flowering stage in 2016, Sarıcakaya (Eskişehir/Turkey) and dried *medicinal* plant materials macerated with 70% MeOH. After evaporation and lyophilisation steps the extract was analysed with ABsciex 3200 Q trap LC-MS/MS system.

Results and Discussion: In LC-MS/MS analysis on *Salvia sclarea*, rosmarinic acid apigenin, luteolin/kaempferol glucuronide derivatives were identified as the main compounds. According to antioxidant activity, *S.sclarea* showed similar DPPH radical scavenging inhibitory activity with positive control gallic acid at the concentration 0.1mg/mL. Extract showed 67.7% inhibition while gallic acid showed 69.5 % inhibition. Beta carotene blanching assay conclusion were attain as 16.7% for *Salvia* extract while gallic acid standard was indicated: 67.3%. All the extracts showed the similar Trolox Equivalent Antioxidant activity (TEAC) with the score of 0.5mM TEAC while gallic acid showed 2.4 mM TEAC. The total phenolic content of the extract was also found 113.1 mgGAE in gr extract.

Keywords: *Salvia sclarea*, Lamiaceae, Phenolic profile, Antioxidant activity.

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POSTER PRESENTATION

VALORIZATION OF SESAME OIL WASTE AS A PHYTONUTRIENT RESOURCE

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Objective: Sesame oil production generates large amounts of cake as a waste after extraction of the oil. If the concerned waste is not assessed properly, it is just used as animal feed or fertilizer in the cultivation areas [1]. The relevant biowaste includes a wide variety of phytonutrients, having medical properties such as lowering the level of blood cholesterol, decreasing the oxidative stress, having anticancer, antiinflammatory and antihypertensive activities [2]. Therefore, the present study aims to present the valorisation of a biowaste derived from sesame oil production by using homogenizor-assisted (HAE).

Material and Methods: Effects of operation parameters on total biophenols (TB), total flavonoids (TF) and antioxidant activity (AA) of sesame cake extract have been investigated by applying multivariate statistic technique, Response surface Methodology (RSM). An efficient extraction method has been developed to obtain phenolic antioxidants from sesame cake through a simple, fast and inexpensive method, homogeniser-assisted extraction (HAE).

Results: Considering the fact that phenolic and flavonoid compounds significantly contribute to the free radicals scavenging activity of the plants, sesame cake might be accepted as a potential source of antioxidants.

Conclusion: This study will contribute to food, cosmetic and pharmecutical industries with a simple and environmentally friendly process by means of a generally recognized as safe solvent .

Keywords: Oilseed cake; biowaste; phytonutrients; antioxidants; optimization; RSM.

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POSTER PRESENTATION

INVESTIGATION OF PHENOLIC ANTIOXIDANTS IN SEVERAL PARTS OF KIWIFRUIT

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Objective / Purpose: Industrial usage of fruits and vegetables produce large amount of waste. These derivatives could be exploited to produce polyphenols. Kiwifruit is one of the most important sources in terms of vitamin C, vitamin A, folic acid and various phytochemicals. Latterly with the increasing consumption of fruit juice, more and more kiwi fruit wastes are being croped. In this study, antioxidant activity and total phenolic content of kiwi fruit and wastes were evaluated by different methods to reduce formation and evaluate valuable biocomponents.

Material and Methods: Polyphenolic extracts of kiwi fruit and wastes were prepared with %50/50 methanol solution by homogeniser assisted extraction (HAE) method. Two different antioxidant activity assays were used to determine the antioxidant capacity of the kiwi fruit and it's parts. Total phenolic content (TPC) was expressed as gallic acid equivalent per gram of material (mg-GAE/g-M). The findings were also evaluated with one-way analysis of variance (ANOVA) test.

Results: In accordance with the results, the highest amount of polyphenolic content were found to be the peels. Regarding antioxidant activity, the richest extract were also found to be kiwi peel of all parts.

Conclusion: Our results indicate that kiwi wastes are potential source of antioxidants owing to its polyphenols.

Keywords: Kiwi fruit, peel, seed, phenolic compounds, antioxidant activity, ANOVA.

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POSTER PRESENTATION

IDENTIFICATION OF PHENOLIC PROFILE IN THE WASTES OF SOME SELECTIVE MEDITERRIAN PLANTS

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Objective: Phenolic compounds are ingredients that can function as antioxidants, which have important physiological functions in plants as well as human health. They are mostly secondary metabolites of plants. On the other hand, peels are the primary waste fraction of the plant crops. Even though the concerned by-products have considerable amount of phytochemicals such as phenolic acids and flavonoids, they are just known to be consumed to produce animal feed, limonen, pectin, molasses and cold-press oils. The present investigation was undertaken to evaluate some of the phytochemical qualities in the waste of 5 most consumed plants from the Mediterranean region of Turkey.

Material and Methods: The samples were prepared with %50/50 methanol solution by homogeniser assisted extraction (HAE). Antioxidant activity identifed by DPPH and CUPRAC antioxidant activity methods. The total phenolic content was determined according to the Folin-Ciocalte method as gallic acid equivalent per gram of dried material (mg-GAE/g-DM). Calorimetric method were used to investigate total flavonoid content. The findings were also evaluated with one-way analysis of variance (ANOVA) test.

Results: The results of the present study suggest that the greatest phenolic content was belong to olive leaf extract followed by mandarin peels.

Conclusion: Total phenolic and flavonoid contents of the wastes were correlated with antioxidant capacity values achieved by CUPRAC and DPPH methods.

Keywords: Orange, grape fruit, lemon, mandarin, olive leaf, peel, phenolic compounds, antioxidant activity, ANOVA.

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POSTER PRESENTATION

DETERMINATION OF ANTIOXIDANT ACTIVITY AND TOTAL PHENOLIC CONTENTS OF EXTRACTS OF *CENTAUREA SALICIFOLIA* SUBSP. *ABBREVIATA* COLLECTED FROM DIFFERENT ALTITUDES

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Objective / Purpose: In this study, total amount of phenolic substances and antioxidant activities of extracts of *Centaurea salicifolia subsp. abbreviata* collected from different altitudes in an alpine region of the Giresun Mountains was determined by spectrophotometer. [1]. **Material and Methods:** *Centaurea* genius is represented in Turkey by 198 taxa, which of 109 are endemic. Different *Centaurea* spp. are used in the popular medicine in countries and in Turkish folk medicine for treatment to against various ailments including stomach ache, abscesses, asthma, hemorrhoids, headache, inflammatory disorders.[2] *Centaurea salicifolia abbreviata* speciments were collected from two different altitudes in Giresun alpine region. It's local name is "peygamber çiçeği". Maceration process with methanol was applied to obtained exctracts from all parts of the species. Folin-Ciocalteu assay was used to determine the total phenolic contents of the extracts.[3] Antioxidant activities of the extracts were evaluated by UV-spectrophotometer. The possible antioxidant activities of extracts were screened by free radical scavenging activity method. DPPH (2,2-diphenyl-1-picrylhydrazyl) and ABTS (2,2-azinobis-(3-ethylbenzothiazoline-6-sulfonic acid)) were used for the methods. BHT, BHA, Gallic Acid, α-Tocopherol, Trolox, Ascorbic acid were used as a standart. [4,5]

Results: While the total phenolic contents of low altitude extracts were revealed to range from 72,61 to 96,03 mg GAE/g high altitude extracts were 61,05 to 80,12 mg GAE/g, respectively. The obtained results have shown that all parts of the species have high level antioxidant properties.

Keywords: ABTS, *Centaurea salicifolia*, DPPH, peygamber çiçeği, total phenolic content.

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POSTER PRESENTATION

ANTIMICROBIAL EFFECTS OF THE STEM EXTRACTS OF *APIUM GRAVEOLENS* MILL.

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Objective / Purpose: In this study, the antimicrobial effects of the stem extracts of *Apium graveolens* Mill. were examined against some pathogen microorganisms.

Material and Methods: Plant leaves were reduced to powder with liquid nitrogen. Ten grams of this material was added separately in 100mL of n-propanol, methanol, acetone, n-hexane, ethyl acetate and ethanol. Then the mixtures were agitated for a period of 72 hours. They were filtered with Whatman no 389 filter paper. Under aseptic conditions the extracts were filtered through 0.45µ-pore size diameter filters and stored at 4°C. The agar well diffusion method is used for the antibacterial and anticandidal effects of extracts.

Results: The extracts of the n-propanol and acetone of *Apium graveolens* was found to be most effective against tested microorganisms from high to low, respectively. Ethanol extract displayed moderate effect while n-hexane and ethyl acetate showed no effect on tested microorganisms. Methanol extract showed effect only on *Bacillus subtilis* ATCC 6633. Propanol extract was found most effective against *Serratia marcescens* ATCC 13880 and showed no effect against *Streptococcus mutans* and *Candida albicans* ATCC 10231. Acetone extract showed high effect also against *Serratia marcescens* ATCC 13880. It showed no effect against *Streptococcus mutans*, *Streptococcus pneumoniae* ATCC 27336, *Klebsiella pneumoniae* ATCC 13882 and *Micrococcus luteus* ATCC 9341.

Conclusion / Discussion: The extracts of the n-propanol and acetone of *Apium graveolens* stem showed high effect comparing to other solvents. The ethanol extracts demostrated moderate effect, while the extract of n-hexane and ethyl acetate showed no effect against tested bacteria and yeasts. Since water is one of the basic compounds which has high polarity. Like water all solvents except hexane are polar; it is easier for them to penatrate in the organisms and show their effect. The n-propanol and acetone and exposed effective secondary metabolites like alkaloids, tannins, and flavonoids against microorganisms from *Apium graveolens* stem.

Keywords: *Apium graveolens*, antimicrobial, effect, folkloric medicine

References:

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POSTER PRESENTATION

EFFECTS OF THE STEM EXTRACTS OF *CYNARA SCOLYMUS* L. ON SOME MICROORGANISMS

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Objective / Purpose: In this study, the antimicrobial effects of the stem extracts of *Cynara scolymus* were examined against some microorganisms.

Material and Methods: Plant stems were reduced to powder with liquid nitrogen. Ten grams of this material was added separately in 100mL of n-propanol, methanol, acetone, n-hexane, ethyl acetate, chloroform and ethanol. Then the mixtures were agitated for a period of 72 hours. They were filtered with Whatman no 389 filter paper. Under aseptic conditions the extracts were filtered through 0.45µ-pore size diameter filters and stored at 4°C. The agar well diffusion method is used for the antibacterial and anticandidal effects of extracts.

Results: The extracts of the acetone and n-propanol of *Cynara scolymus* was found to be most effective against tested microorganisms. Ethanol extract showed moderate effect while n-hexane didn't show any effect on tested microorganisms. Methanol extract showed effect only on *Bacilllus cereus* ATCC 11778. Propanol extract was found most effective against *Serratia marcescens* ATCC 13880. Acetone extract showed high effect against *Pseudomonas aeruginosa* ATCC 35032 while chloroform and ethyl acetate showed static effect. *Pseudomonas aeruginosa* ATCC 35032 was found sensitive against 5 extracts while *Stapylococcus epidermidis* ATCC 12228 was resistant to all extracts used.

Conclusion / Discussion: The extracts of the n-propanol and acetone of *Cynara scolymus* stem showed high effect comparing to other solvents. The ethanol extracts demostrated moderate effect, while the extract of n-hexane showed no effect against tested bacteria and yeasts. Since water is one of the basic compounds which has high polarity. Like water all solvents except hexane are polar; it is easier for them to penatrate in the organisms and show their effect. The n-propanol and acetone brings out effective secondary metabolites like alkaloids, tannins, and flavonoids against microorganisms from *Cynara scolymus* stem while other solvents didn't revealed secondary metabolites with antimicrobial effects.

Keywords: *Cynara scolymus*, antibacterial, anticandidal, effect, agar disk diffusion method

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POSTER PRESENTATION

ANTIFUNGAL ACTIVITIES OF *URTICA DIOICA* L., *SINAPIS ARVENSIS* L. AND *APIUM GRAVEOLENS* MILL. LEAVES ON *BOTRYTIS CINEREA* FR.

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Objective / Purpose: In this study, the antifungal effects of the leaf extracts of *Urtica dioica*, *Sinapis arvensis*, and *Apium graveolens* were examined against *Botrytis cinerea*.

Material and Methods: Plant leaves were reduced to powder with liquid nitrogen in ceramic mortar. Ten grams of these materials were added separately in 100mL of boiling water, n-propanol, methanol, ethanol, acetone and ethyl acetate. Fenhexamid was used as positive control and sterile distilled water was used as negative control. Then the mixtures were agitated for a period of 72 hours. They were filtered with Whatman no 389 filter paper. Under aseptic conditions the extracts were filtered through 0.45µ-pore size diameter filters and stored at 4°C. The agar well diffusion method is used for the antibacterial and anticandidal effects of extracts.

Results: The boiling water extract of *Urtica dioica* was found effective against *B.cinerea* while other extracts showed no effect. Fenhexamid, as positive control, inhibited the fungal growth completely while water and pure solvents showed no effect.

Conclusion / Discussion: The *Urtica dioica* boiling water extract showed antifungal effect. Other solvents and plants didn't have any effect on *B.cinerea*. Fenhexamid was used as positive control and stopped fungal growth completely. It can be said that boiling water has revealed a component in *U.dioica* that has antifungal effect. But the same extract can be tested on other fungi to check whether it has same effect or not.

Keywords: *Botrytis cinerea*, *Urtica dioica*, *Sinapis arvensis*, *Apium graveolens*, antifungal effect

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POSTER PRESENTATION

ANTIBACTERIAL AND ANTICANDIDAL EFFECTS OF THE LEAF EXTRACTS OF *PERSEA AMERICANA* MILL.

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Objective / Purpose: In this study, the antibacterial and anticandidal effects of the leaf extracts of *Persea americana* Mill. were examined against some pathogen bacteria and some *Candida* species.

Material and Methods: Plant leaves were reduced to powder with liquid nitrogen. Ten grams of this material was added separately in 100mL of n-propanol, methanol, acetone, n-hexane, ethyl acetate and ethanol. Then the mixtures were agitated for a period of 72 hours. They were filtered with Whatman no 389 filter paper. Under aseptic conditions the extracts were filtered through 0.45µ-pore size diameter filters and stored at 4°C. The agar well diffusion method is used for the antibacterial and anticandidal effects of extracts.

Results: The extracts of the n-propanol, acetone and ethanol of *Persea americana* was found to be high effective against tested microorganisms from high to low, respectively. Methanol and ethyl acetate displayed moderate effect while n-hexane showed no effect on tested microorganisms. n-propanol extract was found most effective against *Mycobacterium smegmatis* ATCC 607 and showed no effect against *Serratia marcescens* ATCC 13880, *Streptococcus pneumoniae* ATCC 27336, *Candida albicans* ATCC 10231 and *Candida tropicalis*. Acetone extract showed high effect against *Bacilllus cereus* ATCC 11778 and *Stapylococcus aureus* ATCC 25923. It showed no effect against *Serratia marcescens* ATCC 13880, *Salmonella typhimirium* ATCC 14028, *Enterobacter aerogenes* ATCC 13048, *Streptococcus pneumoniae* ATCC 27336 and *Klebsiella pneumoniae* ATCC 13882. Ethanol extract was found most ffective against *Bacilllus cereus* ATCC 11778 and showed static effect against *Proteus vulgaris* ATCC 33420, *Pseudomonas aeruginosa* ATCC 35032, *Salmonella typhimirium* ATCC 14028.

Conclusion / Discussion: The extracts of the n-propanol, acetone and ethanol of *Persea americana* leaves showed high effect as regards to other solvents, respectively. The extracts of methanol, ethyl acetate demostrated moderate effect, while the extract of n-hexane had no effect against tested bacteria and yeasts. Hexane is a non-polar solvent but the other solvents are all polar. Since water is one of the basic compounds which has high polarity. Like water all solvents except hexane are polar; it is easier for them to penatrate in the organisms and show their effect. The n-propanol, acetone and ethanol revealed antimicrobial effective secondary metabolites like alkaloids, tannins, and flavonoids from *Persea americana* leaves.

Keywords: *Persea Americana* Mill., antibacterial, anticandidal, effect, folkloric medicine

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POSTER PRESENTATION

ALTITUDE EFFECT ON THE CHEMICAL COMPOSITION AND FUNCTIONS OF ESSENTIAL OILS OF*MICROMERIA BARBATA* FROM LEBANON

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Micromeria barbata, is an aromatic herb naturally grown in Lebanon. The aim of this study is to investigate the effect of altitude on the chemical composition, antimicrobial and antioxidant activity of the essential oil form *Micromeria barbata* in Lebanon. Plants were collected during flowering season from three different altitudes 650m, 1200m and 1700m. The materials were dried at room temperature in a shadow place for 5 days. The essential oil was extracted by hydro-distillation and the chemical components were analysed by *GC/MS*. The oil yield was affected by the altitude: from 0.9% at 650 m to 1.6% at 1200 m and 1700 m. GC/MS analyses revealed that the composition changes as function of altitude.

Indeed, the major constituent of essential oils was pulegone (65.12%) at 650 m. This percentage was gradually reduced to 7.43% at 1200 m to reach 1.97% at high altitude (1700 m). Inversely, as the altitude increased from 650 m to 1700 m, the rates of some components in essential oil, such as Limonene (from 2.22 to 25.09%), Piperitone (from 0.15 to 21.75%) and 2-Pinen-7-one (from 0.57 to 26.7%), were increased, in contrast to Pulegone. These results also show that antioxidant and antimicrobial activities of *Micromeria barbata* essential oil varies with the altitude of the growing plant.

Keywords: *Micromeria barbata*, essential oil, altitude, chemical composition, antimicrobial, antioxidant.

POSTER PRESENTATION

INHIBITORY EFFECT OF ESSENTIAL OIL FROM *ALLIUM SATIVUM* AGAINST SOME SPECIES OF DERMOPHYTES AND ASPERGILLUS

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Objective: This work aims to study the effect of the essential oil of garlic bulbs against some species of dermophytes and aspergillus respectively responsible for superficial and deep infections in humans and animals and the spoilage of many foods and feeds.

Material and Methods: The garlic bulb essential oil was obtained by conventional Clevenger extraction and was analyzed by GC-MS. Its effect against several fungal species namely *Aspergillus nidulans, Aspergillus fumigatus, Microsporum canis, Trichophyton mentagrophyte, Trichophyton schonleinii, Trichophyton violaceum, Epidermophyton flocosum*, was tested by the agar dilution technique. The inhibition rate was calculated for each fungus at different dilutions of essential oil used.

Results: The results show that among the components identified by GC/ MS, sulfur compounds proved to be the most abundant with two major components; diallyl disulfide (24,58 ± 1,17) and diallyl trislfude (29,45 ± 0,22). The effectiveness of garlic essential oil has been observed on all the strains tested. A greater inhibitory effect was demonstrated against *Trichophyton violaceum, Epidermophyton flocosum* and *Microsporum canis* even at low dilutions.

Conclusion: Faced with the narrow range of molecules used in antifungal therapy and with the appearance of multiresistance, the garlic bulb proved through such results that it is a good alternative.

Keywords: *Allium sativum*, essential oil, Antifungal activity, Trichophyton, Aspergillus.

POSTER PRESENTATION

CHEMICAL AND BIOLOGICAL STUDIES OF *PINUS HALEPENSIS* AND *PIPER CUBEBA*

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The present work is part of the valorization of *Pinus halepensis* and *Piper cubeba*: phytochemical and biological studies with five main aspects were conducted. A microscopic study led to the identification of *Pinus halepensis* needle pockets as well as starch grains within the endoderm surrounding a transfusion tissue with pits or tracheids. On the other hand, the characterization of the essential oils of the two species analyzed by CPG and HPLC, showed the presence of 203 products for *Piper cubeba* with the majority product cubebol, and 103 products in the essential oil of *Pinus halepensis* dominated by α pinene. The essential oils of *P. halepensis* and *P. cubeba* revealed antifungal activity against *Penicillium italicum*, *Fusarium oxysporium*, and *Botrytis cinerea*. Percent inhibition (TRC%) of mycelial growth was determined according to The essential oils of both species can indeed be a source of active ingredients that can be used in the treatment of fungal diseases or in the conservation of fruits and foods in general.

It is important to note also that the presence of α pinene in the essential oil of *Pinus halepensis* and cubebol in *Piper cubeba* seems to be responsible for the antimicrobial activity, which inhibits *E. coli*, *P. aeruginosa*, *E. hirae*, *S. aureus* and *C. albicans*. The test was conducted by the bioautography technique "agar overlay" developed by Rahalison et al. (1991). The results found, suggests prospects for application in the fields of the pharmaceutical and food industries.

Keywords: *Pinus halepensis*; *Piper cubeba* ; Phytochemistry ; Essential oils

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POSTER PRESENTATION

PHYTOCHEMICAL STUDIES OF SOME GEOPHYTES GROWING IN TURKEY

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Objective: Turkey is one of the home country of many bulbous plants, nearly 1081 taxons (900 species). The most of the geophytes are well-known to possess economic and medicinal prominence. It is worth to mention that a good number of the geophytes such as *Galanthus, Colchicum, Fritillaria* species are considered as medicinal plants due to their different bioactive constituents. Some geophyte species will be examined for their phytochemical properties in this study.

Material and Methods: The bulbs of *Fritillaria* L., *Iris* L., *Colchicum* L., *Lilium* L., *Polygonatum* Miller, *Hyacinthus* L., *Tulipa* L., *Nectaroscordum* Lindl., species and *Pancratium maritumum* L. were used for the determination of phytochemical constituents by LC-MS.

Results: This study performed from the project would make a good example of multi-disciplinary study regarding *ex-situ* preserving of Turkey's geophytes and determining their phytochemical constituents most of which are medicinal. The details and prominent results will be discussed in this presentation.

Conclusion: Some secondary metabolites have been identified from the bulbs of *Fritillaria* L., *Iris* L., *Colchicum* L., *Lilium* L., *Polygonatum* Miller, *Hyacinthus* L., *Tulipa* L., *Nectaroscordum* Lindl., species and *Pancratium maritumum* L. by LC-MS. The results are also supported to contribute chemical diversity in this species.

Keywords: Geophytes, phytochemicals, secondary metabolites.

Acknowledgement
This study was supported by "Cultivation of Geophytes Growing in Turkey, Developing New Species and Varieties for Relevant Sectors, Their Phytochemical Analyses and Some Biological Activities", Project code: TÜBİTAK-KAMAG-110G007-PSUP (2010-2015-2018).

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POSTER PRESENTATION

TYROSINASE INHIBITORY AND ANTIOXIDANT POTENTIAL OF *GERANIUM* AND *ERODIUM* TAXA FROM TURKEY

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Objective / Purpose: Melanin is a pigment that gives skin, hair, and eyes their color. Excessive melanin production in skin leads to hyperpigmentation and various skin disorders. Tyrosinase (TYR) is the key enzyme in melanin biosynthesis and its inhibitors are used in cosmetic products with skin whitening, depigmentative/hypopigmentative purposes. Due to side effects and toxicity problems of existing TYR inhibitors, there is still a huge need for new inhibitors from herbal origin. The aim of this study is to determine antioxidant and TYR inhibitory effects of *Geranium* and *Erodium* species collected from different regions of Turkey.

Material and Methods: The ethanol extracts of 15 taxa (17 samples) from the genus *Erodium* L'Her. Ex Aiton and 21 taxa (36 samples) from the genus *Geranium* L. were screened using ELISA microtiter assay at 2 mg/mL stock concentration for their TYR inhibitory activity. Antioxidant activities of the extracts were evaluated using different methods including free radical scavenging (DPPH and DMPD) and reducing power (FRAP and PRAP). Three extracts which showed the relatively high TYR inhibitory effect were phytochemically analyzed using HPLC-PDA.

Results: Our results indicated that almost all the extracts showed significant antioxidant activity with the exception of DMPD assay. More than 40 extracts displayed DPPH scavenging (>90%) and FRAP activities higher than quercetin. Among the tested extracts, *G. gracile* (0.241 ± 0.006) showed highest PRAP activity. *Erodium* and *Geranium* extracts displayed inhibition lower than 30% and 40% against TYR, respectively. The extracts of *G. glaberrimum* (31,41 ± 1,11 %), *G .macrostylum* (31,15 ± 1,35 %), *G. lasiopus* (30,01 ± 0,09 %) showed the highest TYR inhibition. Ellagic and gallic acids were determined to be present in high amount in these extracts by HPLC.

Conclusion / Discussion: Our findings indicated that *Geranium* and *Erodium* species have notable antioxidant activity and *G. glaberrimum*, *G.macrostylum* and *G. lasiopus* deserve future studies for determining their possible TYR inhibitory compounds.

Keywords: Tyrosinase, enzyme inhibition, antioxidant, *Geranium*, *Erodium*

Acknowledgements: This study was financially supported by Gazi University (BAP Project Number: 02/2016-01).

POSTER PRESENTATION

DISCOVERY OF TYROSINASE INHIBITORS FROM *GERANIUM GLABERRIMUM* BOISS. & HELDR. USING *IN VITRO* AND *IN SILICO* METHODS

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Objective / Purpose: *Geranium glaberrimum* Boiss. & Heldr. (Geraniaceae) is an endemic plant species that shows narrow distribution around Antalya and Konya provinces (Turkey). Our previous study indicated that *G. glaberrimum* (GG) ethanol extract had 31.41 ± 1.11 % inhibition against tyrosinase (TYR) along with a significant antioxidant activity. The aim of this study was to characterize active compounds of *G. glaberrimum* through activity-guided fractionation using *in vitro* and *in silico* methods.

Material and Methods: The ethanol extract of GG was separated into 6 fractions (GG-1-6) by preparative liquid chromatography (LC). TYR inhibitory activity of the fractions was tested using ELISA microtiter assay at 2 mg/mL stock concentration. The extract and its fractions were analyzed using LC-Q-TOF-MS. TYR inhibitory activity of five compounds (geraniin, corilagin, ellagic acid, gallic acid and quercetin) detected in the active fractions/subfractions was tested.

Results: Among the tested fractions, GG-2 (51.79 ± 3.84 %) displayed the highest inhibitory activity against TYR. Ellagic acid, gallic acid, quinic acid, 3,4-dihydroxybenzoic acid, 4-*O*-methyl gallate, geraniin, corilagin, and quercetin were detected in the extract. As three major compounds found in the active fraction (GG-2), two of them were identified as geraniin and corilagin (ellagitannin derivatives), while the 3rd one was commented to be most probably castalagin as another tannin derivative. One of two major compounds found in the 6th fraction was verified as quercetin. Among the tested compounds, quercetin (74.77 ± 0.26 %) was found to possess the highest inhibition against TYR and molecular interactions of these compounds were also established using docking simulations.

Conclusion / Discussion: Our data indicated that geraniin, corilagin, and quercetin found in GG seem to be responsible for its TYR inhibitory effect.

Keywords: Tyrosinase, enzyme inhibition, *Geranium glaberrimum*

Acknowledgements: This study was financially supported by Gazi University (BAP Project Number: 02/2016-01).

POSTER PRESENTATION

X-RAY CRYSTALLOGRAPHIC DATA OF SESQUITERPENE LACTONES FROM *CHRYSOPHTHALMUM MONTANUM* ORIGIN FROM TURKEY

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Objective: Sesquiterpene lactones (SLs) are known as characteristic components from a great number of Asteraceae plants which exhibit a broad spectrum of biological activities such as anticancer, anti-inflammatory, and antibacterial effects. The plant *Chrysophthalmum montanum* (DC.) Boiss. (Asteraceae) is locally named as "tutça" or "nezle otu", is mainly distributed in eastern parts of Turkey[1]. In our previous researches, it was determined that the chloroform subextract of the aerial parts of *C. montanum* possessed several biological activities, such as anti-inflammatory, leishmanicidal, cytotoxic and phytotoxic effects[2]. In the present work, we aimed to reveal the crystal data of isolated guaiane type SLs from *C. montanum*.

Material and Methods: The chloroform subextract of the aerial parts of *C. montanum* was subjected to silica gel column chromatography (CC). The fractions were further subjected to silica gel CC and Sephadex LH-20 CC to isolate and purify SLs. Their structures were identified using spectral methods (UV, IR, NMR, EI- and HREI-MS). Three of them were recrystallized from mixtures of $CHCl_3$:MeOH (1:0.5) and MeOH:n-hexane (1:0.5), affording colourless crystals suitable for X-ray diffraction analysis.The certain molecular structures of the three guaianolideswere obtained by single-crystal X-ray diffraction technique.

Results: Among the isolated SLs, three known sesquiterpene lactones,, namely 6*α*-acetoxy-4*α*-hydroxy-1*β*H-guaia-9.11(13)-dien-12.8*α*-olide (**1**), 6*α*-acetoxy-4*α*-hydroxy-9*β*.10*β*-epoxy-1*β*H-guaia-11(13)-en-12.8*α*-olide (**2**), and (4*α*,5*α*,8*β*,10*β*)-4,10-dihydroxy-1,11(13)-guaidien-12,8-olide (**3**), were established by X-ray crystallography .

Conclusion: We also firstly revealed the X-ray crystallographic data of compounds **1** and **2** in this study. The structure of compound **3** was confirmed by X-ray crystallography.

Key Words: *Chrysophthalmum montanum*, Guaiane sesquiterpene lactone, Crystal structure

Acknowledgement: This study was supported by TUBİTAK-2214/A, TUBİTAK-2211/A and ICCBS-HEJ.

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POSTER PRESENTATION

ANTI-INFLAMMATORY ACTIVITY OF ENDEMIC SPECIES, *CHRYSOPHTHALMUM DICHOTOMUM* BOISS. & HELDR., GROWING IN TURKEY

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Objective: An endemic species to Turkey, *Chrysophthalmum dichotomum* Boiss. & Heldr. (Asteraceae) that grows in wooded or shrubby valley beds in the district of Antalya, was also known, namely "çatal tutça" in Turkish. In our previous study, we evaluated phytotoxic, cytotoxic and insecticidal effects of *C. dichotomum*[1]. Our ongoing researches on this species, we aimed to evaluate the potential anti-inflammatory activity of some extracts from *C. dichotomum*.

Material and Methods: After the extraction of whole plant of *C. dichotomum* with 80% methanol was successively partitionated with solvent extraction, yielding *n*-hexane, chloroform, *n*-butanol and remain water fractions. The methanol extract and the fractions were evaluated for anti-inflammatory activities using chemiluminescence technique by oxidative burst assay[2].

Results: Among the tested samples, the chloroform fraction and methanol extract had significant anti-inflammatory activities with IC_{50} values 12.7±1.0 and 57.5±7.6 µg/ml, respectively.

Conclusion: According to our research, *C. dichotomum* was found to be a good natural source for developing novel anti-inflammatory agents. Further studies are necessary in order to determine the bioactive contstituents.

Keywords: *Chrysophthalmum dichotomum*, anti-inflammatory activity, oxidative burst assay.

Acknowledgement: This study was supported by TUBİTAK-2214/A, TUBİTAK-2211/A and ICCBS-HEJ.

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POSTER PRESENTATION

ANTIBACTERIAL EFFECT OF SOME HIGHLAND PLANT SPECIES GROWING IN THE EASTERN BLACKSEA REGION OF TURKEY ON SOME PATHOGENIC BACTERIA

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Objective / Purpose: Antibiotic-resistant represent a major problem worldwide. Therefore, there is an increasing interest in developing natural products as antibiotics. In this study, we examined the antibacterial effects of essential oils and aqueous extracts of some *Rhododendron, Pedicularis, Salvia* and *Thymus* species growing naturally in the highlands of the Eastern Blacksea Region of Turkey.

Material and Methods: The essential oils were prepared from coarsely ground plants using Clevenger apparatus. Agar well diffusion method was used to test antimicrobial activity. *Escherichia coli* and *Staphylococcus aureus* were used as target microorganisms representing gram negative and gram positive bacteria, respectively.

Results: It was shown that all tested essential oils, except *Salvia* spp. which exibited no inhibitory effect indicated an antimicrobial activity against *S. aureus* and *E. coli*. The highest antibacterial effect was detected against *S. aureus* and *E. coli* by the essential oil of *Thymus vulgaris* (inhibition zone; 26.86±2.77 mm and 34.83±1.90 mm, respectively).

Conclusion / Discussion: As a conclusion, this study suggest that the essential oils of *Rhododendron, Pedicularis,* and *Thymus* species may be used to control some pathogenic microorganisms. More studies on the use of these essential oil as a natural antibacterial are warranted.

Keywords: antibacterial effect, pathogenic, essential oils, agar well method, *Rhododendron, Pedicularis,* and *Thymus*

POSTER PRESENTATION

EFFECTS OF DIFFERENT IRRIGATION LEVELS ON VEGATATIVE GROWTH PARAMETERS OF CHERRY LAUREL (*Prunus laurocerasus*)

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Objective / Purpose: Cherry Laurel generally grows without cultural practices in nature. In this study, we tried to see changes of morphological parameters of Cherry Laurel under different irrigation levels. In this purposes, four irrigation topics (no irrigation control, %33, %66 of full irrigation, and full irrigation) were set with three replications. Results were evaluated using comparison among the irrigation levels.

Material and Methods: In the field, two-year old Cherry Laurel seedlings were planted spacing of 3x3 meters. Experiment plan was a randomized block designed with three replications. Irrigation system was established as a drip irrigation system in order to meet sandy soil water requirements. Soil water status was measured using gravimetric method. Irrigation application was started when soil water levels decreased to half of usable water of effective root depth.

Results: Two-year findings of this work showed that increases in irrigation water amount resulted higher shoot growth and plant height. The highest plant height was recorded as 215,7 cm at the full irrigation level, and the lowest plant height was recorded as 90,3 cm at the control parcel. Leaf water potential was also affected by irrigation level as -1,3 and -2,0 mbar at the full irrigation and control parcel, respectively. Similarly, seedling trunk diameter was positively effected irrigation water levels. Trunk diameter reaches the highest size of 36 mm at the full irrigation level, and the lowest diameter was recorded as 22 mm at the control level.

Conclusion / Discussion: It can be concluded that irrigation applications was positively effects vegetative growth of Cherry Laurel seedling. The results imply that soil water status may play an important role on plant's vegetative growth even being in rainy areas of eastern black sea region. These positive effects may result high quality Cherry Laurel production in the area.

Keywords: Cherry laurel, irrigation levels, pomological parameters.

POSTER PRESENTATION

ANTIOXIDANT PROPERTIES AND COMPOSITION OF *C. CRETICUM* VOLATILE CONSTITUENTS

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Objective / Purpose: The aromatherapic, antiseptic, anthelmintic, potent sedative, healing effects againts respiratory, cough, sinus, muscles and tissues problems of terpenoids and essential oils from different plants in medicine are revealed and industrial importances are increasing. The aim of this study was the determination of volatile constituent and antioxidant properties of *Cirsium creticum* (Lam.) d'Urv. subsp. *creticum* (*Asteraceae*) plant in hexane extract.

Material and Methods: *C. creticum* plants collected from natural habitat in Trakya region (Turkey). Dried and powdered whole plants extracted by soxhelet exraction method by using *n*-hexane as solvent and extracts analyzed for determination volatile components by using GC-MS gas chromatograph [1]. The ferric reducing antioxidant power (FRAP) [2], Trolox equivalent antioxidant capacity (TEAC) by the $ABTS^{\bullet+}$ [3] and cupric ion reducing antioxidant capacity assays [4] in hexane extracts were carried out for investigate the antioxidant properties of *C. creticum.*

Results: The most prevailing major compounds were hydrocarbons (41.11 %), terpenoids (33.26 %), esters (11.94 %) and total of 40 components identified by GC-MS analyses in C. *creticum* hexane extract. The radical scavenging activity of hexane extract against $ABTS^{\bullet+}$ was 0.675 mmol Trolox/g extract and FRAP activity was 52.83 µmol Fe^{2+}/g extract.

Conclusion / Discussion: This study gives useful informations about bioactive volatile contents and antioxidant properties for *C. creticum* after *n*-hexane extraction.

Keywords: *C. creticum*, volatile compounds, $ABTS^{\bullet+}$ scavenging activity, FRAP.

Acknowledgements: This study was supported by TUBITAK (Project No:116Z450).

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POSTER PRESENTATION

ISOLATION AND STRUCTURAL DETERMINATION OF C. *CRETICUM* FROM TRAKYA REGION

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Objective / Purpose: A ethnobotanical research carried out in Catalca-Turkey, explored that fruits of *Cirsium creticum* (esekcalisi) are used as remedy against mushroom poisoning in folk medicine [1]. In recent research, studied on the bioctivity of *C. creticum* plants collected from natural habitat in Trakya region (Turkey) by several methods and determined that higher activity in methanol extract than n-hexane, diethyl ether and ethylacetate extracts [2]. The aim of this work was the isolation and structure elucidation of biologically active compounds and other secondary metabolites from C. *creticum* (Lam.) d'Urv. subsp. *creticum* (*Asteraceae*) from methanolic extracts.

Material and Methods: *C. creticum* which is wild plant species in Trakya region, was collected in June 2016. The whole plants parts were ground and powder-homogenized after dried. Then they were macerated at room temperature with n-hexane, diethyleter, ethylacetate and methanol, respectively. The extracts were individually concentrated on a rotary evaporator under vacuum. The methanol fraction of plant was subjected on silica gel according to their polarity by using different solvent systems. The subfractions were applied to the preperative recycling HPLC for the purifications of the compounds. Structure elucidation of the purified compounds carried out by means of spectroscopic techniques such as 1D, 2D NMR (COSY, HMBC, HSQC, APT, DEPT) techniques and Mass Spectroscopy.

Results: In this work, the sturucture of a compound isolated from methanol extract was elucidated. Phytochemical studies of the plant continue.

Conclusion / Discussion: In this study, on the chemotaxonomic investigation of *C. creticum* and the isolation of new biologically active compounds were been carried out.

Keywords: *Cirsium creticum*, isolation, structure elucidation, NMR spectroscopy.

Acknowledgment: This study was supported by TUBITAK (Project No:116Z450).

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POSTER PRESENTATION

CHEMICAL COMPOSITION OF THE FIXED AND ESSENTIAL OILS OF *NIGELLA SATIVA* L. FROM TURKEY

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Objective / Purpose: *Nigella sativa* L. is an annual herbaceous plant which has medicinal and culinary uses. The seeds and extracts have antioxidant and antimicrobial effects. Besides, the seed oil is rich in unsaturated fatty acids. This research was conducted to determine the essential and fixed oil components of ten *Nigella sativa* populations in Eskisehir ecological conditions.

Material and Methods: This study was carried out in the experimental field of Eskişehir Osmangazi University, Faculty of Agriculture, and Department of Field Crops in 2009. Ten population were used in the research. The experimental design was randomized block design with three replications. Seed yields were harvested at maturity. Yield and yield components were determined. For essential oil content (%) distillation process was carried out using the Clevenger apparatus. 10 g crushed seed were watered with 100ml distilled water (1:10). For crude oil analysis the samples were extracted with petroleum ether (Soxhelet, Gerhardt 2000 digital system)

Results: Significant differences were high for all components at 5 % level ($p < 0.05$). The highest ratio of essential oil was Küre, Söğüt, Bilecik population (0.40 %). Main essential oil components were 67.7 % thymoquinone, 8.4 % carvacrol, 4.8 % junipene, % 2.3 *p*-cymen, 1.9 % 4-Terpineol, 0.6 % longipinene, 0.5 % bornylacetate. The main unsaturated fatty acid was linoleic acid (39.20-43.74 %) followed by oleic acid (33.41-37.75 %). The total MUFAs, PUFAs, and SAFAs compositions were between 36.31-38.55%, 39.27-44.17% and 19.51- 22.23%, respectively.

Conclusion / Discussion:
Statistically significant differences were found between *Nigella sativa* L populations in terms of all yield and yield components. There were variations between populations in terms of oil composition.

Keywords: Black cumin, *Nigella sativa* L., yield, essential oil, fixed oil

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POSTER PRESENTATION

DNA PROTECTIVE ROLES OF *PISTACIA TEREBINTHUS* LEAF EXTRACTS

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Objective / Purpose: Different parts of pistachio tree are used for many purposes because of their food, medicinal and ornamental values. The shells, roots, resinous leaves, seeds and fruits are known as medicinal plant parts. Various species of this genus have ethnobotanical uses in Turkey and many countries. Among these species *Pistacia vera*, *Pistacia terebinthus*, *Pistacia khinjuk* and *Pistacia atlantica* are used as rootstock for nut production. They are widely distributed along the Mediterranean basin. Leaves of pistachio species have higher content of sesquiterpenes, especially E-caryophyllene, germacrene D and d-cadinene. In the present study, the possible DNA protective roles of *Pistacia terebinthus* leaf extracts were screened using aqueous and ethanol solvents.

Material and Methods: The *Pistacia terebinthus* leaves were sampled from trees which are used as rootstock from pistachio orchard. For the extraction of leaves, ethanol and water were used as solvents. For assays of the study, plasmid DNA was treated with H_2O_2 and UV in the presence of extracts. The results were examined by imaging with agarose gel.

Results: This study has demonstrated that different extracts *of Pistacia terebinthus* leaves exhibited different DNA protective effect. According to the results of the study, it was determined that ethanol extracts had DNA protective effect at lower concentrations than water extracts and water extracts had effect at higher concentrations.

Conclusion / Discussion: The study showed that extracts of leaves of *Pistacia terebinthus* have DNA protective activity in different *in vitro* methods. For reveal pharmaceutical properties of plants, extraction techniques will be important in future.

Keywords: *Pistacia terebinthus*, DNA protective role, pBR322 plasmid DNA

POSTER PRESENTATION

EFFECT OF METHYL JASMONATE ON THE GERMINATION OF TWO QUINOA GENOTYPES UNDER SALT STRESS

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Background: Salinity is one of the major constraints limiting seed germination and seedling growth in crop plants. In recent years, plant growth regulators have been increasingly used to mitigate the detrimental effects of soil salinity.

Objectives: The purpose of the present study was to investigate effect of methyl jasmonate on germination properties of two quinoa genotypes under salt stress.

Material and Methods: Four NaCl (0, 50, 100 and 200 mM) and methyl jasmonate doses (0, 10, 20 and 40 µM) were applied to two quinoa genotypes (black and red) using completely randomized design with three replications. In the study, germination rate, germination time, plumule and radicle length were investigated.

Results: Salt treatments affected negatively all of the parameters examined, compared with the control. Germination rate and time was influenced by genotype and methyl jasmonate interaction. Black quinoa had higher response to methyl jasmonate in terms of germination rate and time than red quinoa. The highest germination rate (100%) was obtained from black quinoa with 40 µM methyl jasmonate, while the lowest (99.1) occurred in red quinoa with 40 µM methyl jasmonate. The results showed that methyl jasmonate decreased the negative effects of salt stress on plumule and radicle length of quinoa. The radicle and plumule length increased with increasing methyl jasmonate applications up to 20 µM, in comparison to the control.

Conclusion: In conclusion, the present results revealed that higher level of salt stress inhibited the germination properties of quinoa seeds, but methyl jasmonate application alleviated adverse effects of salt stress.

Key Words: Germination rate, plumule and radicle length, salinity.

POSTER PRESENTATION

CONTRIBUTION TO THE PHYTOCHIMIC STUDY AND THE ANTIOXIDANT ACTIVITY OF THE ESSENTIAL OIL OF THE WILD CARROT

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Objective / Purpose: This study is devoted to the phytochemical valorization of wild carrot originating from Algeria and Tunisia. This valorization consists of studying the main chemical constituents of the essential oil extracted from its flowering tops on the one hand, and highlighting its antioxidant effect on the other.

Material and Methods: The wild carrot arial plants (*Daucus carota* L) were harvested in full bloom during the month of May 2017. The extraction of essential oils was accomplished by steam distillation. The different organoleptic characteristics of the essence of *Daucus carota* L have been noted according to the AFNOR standards. Quantitative and qualitative analysis was performed by Fourier transform infrared spectroscopy (FTIR) and UV spectroscopy. For antioxidant activity, we used the technique of electron paramagnetic resonance (EPR). This method can be considered reliable and comparable with other methods for determining the antioxidant activity [1].

Results: At the end of this preliminary comparative phytochemical study conducted on wild carrot (*Daucus carota* L) from Algeria and Tunisia, we found that the yield of essential oil is low compared to that given for the wild carrot originating from Lebanon which is of the order of 3.47% [2]. Phytochemical tests reveal the presence of different families of chemical compounds in our oil such as aromatic compounds and terpene compounds, this variation may be due to one or the combination of the following factors: genetic background, age, plant environment and the presence of chemotype [3]. The DPPH radical inhibition test studied by EPR showe that *Daucus carota* L has a strong antioxidant activity. This fact is coherent with the previously reported antioxidant effect of wild carrot dichloromethane-methanol extract [4].

Conclusion / Discussion: The essential oil of the wild carrot extracted by steam distillation has organoleptic and antioxidant properties which are very appreciated in perfumery and very coveted in aromatherapy.

Key words: Essential oil, *daucus carota* L, wild carrot, antioxidant activity, phytochemistry, EPR.

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POSTER PRESENTATION

DETERMINATION OF ANTIOXIDANT EFFECT AND TOTAL PHENOLIC CONTENTS OF TWO ENDEMIC *RHAPONTICOIDES* SPECIES (*R. MYKALEA* AND *R. HIERROI)*

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Purpose: In this study two endemic *Rhaponticoides* species (*R. mykalea* and *R. hierroi*) that were collected different regions of Turkey are examined for the purpose of determining the antioxidant effect and total phenolic contents. **Material and Methods:** Ethanol and methanol extracts of leaf and stem parts of *R. mykalea* and *R. hierroi* were used in this study. DPPH Radical Clearing Activity, Chelating Activity of Iron (II) Ions, Lycopene and β-Carotene Amount Determination and Total Phenolic Compound Amount Determination methods were used for the analysis of antioxidant effects. **Results:** With DPPH Radical Clearing Activity method *R. hierroi* methanol extract 108.50 ± 1.36 µg/mL IC_{50}; *R. hierroi* ethanol extract 347.04 ± 5.41 µg/mL IC_{50}; *R. mykalea* methanol extract 125.78 ± 9.73 µg/mL IC_{50}; *R. mykalea* ethanol extract 130.85 ± 3.81 µg/mL IC_{50} antioxidant effect. With Chelating Activity of Iron (II) Ions method *R. hierroi* methanol extract 0.46 ± 0.35µg/mL IC_{50}; *R. hierroi* ethanol extract 5.63 ± 0.21 µg/mL IC_{50}; *R. mykalea* methanol extract 1.10 ± 0.11 µg/mL IC_{50}; *R. mykalea* ethanol extract 1.26 ± 0.02 µg/mL IC_{50} chelating activity. *R. hierroi* methanol extract has 0.427 µg/mL lycopene and 0.577 µg/mL β - Caroten;e *R. hierroi* ethanol extract has 0.513 µg/mL lycopene and 1.091 µg/mL β - Carotene; *R. mykalea* methanol extract 0.265 µg/mL lycopene and 0.343 µg/mL β - Carotene; *R. mykalea* ethanol extract has 0.338 µg/mL lycopene and 0.574 µg/mL β - Carotene. We determined that *R. hierroi* methanol extract included 121.98 ± 3.83 mg GAE/g; *R. hierroi* ethanol extract included 124.96 ± 7.32 µg/mL mg GAE/g; *R. mykalea* methanol extract included 136.02 ± 6.32 mg GAE/g; *R. mykalea* ethanol extract included 103.94 ± 4.99 mg GAE/g total phenolic content. **Conclusion:** In this study, it has been determined that the extracts obtained from *R. hierroi* and *R. mykalea* plants DPPH free radical scavenging activity, it was determined that all extracts had higher IC_{50} antioxidant activity values than BHT, a synthetic antioxidant. The methanol extract of *R. hierroi* showed the highest activity of chelating iron (II) ions. When the quantities of lycopene and β - carotene were evaluated, the most effective result came from the ethanol extraction of *R. hierroi*. It was also determined that the *R. mykalea* methanol extract has the highest total phenolic content (136, 02 ± 6,32 mg GAE / g extract).

Keywords: Antioxidant, Total phenolic content, Endemic, Herbal plant, *Rhaponticoides*
Acknowledgement: This study supported by Selcuk University Scientific and Technological Research Projects Coordinator **17201113** project. We would like to thank the institute for their support.

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POSTER PRESENTATION

DETERMINATION OF ANTIMICROBIAL EFFECT AND DNA INTERACTION OF TWO ENDEMIC *RHAPONTICOIDES* SPECIES (*R. mykalea* and *R. hierroi)*

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Purpose: This study was carried out to determine the antimicrobial effect and DNA interaction of two endemic *Rhaponticoides* species (*R. mykalea* and *R. hierroi*) which are distributed in Turkey. Ethanol and methanol extracts of leaf and stem parts of *R. mykalea* and *R. hierroi* were used in this study. **Material and Methods:** The antimicrobial activities of the extracts were determined by agar well method and evaluated on *Bacillus cereus* NRRL B-3711, *Bacillus subtilis* ATCC 6633, *Staphylococcus aureus* ATCC 25923, *Enterococcus faecalis* ATCC 29212, *Enterococcus hirae* ATCC 9790, *Escherichia coli* ATCC 35218, *Escherichia coli* ATCC 25922, *Pseudomonas aeruginosa* ATCC 27853, *Klebsiella pneumaniae* ATCC 13883, *Salmonella typhimurium* ATCC 14028, *Candida albicans* ATCC 10231, *Candida krusei* ATCC 6258 and *Candida tropicalis* Y-12968. For comparison, ampicillin, chloramphenicol (antibacterial) and ketoconazole (antifungal) were used as standard antibiotics. The diameter of the inhibition zones, formed after incubation, is measured in mm. The DNA interaction of plants extracts were determined by agarose gel electrophoresis method. The effect of extracts on DNA was measured for 24 and 48 hours. Furthermore, the nucleotide linkage of the substances was investigated by restriction enzyme digestion. **Results:** *R. hierroi* methanol extract formed against to *E. coli* ATCC 35218 10.67 ± 0.47 mm; against to *S. aureus* ATCC 25923 12 ± 0.82 mm and against to *K. pneumaniae* ATCC 13883 13.33 ± 0.47 mm inhibition zone diameter. *R. hierroi* ethanol extract formed against to *S. aureus* ATCC 25923 12.67 ± 0.94 mm; against to *B. subtilis* ATCC 6633 10.33 ± 0.47 mm inhibition zone diameter. *R. mykalea* methanol extract formed against to *P. vulgaris* RSKK 96029 13 ± 1.41 mm; against to *K. pneumaniae* ATCC 13883 12.33 ± 0.47 mm; against to *B. cereus* NRRL B – 3711 11.67 ± 0.47 mm and against to *P. aeruginosa* ATCC 27853 12 ± 0 mm inhibition zone diameter. *R. mykalea* ethanol extract formed against to *E. hirae* ATCC 9790 11.67 ± 0.47 mm; against to *K. Pneuma niae* ATCC 13883 11.33 ± 0.47 mm and against to *P. aeruginosa* ATCC 27853 12 ± 0 mm inhibition zone diameter. Likewise, the extracts were observed to cause DNA breaks and bound to both A/A and G/G nucleotides by restriction enzyme digestion experiments. **Conclusion:** In this study, it has been determined that the extracts obtained from *R. hierroi* and *R. mykalea* plants have antimicrobial activity on at least one or more microorganisms. The *R. mykalea* methanol extract was found to be more effective than the others. The highest inhibition zone diameter was determined against *R. hierroi* methanol extract *K. pneumoniae* ATCC 13883 strain (13,33 ± 0,47 mm). It has been determined that the extracts had a concentration and time-dependent effect on the DNA and this effect and is in the form of DNA cutting activity. The strongest effect was observed at high concentration, while at other concentrations, form III DNA was observed which formed a double chain fracture outcome.

Keywords: Antimicrobial effect, DNA interacton, Endemic, Herbal plant, *Rhaponticoides*, Turkey

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POSTER PRESENTATION

EFFECTS of PLANT GROWTH PROMOTING *Bacillus pumilus* on WATER MANAGEMENT and PHOTOSYNTHETIC PARAMETERS in WHEAT (*Triticum aestivum* L.) GROWN UNDER CADMIUM and ZINC STRESS

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Objective / Purpose: Plant growth-promoting rhizobacteria (PGPR) are bacteria that can enhance plant growth and protect plants from abiotic stresses through a wide variety of mechanisms; those that establish close associations with plants, such as the endophytes, could be more successful in plant growth promotion. The effect of 150 □M $CdCl_2$ and 10 mM $ZnSO_4$ on growth, relative growth rate (RGR), relative water content (RWC), osmotic potential (Ψ_{Π}), the maximal efficiency of PSII photochemistry (F_v/F_m), proline (Pro) content and thiobarbituric acid reactive substances (TBARS) evaluated in wheat (*Triticum aestivum* L.) growing in media with and without an amendment of *Bacillus pumilus* (PGPR) application for 7 days.

Results: After exposure to 150 □M Cd and 10 mM Zn, the significant reduction in Pro content began after the first day of stress in wheat leaves. RWC, RGR, Ψ_{Π} and F_v/F_m decreased after both Cd and Zn stresses during the experimental period. Both stress caused an increase in TBARS as from the first day of stress. On the other hand, the application of PGPR to perlite could change the mobility of Cd and Zn, and so the uptake to wheat of cadmium and zinc was reduced.

Conclusion: Under PGPR application, the oxidative stress induced by Cd and Zn treatments was reduced, providing the decrease in TBARS content and increase in RGR, RWC, F_v/F_m, Pro and Ψ_{Π}. It is concluded that application of PGPR had significant positive effects on oxidative damage, water status and photosynthetic activity in wheat leaves exposed to multiple stresses.

Keywords: *Bacillus pumilus*, Cadmium, PGPR, Osmotic adjustment, *Triticum aestivum* L., Zinc

POSTER PRESENTATION

MOLYBDENUM APPLICATION IMPROVES THE ANTIOXIDANT ACTIVITY AND TOLERANCE IN RESPONSE TO CADMIUM-INDUCED OXIDATIVE STRESS IN WHEAT ROOTS

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Objective/Purpose: Increasing concentration of heavy metals (HM) due to various anthropogenic activities is a serious problem. Plants are very much affected by HM pollution particularly in contaminated soils. Survival of plants becomes tough and its overall health under HM stress is impaired. Metal toxicity causes multiple direct and indirect effects in plants that concern practically all physiological functions. The problems arise when cells are confronted with an excess of heavy metal that lead cellular damage. Plants have evolved a variety of adaptive mechanisms to respond to heavy metal stress including cadmium (Cd) stress. As a stress-resistance element, Molybdenum (Mo) has been extensively reported to facilitate the improvement of abiotic stress tolerance against salinity, low temperature and water stress in plants. Among the mechanisms underlying tolerance improvement in plants, improvement of antioxidant defense by Mo is a crucial strategy for plants to adapt to abiotic stresses. However, little is known about the potential mechanism by which Mo improves antioxidant defense under abiotic stresses, particularly Cd stress. To get more information on the responses to Cd in plants treated with Mo, we aim to investigate the effects of hydroponically Mo application on the water content (RWC), the activities of some antioxidant enzymes, proline content (Pro), hydrogen peroxide content (H_2O_2) and lipid peroxidation (TBARS) in wheat roots exposed to Cd stress. **Material-Methods:** Germinated wheat seedlings were transferred to half strength Hoagland solution and were grown under controlled conditions. The seedlings were grown in hydroponic culture containing this solution for 21 d and Mo application (0.15 and 0.30mM) was treated alone or in combination with 150 and 300 □M Cd stress. The root relative water content (RWC) was calculated by the following formula (Smart and Bingham 1974). Determination of Pro and H_2O_2 content was performed according to Bates et al. (1973) and Liu et al. (2010), respectively. The activities of SOD, CAT, POX and GR was estimated according to the method of Beauchamp and Fridovich (1971); Bergmeyer (1970), Seevers et al. (1971) and Nakano and Asada (1981), respectively. The level of lipid peroxidation was determined by thiobarbituric acid reactive substances (TBARS) according to Madhava Rao and Sresty (2000). **Results:** A decrease in activities of superoxide dismutase (SOD), catalase (CAT), ascorbate peroxidase (APX) and glutathione reductase (GR) were observed in response to increasing levels of Cd concentration. Also, the decrease in Pro and RWC were observed more pronounced in 300 □M Cd. However, in Cd-stressed wheat, Mo application resulted an alleviation on RWC and Pro, and a decline in H_2O_2 content. Also, when comparison to the plants treated with stress alone, Mo to Cd-stressed wheat significantly decreased TBARS content and significantly enhanced the activities of SOD, CAT, peroxidase (POX) and APX. **Conclusion:** It could be concluded that exogenous Mo may have the application possibility for a future practical trial of stress reduction leading to mitigated heavy metal toxicity and improved the water content and the antioxidant enzyme activities in wheat roots.

Keywords: Antioxidant enzyme, Cadmium stress, Hydrogen peroxide, Molybdenum, *Triticum aestivum*

POSTER PRESENTATION

SOME CHEMICAL COMPOUNDS OF *CICHORIUM INTYBUS* L. SPECIES DISTRIBUTED IN VAN REGION

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Cichorium intybus L. is a perennial plant species included the *Asteraceae* family and *Cichorium* genus. It is known as "Beyaz Hindiba" in the Turkey. *C. intybus* shows spread generally in Europe, West Asia and North Africa. In Turkey, it is in almost every region. The roots of this plant are used commonly in the treatment of diseases such as high fever, anorexia, headache, inflammation, indigestion, gout, skin allergy, asthma, colic, epilepsy and pharyngitis from time immemorial.

In the study, it is aimed to determine some nutrients and mineral substance contents of *C. intybus* which is naturally grown around the Van lake in the Eastern Anatolia Region, Turkey. In plant samples, some nutrients and mineral contents such as total ash, crude protein, pH, crude cellulose and N, Na, Mg, K, Ca, P, S, Mn, Fe, Cu, Zn, Cd, Co have been investigated. As a result of the research; it has been determined as crude protein ratio 9.53%, pH 6.25, total nitrogen content 1.53 %, crude ash content 6.21% and crude cellulose content 41.60%. In addition, while some mineral substance contents were determined as K 14.05 g/kg, Ca 12.25 g/kg, P 1.59 g/kg, Mn 20.04 mg/kg, Fe 161.68 mg/kg and Zn 18.84 mg/kg, heavy metal content were determined as Cr 0.09 mg/kg, Cd 0.15 mg/kg, Co 1.33 mg/kg and Pb 0.14 mg/kg.

Keywords: *Cichorium intybus* L., Eastern Anatolia, Heavy Metal, Medicinal Plants

POSTER PRESENTATION

SOME CHEMICAL CONTENTS OF *VERBASCUM ORIENTALE (L.)* ALL. SPECIES SPREADING IN VAN REGION

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Verbascum is an important genus involved in the *Scrophulariaceae* family with about 360 species. *Verbascum* species shows a wide geographical spread in the world. In Turkey, there are about 251 taxa of *Verbascum* species and is endemic about 80% of them. *Verbascum* species are mostly annual, biennial or perennial herbaceous plants or rarely bush form plants. *Verbascum orientale* L. All. is an annual and grassy species. It is known as "İbrahim otu" in our country. *Verbascum* species are used in the treatment of chest softener, expectorant, sedative, diarrhea, migraine, asthma and rheumatic diseases in folk medicine.

In the study, it is aimed to determine some nutrients and mineral substance contents of *Verbascum orientale* L. *All.* which is naturally grown around the Van lake in the Eastern Anatolia Region.. In plant samples, some nutrients and mineral contents such as total ash, crude protein, pH, crude cellulose and N, Na, Mg, K, Ca, P, S, Mn, Fe, Cu, Zn, Cd, Co have been investigated.As a result of the research; it has been determined as crude protein ratio 9.00%, pH 5.96, total nitrogen content 1.44 %, crude ash content 14.0% and crude cellulose content 48.56%. In addition, while some mineral substance contents were determined as K 5.45 g/kg, Ca 5.80 g/kg, P 1.57 g/kg, Mn 22.74 mg/kg, Fe 225.05 mg/kg and Zn 29.81 mg/kg, heavy metal contents was determined as Cr 0.05 mg/kg, Cd 0.14 mg/kg, Co 1.54 mg/kg and Pb 0.04 mg/kg.

Key Words: *Verbascum orientale* L. *All.*, Eastern Anatolia, Heavy Metal, Medicinal Plants

POSTER PRESENTATION

AMELIORATING EFFECT OF *FERULA COMMUNIS* AND *RHEUM RIBES* ON CARBON TETRACHLORIDE-INDUCED OXIDATIVE STRESS AND TESTIS DAMAGE

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Objective / Purpose: The high rate of male infertility have necessitated the search for cost effective and available alternatives. *Ferula communis* (FC) and *Rheum ribes* (RR) have extensively been used in traditional medicine for a wide range of ailments. The purpose of this study is to evaluate the efficacy of FC and RR as a complementary medicine for treatment of male infertility in rat.

Material and Methods: Forty-nine rats were divided into seven groups of seven animals each. Group I (negative control) received 10 ml/kg soybean oil intraperitoneal weekly in addition to feed and water *ad libitum*. Group II (positive control) received Carbon tetrachloride (CCl_4) 10 ml/kg (30% in soybean oil) weekly. Group III and IV, received 200 mg FC and 200 mg RR daily in addition to 10 ml/kg CCl_4 weekly. Group V and VI received 200 mg FC and 200 mg RR daily. After 4 weeks, serum malondialdehyde (MDA), testosterone, Luteinizing hormone (LH), Follicle stimulating hormone (FSH), prolactin and oestradiol were estimated. Total antioxidant status (TAS) and total oxidant status (TOS) levels were determined. Histopathologic examinations of the testis were carried out.

Results: CCl_4 significantly reduced FSH, and Testosterone when compared with control. Co-administration of FC plus CCl_4 and RR plus CCl_4 significantly reduced MDA level. Changes in serum activities as well as MDA, TAS, and TOS levels showed that CCl_4 caused lipid peroxidation and testis damage.

Conclusion / Discussion: FC showed more curative activity against the CCl_4 malignant action on the testis compared to RR, and the use of both plants in the treatment of male infertility may be beneficial.

Key words: Testis, *Ferula communis, Rheum ribes*, CCI_4

POSTER PRESENTATION

AGRONOMIC CHARACTERISTICS of BUCKWHEAT (*Fagopyrum esculentum* MOENCH) CULTIVATED IN TURKEY

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Objective / Purpose: In this study, ıt was evaluated agronomic properties of buckwheat (*Fagopyrum esculentum* Moench) foreign originated newly entered to agricultural cultivation in Turkey.

Material and Methods: It was investigated sprouting percentage, number of flowering days, vegetation period, plant height, dried herb yield, seed yield, thousand seed weight, harvest index, moisture, dry matter, cellulose and ash content properties of buckwheat cultivated at different fertilizer doses (0, 10 and 20 kg/da DAP 18-46) and different sowing dates for two years in Konya ecological conditions.

Results: When the research results are analyzed, according to five different sowing times; buckwheat sprouting percentage (% 62-96), number of flowering days (24-28 days), vegetation period (90-100 days), plant height (71.10-93.60 cm), dried herb yield (381.33-573.61 kg/da), seed yield (160.44-224-24 kg/da), thousand seed weight (20.69-24.79 gr),harvest index (% 0.12-0.26), moisture (in herb% 4.14-5.83; in seed % 3.42-8.51), dry matter (in herb% 94.17-95.75; in seed % 91.57-96.58), cellulose % 6.10-12.60 and ash (in herb%1.167-2.045, in seed % 1.040-6.421) yield of buckwheat herbs and a seeds were investigated cultivated at five different sowing dates and different fertilizer doses(0, 10 and 20 kg/da DAP-18-46) in Konya ecological conditions.

Conclusion / Discussion: According to the results obtained in this study; In Konya and similar ecologies, to produce buckwheat herbs and seeds was applied at 10 kg / da fertilizer and it would be appropriate to cultivate by sowing at the beginning of May.

Keywords: Buckwheat, *Fagopyrum esculenthum* Moench, sowing date, agronomic properties

POSTER PRESENTATION

THE ELEMENTAL CHARACTERIZATION OF ANISE (*Pimpinella anisum* L.) POPULATION CULTIVATED in DIFFERENT REGIONS TURKEY

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Objective / Purpose: This study, important mineral contents of seeds of different anise populations cultivated eleven province (Antalya, Aydın, Denizli, Eskişehir, Antep, Hatay, Isparta, İzmir, Kırşehir, Muğla, Uşak) in different ecological conditions of our country were investigated.

Material and Methods: Studied seed samples of the anise populations were obtained from producers of cultivars. Investigated elements are the macro elements (Na, K, Ca, Mg and P), micro elements (Fe, Zn, Cu and Mn) and heavy metals (Al, Ba, Co, Ni, Cr ve Pb) were determined by ICP-OES. The analyses of mineral compositions in anise species were determined using NMKL 161 method. A Perkin-Elmer Optima 2000 inductively coupled plasma–optical emission spectrophotometer (ICP–OES) was used to analyze the elements in anise samples.

Results: The highest amount of potassium (K) element among the macro elements in the anise populations was obtained from the Antep population with 19434.03 ppm and the lowest amount was obtained from the Hatay population with 9198.69 ppm. Iron content (Fe) content of micro elements was highest in Antalya population with 1408.01 ppm and lowest in Mugla population with 121.92 ppm. The highest Al content (1630.03ppm) in terms of heavy metal content was obtained from the population of Antalya.

Conclusion / Discussion: In this research, differences in the seed mineral contents of anis (*Pimpinella anisum* L.), a local population with different agricultural characteristics obtained from different provinces of our country, have been determined.

Keywords: Anise, *Pimpinella anisum* L.,macro elements, micro elements, heavy metal, seed

POSTER PRESENTATION

ESSENTIAL OIL YIELD and COMPOSITIONS of CHAMOMILE (*Matricaria chamomilla* L.) CULTIVATED in DIFFERENT PROVINCE TURKEY

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Objective / Purpose: In this study, ıt was investigated essential oil yield and compositions of Chamomile (*Matricaria chamomilla* L.) cultivated in Konya and Karaman ecological conditions, Turkey.

Material and Methods: The air-dried flowers of chamomile were subjected to hydrodistillation for 3h using a Clevenger-type apparatus to produce essential oil. The GC-MS analysis was carried out with Agilent 7890 GC-MS system. The relative percentages of the separated compounds were calculated from total ion chromatograms. The identification of the oil components was based on the Wiley and NIST mass spectral library.

Results: Essential oil yield of sage was determined as 0.73 % in Konya and 0.62 % in Karaman. The most important essential oil component of chamomile, kamazulen content is 13.50% in Konya location and 13.90 % in Karaman location. Alpha-bisabolol content from the essential oil components in the Konya and Karaman province was determined as 38.60% and 27.36%, respectively.

Conclusion / Discussion: According to the results of this study, it was determined that significant differences between essential oil yield and components of chamomile (*Matricaria chamomilla* L.) produced in different province of our country were determined.

Keywords: Chamomile, *Matricaria chamomilla*, essential oil, composition, kamazulen

POSTER PRESENTATION

ELEMENTAL CHARACTERIZATION OF BUCKWHEAT(*Fagopyrum esculentum* Moench) CULTIVATED IN TURKEY

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Objective / Purpose: This study, mineral and heavy metal contents of buckwheat (*Fagopyrum esculentum* Moench) newly imported foreign origin in our country were investigated.

Material and Methods: Buckwheat seeds cultivated at Konya ecological conditions at five different sowing times and at different doses of fertilizer (0, 10 and 20 kg / da DAP-18-46) were obtained macro elements (Na, K, Ca, Mg and P), micro elements (Fe, Zn, Cu and Mn) and heavy metals (Al, Ba, Co, Ni, Cr ve Pb), were determined by ICP-OES.The analyses of mineral compositions in buckwheat seeds were determined using NMKL 161 method.

Results: It was determined that the amount of phosphorus (P) from macro nutrients in buckwheat seeds ranged from 1197-3778 ppm according to different sowing times, and the amount of iron (Fe) from micro nutrients varied between 20.5-393.10 ppm. The amount of aluminum (Al) in heavy metals varied between 47.03-328.30 ppm.

Conclusion / Discussion: In this research, it was found that the seeds of the buckwheat (*Fagopyrum esculentum* Moench) grown at different planting times and fertilizer doses show significant differences in mineral content.

Keywords: Buckwheat, *Fagopyrum esculentum* Moench, planting time, mineral, element, heavy metal, seed

POSTER PRESENTATION

THE ELEMENTAL CHARACTERİZATION of FENNEL (*Foeniculum vulgare* MILL) POPULATION CULTIVATED in DIFFERENT REGIONS TURKEY

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Objective / Purpose: This study was carried out on the important minerals found in the seeds of different populations of fennel species (*Foeniculum vulgare* Mill) cultivated on 11 provinces (Antalya, Aydin, Denizli, Eskişehir, Antep, Hatay, Isparta, İzmir, Kırşehir, Muğla, Uşak) macro element, micro element and heavy metal contents were investigated.

Material and Methods: Seed samples of the fennel (*Foeniculum vulgare* Mill) populations studied were obtained from the producers of the province. Investigated elements are the macro elements (Na, K, Ca, Mg and P), micro elements (Fe, Zn, Cu and Mn) and heavy metals (Al, Ba, Co, Ni, Cr ve Pb), were determined by ICP-OES.The analyses of mineral compositions in fennel populations were determined using NMKL 161 method. A Perkin-Elmer Optima 2000 inductively coupled plasma–optical emission spectrophotometer (ICP–OES) was used to analyze the elements in fennel samples.

Results: The highest amount of calcium (Ca) element in the fennel populations was obtained from the Hatay population with 10532.64 ppm and the lowest amount was obtained from the Kırşehir population with 8673.18 ppm in the fennel populations. Iron content (Fe) content of micro elements was highest in Aydın population with 235.40 ppm and lowest in Antalya population with 58.44 ppm. In terms of heavy metal contents, the highest content of aluminum (Al) was found from the population of Hatay (239.21 ppm) and lowest in Antalya (12.82 ppm).

Conclusion / Discussion: In this research, differences in the seed mineral contents of fennel (*Foeniculum vulgare* Mill) populations with different agricultural characteristics obtained from different provinces of our country, have been determined.

Keywords: Fennel, *Foeniculum vulgare* Mill ,macro elements, micro elements, heavy metal

POSTER PRESENTATION

A STUDY ON ESSENTIAL OIL YIELD and COMPONENTS OF LAVENDER (*LAVANDULA ANGUSTIFOLIA* MILLER) CULTIVATED in TURKEY

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Objective / Purpose: In the study, essential oil yield and its components obtained from Lavender [*Lavandula angustifolia* Miller (Lamiaceae)] cultivated in Konya ecological conditions were investigated.

Material and Methods: The air-dried flowers of lavender were subjected to hydrodistillation for 3 h using a Clevenger-type apparatus to produce essential oil. The GC-MS analysis was carried out with Agilent 7890 GC-MS system. The relative percentages of the separated compounds were calculated from total ion chromatograms. The identification of the oil components was based on the Wiley and NIST mass spectral library.

Results: The yield of essential oil from lavender flowers was determined to be 0.51%. The major essential oil components of lavender oil were linalool (28.827%), linalyl acetate (10.1%) and borneol (11.219%), respectively.

Conclusion / Discussion: According to the results of this study, it was determined that significant differences between essential oil yield and components of the lavender (Lavandula angustifolia Miller) produced in different provinces of our country were determined.

Keywords: Lavender, *Lavandula angustifolia* Miller, essential oil, component, linalool

POSTER PRESENTATION

SPME/GC-MS ANALYSIS OF THE VOLATILE COMPONENTS OF *EPILOBIUM ANGUSTIFOLIUM* L. SPECIES FROM TURKEY

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Objective / Purpose: The genus *Epilobium* (Onagraceae) is represented by 250 species all over the world and 26 species in Turkey. It is known that various species of *Epibolium* are used in prostate disease and as anti-aging agents in cosmetics. In addition, *Epilobium angustifolium* L. was found to be effective on prostaglandin biosynthesis and anti-inflammatory effects of the species were reported. In this study, it is aimed to analyze the volatile organic compounds of *E. angustifolium*.

Material and Methods: The aerial parts of *E. angustifolium* was collected from the Mediterranean region of Turkey at June 2017. Flower, stem and leaf samples of the species were separately analyzed by hydrodistillation and SPME methods with GC-MS. The components of the essential oils were identified by comparison of their mass spectra and retention indices (RI) with those given in the literature.

Results: γ-terpinene (29.4) and limonene (49.0% and 60.3%) were found to be the main components in the essential oils obtained by hydrodistillation method from flower, stem and leaf parts of plant, respectively. Besides, limonene (95.5%) was identified as the main component in flowers, γ-terpinene (29.4) and β-pinene (9.3) in the leaves and limonene (93.6%) in the stems by the SPME method.

Conclusion / Discussion: Aqueous, methanolic, and ethanolic extracts of *E. angustifolium* were reported previously but this is the first report on the volatile compounds of flowers, stems and leaves of the species. Bioactivity studies to explain its traditional usage is still under investigation.

Keywords: *Epilobium angustifolium*, GC-MS, SPME

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POSTER PRESENTATION

EFFECTS OF SOME GYPSOGENIN DERIVATIVES ON HUMAN CHRONIC MYELOGENOUS LEUKEMIA

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Objective / Purpose: Chronic myelogenous leukemia (CML) is a form of cancer affecting the blood which is initially treated with imatinib. However, some patients treated with imatinib were failed to respond because of the point mutations which is developed in the Bcr-Abl kinase domain of CML. To overcome this drug resistant problem, several new generation inhibitors have been developed, but did not succeeded. Gypsogenin is a plant-derived pentacyclic triterpenoid which exhibits multiple pharmacological properties and emerges as a promising natural compound for cancer prevention and therapy. In the present study, three gypsogenin derivatives were selected to investigate their *in vitro* activity against CML K562 cell line (Bcr-Abl positive leukemia).

Metarial and Methods: MTT cell proliferation assay was employed to evaluate the cytotoxic effect of GA compared with imatinib (positive control) against leukemia and normal blood cells. For detection of cell death, apoptotic/necrotic/healthy assay was performed against K562 cell line. To investigate kinase inhibitory activity of GA, the Abl1 kinase profiling assay and molecular docking study were performed.

Results: Benzyl 3-hydroxy-23-oxoolean-12-en-28-oate (**1c**) was found to be the most effective anticancer agent on K562 cell line with IC_{50} value of 9.3 μM. This compound exhibited more than 9 times lower cytoxicity than imatinib (positive control) on normal peripheral blood mononuclear cells (PBMC). **1c** showed inhibitory activity against Abl (IC_{50} = 8.7 μM), a kinase part of Bcr-Abl, although its inhibitory profile against eight kinases was different from that of imatinib. The interaction of ATP binding site of Abl and **1c** was explained rationally by molecular docking study, and its binding mode was different from imatinib. Furthermore, **1c** suppresses signaling downstream of Bcr-Abl.

Conclusion: Current findings highlighted the potential of this class of plant extracts as newer generation of Abl tyrosine kinase inhibitors.

Key Words: Gypsogenin, Abl kinase, Apoptosis, Leukemia

Reference:

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POSTER PRESENTATION

DETERMINATION OF ADAPTATION AND MORPHOLOGICAL PROPERTIES OF FENUGREEK (*Trigonella foenum graecum* L.) IN BOLU ECOLOGICAL CONDITIONS

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Objective / Purpose: Fenugreek (*Trigonella foenum graecum* L.) has an important place among cultivated plants in our country as well as in the world. This plant is evaluated as leguminous plants and medicinal and aromatic plants. It is also one of the plants exported in our country. For this reason, genetic resource and growing of fenugreek is known well.

Material and Methods: This study was carried out determine the morphological properties of 118 fenugreek populations which obtained from USDA (United States Department of Agriculture) and 2 cultivars as control (Çiftçi and Güraslan) in field experiment area of Abant İzzet Baysal University, Faculty of Agriculture and Natural Sciences. It was conducted according to Augmented trial design in 2017.

Results: Among the cultivars and populations, germination day (8-29 days), days to flowering (41-59 days), days to first pod setting (73-51), plant height (33.40-79.60 cm), first pod height (15.25-36.60 cm), pod weight (2-92 g/per plant), number of seed per pod (5.4-15.35) and pod lenght (8.02-15.37 cm) were determined.

Conclusion / Discussion: As a result of study, While the highest pod weight was seen from Pakistan (PI 426973) population, the highest number of seed per pod was observed from Çiftçi cultivar.

Keywords: Bolu, fenugreek, morphological properties.

References:

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POSTER PRESENTATION

EFFECT OF TEMPERATURE ON THE STABILITY OF PHENOLIC ANTIOXIDANTS IN OLIVE LEAF EXTRACT DURING STORAGE

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Objective / Purpose: Olive leaf is considered as one of the major Mediterranean plants byproducts, and also rich in phytochemical compounds in such as oleuropein, hydroxytyrosol, verbascoside, luteolin-O-7-glucoside, apigenin-O-7-glucoside, gallic acid, rutin and ligstroside. The physiological properties of these compounds including antiallergic, anticancer, anticarcinogenic, anti-inflammatory, antimicrobial, antioxidant, analgesic and platelet aggregation inhibition. Due to the availability of these properties, phytochemical components are considered as a first-class pharmaceutical compound. For this reason, attention should be given in their production, packaging processes, and storage conditions [1,2]. In our study, we had investigated the effect of different storage temperatures on the concentration of the total /individual phenolic contents and antioxidant activities for the extracts.

Material and Methods: The microwave-assisted extraction method was employed to prepare the olive leaf extracts. Based on colorimetric oxidation/reduction reaction, UV- spectrophotometry was used to measure the concentration of bioactive contents and antioxidant activity (AA) for extract. And also chromatographically and periodically, the oleuropein concentration decreasing was recorded to investigate the effect of the different storage temperatures .

Results: At refrigerator condition, there was no reduction in total /individual phenolic contents and antioxidant activities of the extracts in the first 270 days. After 300 days of storage, they showed retention of almost 20% of total phenolic content and above 30% of Oleuropein concentration and 40% of antioxidant activities.
The total /individual phenolic contents and antioxidant activities of the extracts were gradually slowly decreased after 385 days at deep freeze refrigerator temperatures.

Conclusion / Discussion: The relatively good retention observed in total /individual phenolic contents and antioxidant activities for the extract stored at room temperature for more than 240 days suggest that olive leaf extract's target compound like oleuropein as well as rutin and verbascoside can be stored at room temperature. This is an important result considering the energy saving and controlling the storage period.

Keywords: Oleuropein, Stability, Temperature, Chromatography, UV- spectrophotometry, Microwave-assisted Extraction

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POSTER PRESENTATION

MENYANTHES TRIFOLIATA L IN VITRO AND IN VIVO EXTRACTS INDUCE APOPTOSIS IN HUMAN GLIOMA CELLS

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Objective / Purpose: Despite the development of very precise diagnostic and therapeutic methods, gliomas remain one of the most challenging diseases of the central nervous system. It has high rates of recurrence and is one of the leading causes of death worldwide [1]. In Europe alone, 27,000 new cases of malignant astrocytic tumors are diagnosed every year. *Menyanthes trifoliata* L. has been used in traditional medicine for centuries because shows many pharmacological properties, but its most interesting could be its anti-cancer potential. The present study examines the induction of apoptosis in grade IV glioma cells after treatment with the aerial parts and root extract of *M. trifoliata* plants derived from *in vitro* and soil and presents the first comparison of the biological effects of four different extracts of *M. trifoliata* on glioblastoma cells.

Material and Methods: We determined the phenolic compounds of *Menyanthes trifoliata* extracts. The effect of root *in vtro* extract on glioblastoma cells were detected by apoptosis and cell cycle analysis by flow cytometry, assessment of mitochondrial membrane potential ($\Delta\psi m$) and proapoptotic genes expression in human grade IV glioma cells.

Results: The root extracts of *Menyanthes trifoliata* were found to exhibit cytotoxic effects against grade IV glioma cells, but not normal human astrocytes. HPLC analysis demonstrated the presence of various polyphenolic compounds, including sinapinic acid, ferulic acid, syringic acid and vanilic acid. High level of pentacyclic triterpene – betulinic acid were also found in Mt. *in vitro* root extract.

Conclusion / Discussion: The present study is the first to demonstrate the anti-cancer properties of *Menyanthes trifoliata* root *in vitro* extract on grade IV glioma**.**

Keywords: Glioblastoma, *Menyanthes trifoliata*, Plant extract, Apoptosis

References:

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POSTER PRESENTATION

CHEMICAL COMPOSITION AND IN VITRO ANTIFUNGAL ACTIVITIES OF MELALEUCA STYPHELOIDES LEAVES: COMPARISON BETWEEN VOLATILE AND NON-VOLATILE EXTRACTS

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Objective / Purpose: This study was carried out to determine the chemical composition and antifungal activities of essential oil, ethanol and aqueous extracts of *Melaleuca styphelioides* Sm. leaves.

Material and Methods: The essential oil of *Melaleuca styphelioides* Sm. leaves was obtained by hydrodistillation and analyzed by gas chromatography–mass spectrometry (GC–MS). The antifungal activities of ethanol and aqueous extracts of *Melaleuca styphelioides* leaves against 3 strains of fungi (*Aspergillus niger*, *Rhizopus nigricans* and *Penicillium digitatum*) were evaluated by the diffusion technique on PDA growth medium and the minimum inhibitory concentration of each extract was assessed by antifungal susceptibility using the broth microdilution method.

Results: A total of 10 components of the essential oil were identified, with the principal compound in the essential oil being methyl eugenol (87.2%). Other minor oxygenated monoterpenoids were also present and which are: *trans*-thujone (0.46%), *cis*-thujone (0.20%) and iso-borneol (0.22%). Besides, volatile and non-volatile extracts were found to express dose-dependent inhibition against all tested fungi strains. Indeed, volatile oil showed significant inhibition of fungal growth and the minimum inhibitory concentration was 2.08 µL/mL for *Aspergillus niger* indicating that *Melaleuca styphelioides* leaf essential oil was particularly effective against this pathogen. Furthermore, the evaluation of minimum inhibitory concentration of *Melaleuca styphelioides* leaf extracts revealed the differential potency of each extract against the tested fungal strains. The most susceptible species for the aqueous extract was *Penicillium digitatum* (IC_{50}= 9.54 mg/mL) whereas *Rhizopus nigricans* was found to be more susceptible to the ethanol extract (IC_{50}= 8.31 mg/mL).

Conclusion: It can be concluded that the essential oil, aqueous and ethanol extracts of *Melaleuca styphelioides* leaves possess antifungal activity and thus it can be suggested to have the potential to be used as alternative fungicide.

Keywords: *Melaleuca styphelioides*; essential oil; extract; antifungal activity.

POSTER PRESENTATION

PLANT-DERIVED BIOSTIMULANT EFFETCS ON *PORTULACA OLERACEA* GROWN UNDER SALT STRESS

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Objective / Purpose: Protein hydrolysates have been shown to play multiple roles as biostimulants of plant growth and to improve crop tolerance to abiotic stresses. For this purpose, this work aimed to study the effect of 3 plant-derived protein hydrolysates on *Portulaca oleracea* tolerance to salt stress.

Material and Methods: A *Portulaca oleracea* cultivar was cultivated in pots under greenhouse. Plants were treated with a factorial combination of three nutrient solutions (non-salt control, 50 and 100 mM NaCl) and root applications of three commercial biostimulants: Trainer (3 $ml.L^{-1}$), Acrecio (10 $ml.L^{-1}$) and Osiryl (1 $ml.L^{-1}$). Growth and physiological parameters were determined.

Results: Salt stress decreased shoot and root dry biomass, chlorophyll and carotenoid contents. However, some substantial differences in the agronomical and physiological responses were observed between biostimulant treated and untreated plants in response to salt stress. Hence, root application of biostimulants increased dry biomass and root dry weight of plants grown under salinity conditions. This was associated with an increase of the Fv/Fm-ratio efficiency in biostimulant-treated plants.

***Conclusion*:** The present study proves that the root application of plant-derived protein hydrolysate increases performance of the *Portulaca oleracea* cultivar when plants are grown under salinity conditions.

Keywords: *Portulaca oleracea* L., salt stress, biostimulant, growth; chlorophyll; carotenoids.

ORAL PRESENTATION

ESSENTIAL OIL AND CHEMICAL COMPOSITIONS OF *THYMUS KOTCHYANUS* BOISS&HOHEN. VAR. *KOTCHYANUS* AND VAR. *ERIOPHORUS*

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Objective / Purpose: Recent studies found out that some of the medicinal plant characteristics can be affected by genetic and environmental factors[1]. The results of this study were (i) to evaluate the essential oil constituents of *Thymus kotchyanus* Boiss&Hohen.var. *kotchyanus* and var. *eriophorus*, grown in different geographical location of Van province, Turkey, (ii) to detect the association between variations of major essential oil constituents and the environmental factors involved in different area around Van.

Material and Methods: The aerial parts of two varieties of *Thymus kotchyanus* were collected from different regions in Van. Essential oils of samples were extracted by hydrodistillation for 3 h using Clevenger type apparatus. The oils were characterized using gas chromatography-mass spectrometry (GS/MS). Some soil and plant nutrient contents (K, Fe, Ca, Mn, Zn, Cu, Zn) were determined using by atomic absorption spectroscopy. Bootstrap hierarchical clustering analyzing method was applied to described the samples into different grouped components.

Results: Our results showed that the thymol was the main component, The highest content of thymol in all investigated samples was obtained from Saray, Van (73.08 %). Fe and Ca concentrations of Thymus were very high for plant samples from different soil properties.

Conclusion / Discussion: Our data indicated that the essential oils extract from Thymus rich about thymol. Plant samples were rich about Ca and Fe from different localities and soil properties with poor organic matter content. This study can be guide of future studies.

Key Words: *Thymus*, plant and soil nutrient, essential oil constituents

References:

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ORAL PRESENTATION

MORPHOLOGICAL CHARACTERISTICS OF BASIL (*Ocimum basilicum* L.) POPULATIONS OBTAINED FROM DIFFERENT COUNTRIES

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Objective / Purpose: Basil (*Ocimum basilicum* L.) is one of the most common species in Lamiaceae family. It is cultivated commonly in the World and has the most economic importance. This plant is also used in traditional and medicine to treat a number of diseases. Basil is used in the food, perfumery and cosmetics industry and has showed bactericidal, fungicidal, antiviral, repellent, antioxidant, antidiarrhoeal, chemopreventive and radioprotective activity.

Material and Methods: This study, in which fifty eight different basil seeds and 1 cultivar seed (Midnight) used, was tested using Augmented trial design at Abant İzzet Baysal University Research and Implementation Area in 2017. Among these populations, 52 populations were adapted to Bolu ecological conditions.

Results: Throughout the research, germination time, flowering time, plant heights, branch amount per plant, fresh and dry herb weight of the 52 different basil populations have been observed.

Conclusion / Discussion: As a result of the study, it has been detected that all researched basil cultivar and populations are cultivable under the Bolu ecological conditions, however, there are major differences between observed genotypes characteristics. Georgia population (Ames 32312) was seen the highest total fresh and dry weight among the populations and controls. Examined properties were seen close value between the controls, but these properties were changed among the populations. The availability of various populations offers the opportunity for production of basil to meet the market requirements of specific basil oils or individual compounds such as linalool, eugenol, methyl chavicol, methyl cinnamate, or methyl eugenol.

Keywords: Basil, Bolu, morphological properties, *Ocimum basilicum*

References:

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POSTER PRESENTATION

ESSENTIAL OIL COMPOSITION FROM *JUNIPERUS COMMUNIS* ORIGINATED FROM ALBANIA

Aurora Buci, Entela Hodaj-Celiku, Hasime Manaj, Sokol Abazi, Spiro Drushku, Diamanto Lazari

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There is a remarkable development of interest in medicinal and aromatic plants worldwide and their cultivation may contribute to the amelioration of the local agricultural economies.

The essential oil of juniper berries (*Juniperus communis* L., Cupressaceae) is traditionally used for medicinal and flavouring purposes. The aim of the present study was to contribute to the knowledge of the essential-oil composition of *J. Communis* originated from Albania, which was performed by capillary GC-MS with an HP-5 column and with an EI detector. Identification of the compounds were made by comparison of mass spectra and retention indices with literature records[1].

J. communis L. is composed mainly of monoterpene (71.8%) and sesquiterpene hydrocarbons (18.7%). Totally were identified (98.2%) of the chemical constituents amounting to 56 compounds and the principal were: α-pinene (35.8%), β-myrcene (19.9%), sabinene (10.0%) and germacene D (4.5%).

Keywords: Essential-oil, α-pinene, GC-MS.

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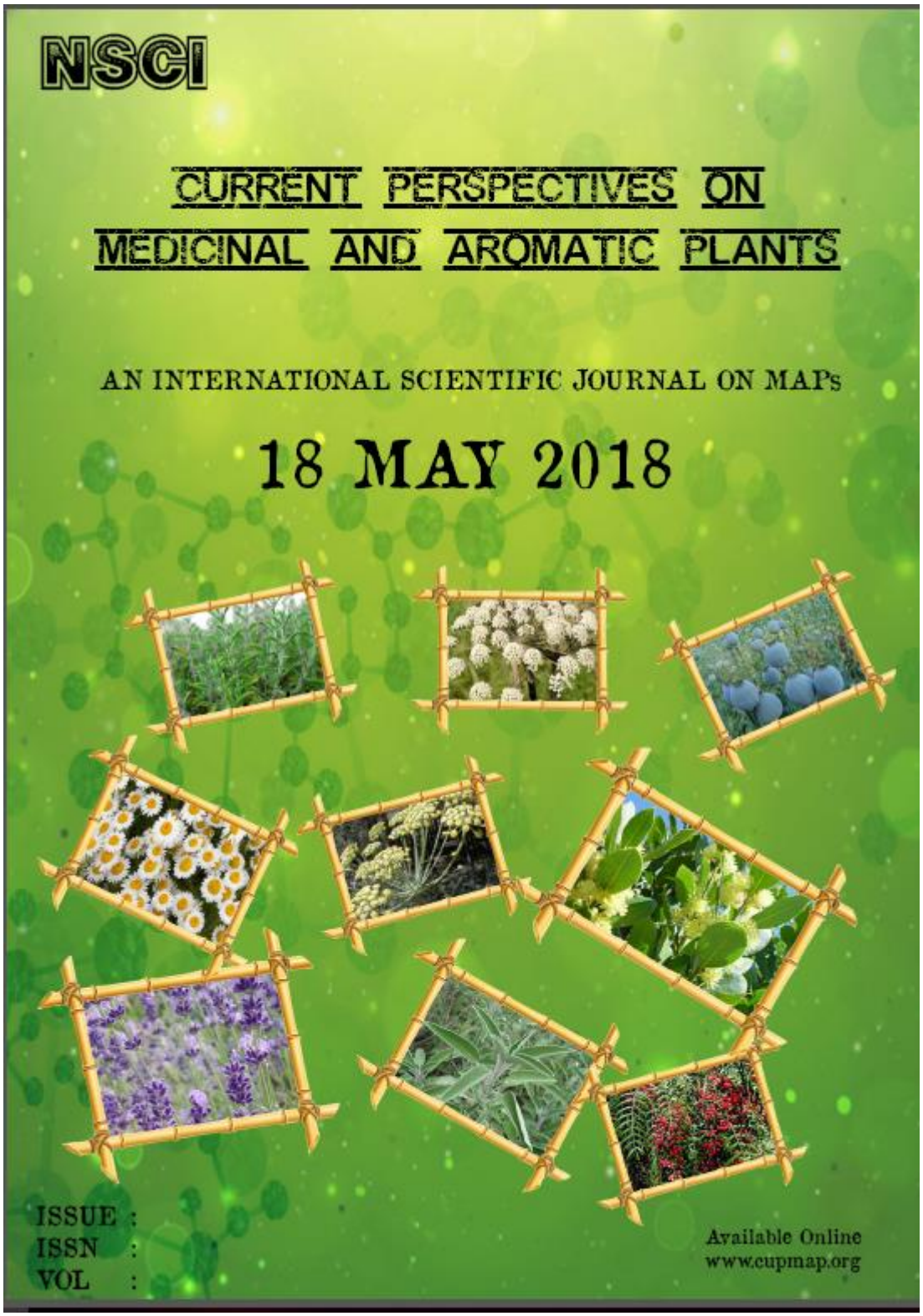

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