



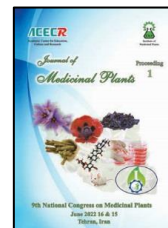
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## 9<sup>th</sup> National Congress on Medicinal Plants

15 & 16 June 2022  
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# *Journal of Medicinal Plants*

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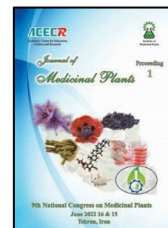
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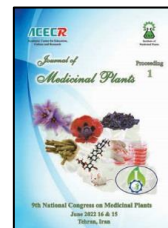
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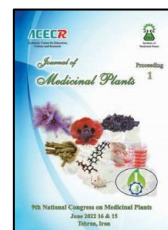
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# Plenary Lecture



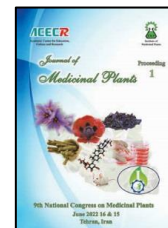
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### Plenary Lecture

## Extraction and Analysis of Essential Oils of Iranian Aromatic plants

Fatemeh Sefidkon

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#### ARTICLE INFO

*Keywords:*

Essential oil  
Pharmaceutical  
industry  
Iranian Flora

#### ABSTRACT

Extensive knowledge about Iranian aromatic plants and applied research on the extraction and identification of their essential oil compositions began in Iran at the Research Institute of Forest and Rangelands with a joint project with UNDP entitled "aromatic plants research and development program" since 1992. In this project, the essential oils of 20 Iranian aromatic plant species was studied. Identification of essential oil constituents of some native and endemic plants such as *Bunium persicum*, *Dracocephalum muldavicum*, *Ducrosia anethifolia*, *Heracleum persicum*, *Zataria multiflora* and 15 other plant species were studied in this project for the first time. In the implementation of this project, the required laboratory facilities were completed, and the Phytochemistry Research Group was formed to analyze and identify the active ingredients of medicinal and aromatic plants. The researches of phytochemistry group in identifying the huge potential of active ingredients (especially the essential oils) of Iranian medicinal and aromatic plants, continued by implementing the project titled "Study of essential oils content and composition of Iranian aromatic plants" in 3 phases. In these projects in addition of determining the type and percentage of all compounds in the essential oils of more than 900 species of Iranian plants, many other achievements were obtained, some of which will be briefly mentioned in this article.

The results of this researches can be summarized in some paragraphs as follows:

- Identification of chemical composition of the essential oils of all aromatic plants of Iran
- Extraction and identification of some alkaloids, flavonoids and other active substances in native plants of Iran
- Cultivation and domestication of some studied plants
- Investigation of biological effects of some essential oils and extracts
- Research on processing and preparation of end products from essential oils and extracts
- Creating an industrial pilot for essential oil extraction



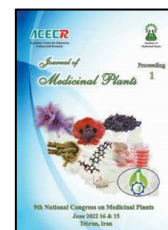
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Plenary Lecture ID: 290

### Research Advances and Future Development Trends in Medicinal Plants

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#### ARTICLE INFO

*Keywords:*

Herbal  
DNA barcodes  
CRISPR-Cas gene editing  
Conservation

#### ABSTRACT

Medicinal plants are thought to be rich in phytochemicals, which are important in the development of novel medications. Due to its geographical location and plant diversity, Iran is a particularly rich country. According to estimations, there are 8167 species of vascular plants in Iran, of which 2597 species are native. Ethnobotanical work (human knowledge of botany and plant ecology) can be the fastest way to collect species for phytochemical and pharmacological studies, and such data must be maintained for future herbal medicine research. Based on the review of sources in Iran, ethnobotanical research gaps include two main topics; that is, lack of scientific identification and insufficient statistical information. In the field of identification, advanced approaches to molecular genetics such as DNA barcodes are of interest today. One of the most pressing issues facing medicinal plants in Iran is the extinction of native and rare species due to improper use, mismanagement and overuse. As a result, there is an urgent need to develop conservation strategies to better protect all native medicinal plant species. In this regard, *in-situ* conservation (natural resources and wild nurseries), *ex-situ* conservation (botanical gardens and seed banks), resource management (such as good agricultural practices and sustainable use solutions) and biotechnological methods (Such as cell culture, micropropagation, synthetic seed technology, and molecular marker-based methods) should all be considered. Moving toward a more resilient and knowledge-based economy emphasizes the significance of aligning medicinal plant research with global trends. Only 11% of studies on medicinal plants is in the field of agricultural sciences and biology, according to a Scopus analysis of over 100,000 publications. More than half of the research is in the fields of pharmacology, toxicology, and pharmacy, and medicine. This study identifies a lack of agro-economic research on plant breeding in terms of domestication, productivity, genetic and biotechnological research. Given the need and relevance of food security and severe climate change, the employment of biotechnology research methodologies in the field of breeding, production, and modern exploitation of medicinal plants will be a very essential step. The integration of omics techniques at multiple stages, from the identification of medicinal plants to the analysis of secondary metabolites, is quickly taking place in the world today with this approach, which uses production in controlled systems (vertical culture and bioreactors). Introduction of novel breeding models in medicinal plants, introduction of model medicinal plants, and CRISPR-Cas gene editing technologies are among the most recent and ongoing advancements in the realm of medicinal plant breeding. In the near future, synthetic biology will play a very important role in the field of medicinal plants; because it provides tools to invest in invented plant chemistry by transferring metabolic pathways to much more stable plants. It also enhances our ability to produce complex drugs in well-studied plant systems.



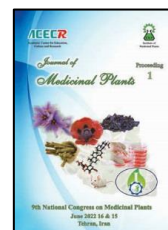
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# **Oral Presentation**





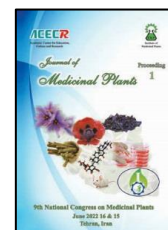
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Oral Presentation ID: 127

### Metabolic Profiling of Two Potential Sources of Galbanum: An NMR-based Metabolomics Study

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#### ARTICLE INFO

Keywords:

<sup>1</sup>H-NMR metabolomics

Barijeh

Chemotaxonomy

*Ferula galbaniflua*

*Ferula gummosa*

#### ABSTRACT

*Ferula gummosa* Boiss. and *Ferula galbaniflua* Boiss. & Buhse (Apiaceae) are two important Iranian source of Galbanum (barijeh). According to a phylogenetic analysis of the nrDNA ITS sequence and the Flora Iranica, *F. gummosa* has been considered as a synonym of *F. galbaniflua*. However, *F. galbaniflua* and *F. gummosa* have different metabolic patterns. So to discriminate these species metabolic profiles of these species samples were study with <sup>1</sup>H-NMR-based metabolomics. The result showed a clear separation between the two species (Ligupersin A and conferdione and high level of mogoltacin were significantly detected *gummosa*, and high level of feselol and sterol compounds were significantly detected in *F. galbaniflua*) that related to the quantity and diversity of their metabolites. Our findings indicate that clear metabolomics discrimination of *F. gummosa* and *F. galbaniflua* makes their chemotaxonomic classification possible.

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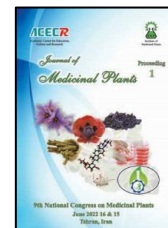
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Oral Presentation ID: 135

### Identification and Evaluation of Iranian Licorice Populations with High Glabridin Content

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#### ARTICLE INFO

##### Keywords:

Liquorice  
Phytochemical analysis  
Glabridin  
Diversity

#### ABSTRACT

The interaction between environment and genotype ascertains the quantity and quality of specialized metabolites [1]. Nowadays, stable, uniform and high-efficiency production of raw materials for pharmaceutical companies has received special attention. To meet these criteria, domestication and introduction of wild medicinal and aromatic plants to the cultivation system is an essential effort. Except of glycyrrhizin, the underground parts of licorice (*Glycyrrhiza glabra* L.) contain valuable medicinal flavonoids that have received much attention in recent years. Glabridin is the most important flavonoid in licorice underground and considered as a phytoestrogen compound as well as represent many biological effects such as antioxidant, anti-inflammatory, neuroprotective, anti-osteoporosis and skin whitening. Although most research on this plant has focused on various aspects of glycyrrhizic acid, the importance of its flavonoids has become increasingly apparent and has attracted attention in recent years. Given that the importance of glabridin and increasing demand for its utilization in industry, the present study was undertaken to introduce the glabridin-rich population from cultivated Iranian licorice (*Glycyrrhiza glabra* L.). Phytochemical quantification of underground part of licorice among eight cultivated populations disclosed that the populations of Ilam, Marvest and Kashmar had the highest content of glycyrrhizic acid, respectively. The glycyrrhizic acid content ranged from 5.04 mg/g DW in Taft population to 23.09 mg/g DW in Ilam population. The glabridin content varied from 0.02 mg/g DW to 0.69 mg/g DW among cultivated populations, wherein the Marvest and Kashmar populations were dedicated the lowest and highest values, respectively. This study provided valuable initial information to continue the breeding process until the introduction of glabridin-rich cultivars from Iranian licorice populations.

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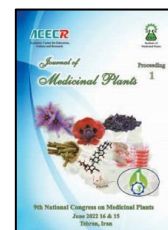
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Oral Presentation ID: 139

### Preparation of Polyphenolic Metabolites from *Rosa damascenes* waste by Use of Biotechnology

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#### ARTICLE INFO

##### Keywords:

*Rosa damascenes*  
Polyphenole  
anti-tyrosinase  
biotechnology

#### ABSTRACT

The most important utilization of rose flowers (*Rosa damascena*) in Iran is rose-water preparation using a traditional steam distillation method. In the rose-water only 5% of all the ingredients of the petals are extracted and the rest of the compounds is largely disposed as the waste biomass [1,2]. In this project, changes in glucosidically conjugated forms of remained phenolic compounds were investigated during the solid-state fermentation of *Rosa damascena* waste using the microorganism *Aspergillus niger* and preparation the enriched polyphenol fraction using a solid-phase extraction (Macroporous adsorption resin) technique and evaluate their antioxidant and anti-tyrosinase activity. First, radial growth of the microorganism, beta-glucosidase activity of microorganism, determination of best fermentation conditions, and maximum accumulation time of polyphenols were tested. Then, a concentration and clean-up of polyphenols was optimized using Macroporous adsorption resin. In the following the biological activity of recovered compounds was investigated by DPPH, and anti-tyrosinase assay. Finally the identification of targets were done by HPLC-MS were made. Total phenol and flavonoid analyses showed that the best fermentation conditions were temperature 35 °C and inoculum  $2 \times 10^6$  spores/g, while HPLC analysis of obtained fractions from SPE, revealed that the 70% ethanol was the proper elution solvent for polyphenols. The HPLC/MS analysis allowed the identification of polyphenolic compounds, and the antioxidant and anti-tyrosinase activity of the obtained polyphenols was demonstrated, more than 90% inhibition activity.

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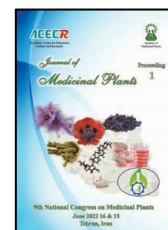
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Oral Presentation ID: 171

### Aromatherapy, Case Reports from New Researches

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#### ARTICLE INFO

*Keywords:*

aromatherapy  
case reports  
anxiety  
stress  
nausea

#### ABSTRACT

Aromatherapy is based on the usage of aromatic materials, including essential oils, and other aroma compounds, for improving psychological or physical well-being. Placebo-controlled trials are difficult to design, as the point of aromatherapy is the smell of the products. There is disputed evidence that it may be effective in combating postoperative nausea and vomiting.

There are recent and new works about clinical trials of aromatherapy. In them, the effect of a number of essential oils on some diseases or syndromes has been studied and, in most cases, the effectiveness has been appropriate. In recent research has used aromatherapy in patients with Alzheimer's disease, reducing pain during labor, sleep quality and anxiety of patients, anxiety, stress, and fundamental nursing skills, anxiety of clinical nurses, neuropathic pain and quality of life in diabetic patients, symptoms of menopause treatment of postoperative nausea and vomiting, pain, and functional state, and quality of life in an elderly individual with knee osteoarthritis [1-3].

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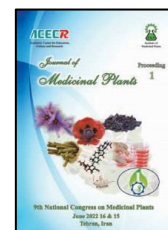
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Oral Presentation ID: 172

### Enhancement of Ajmalicine and Vinblastine Accumulation in Callus Cultures by Endophytic Fungi of *Catharanthus roseus* cv. Icy Pink

Nastaran Hemmati<sup>1</sup>, Majid Azizi<sup>1</sup>, Rosella Spina<sup>2</sup>, François Dupire<sup>2,3</sup>, Hossein Arouei<sup>1</sup>, Mohsen Saedi<sup>4</sup>, Dominique Laurain-Mattar<sup>2,\*</sup>

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Endophyte Vinblastine Ajmalicine LCMS TQ Callus Culture</p>	<p><i>Catharanthus roseus</i> belonging to the Apocynaceae family synthesizes indole alkaloids like vinblastine and ajmalicine, used in cancer treatment and to decrease high blood pressure, respectively. However, these compounds with a high value-added are accumulated at a low level in the plants. For the first time, endophytic fungi isolated from leaves (<i>Stemphylium amaranthi</i>) and roots (<i>Gliomastrix masseei</i>) of <i>C. roseus</i> cv. Icy Pink was used as fungal elicitors to improve the biomass of <i>C. roseus</i> callus culture and the accumulation of indole alkaloids in the calli. After the isolation and the identification of endophytic fungi from <i>C. roseus</i> cv. Icy Pink leaf and root, phytochemical analysis of ethyl acetate crude extracts of these endophytes were determined. The stimulation effect of these endophytes on the growth of <i>C. roseus</i> callus and biosynthesis of vinblastine and ajmalicine were studied. The ethyl acetate extract of <i>S. amaranthi</i> showed the maximum scavenging activities in 1,1-Diphenyl-2-picrylhydrazyl (DPPH) and 2,2'-azinobis-3-ethylbenzothiazoline-6-sulfonic acid (ABTS) assays. The maximum amount of total flavonoid and total phenol content was found in <i>S. amaranthi</i> (18.29±0.03 mg gallic acid equivalents.g<sup>-1</sup> and 0.117±0.00001 mg quercetin equivalents.g<sup>-1</sup>, respectively). Also, 5% cell extract and 5% culture filtrate extract of this endophytic fungus during seven days of calli culture led to the highest contents of ajmalicine (0.735 µg.g<sup>-1</sup> FW) and vinblastine (0.059 µg.g<sup>-1</sup> FW) respectively. Considering the results, endophytic fungal extracts, added to the <i>in vitro</i> cultures, increased the amount of vinblastine, ajmalicine, and callus growth. The maximum elicitation of these parameters is dependent on fungal endophyte species, concentration, sampling time, and type of elicitors. Thus, endophytic fungi isolated from <i>C. roseus</i> could be used as a fungal elicitor to improve indole alkaloid production [1, 2].</p>

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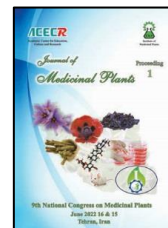
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Oral Presentation ID: 176

### Nanotechnology Advances in Natural Compound Delivery

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#### ARTICLE INFO

*Keywords:*

Natural compounds  
Nanotechnology  
Solubility  
Absorption

#### ABSTRACT

Natural compounds have been explored to treat fatal diseases like cancer and a variety of infectious diseases. However, they usually suffer from problems like lack of water solubility and/or absorbability from biological membranes. Nanotechnology involves the design, synthesis, characterization, and application of materials and devices with at least one of the dimensions on the nanoscale (1–100 nm)[1]. Nanoparticles have a high potential for treating various diseases such as cancer, inflammation, and drug diseases because of their ability to encapsulate and deliver large numbers of drug molecules including the natural compounds [2]. A successful nanomedicine that can target and treatment a wide range of cancers with minimal side effects is still elusive. Therefore, efforts are being made to improve the design parameters for an efficient delivery system to transport natural therapeutic agents to the target tissues. In this lecture, we will discuss about recent advances in natural compounds delivery using nanotechnology approaches.

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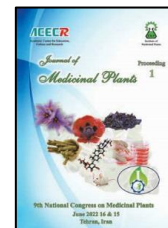
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### Application of Nanotechnology in the Development of Herbal Products

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#### ARTICLE INFO

*Keywords:*

Nanotechnology  
Herbal Products  
Drug Delivery  
Chronic diseases  
Medicinal Plants

#### ABSTRACT

The application of pharmaceutical nanotechnology (nanodrugs) for active metabolites and plant extracts has attracted the attention of scientists in recent years. This emerging plant revolution has led to the development of other approaches to drug delivery of biologically active plant compounds and plant extracts with poor solubility, in order to increase their bioavailability and effectiveness. In this context, most pharmaceutical nanotechnology-related technologies and targeted drug delivery strategies include phytosomes, nanoparticles, hydrogels, microspheres, transfersomes and ethosomes, self-nano emulsifying drug delivery systems (SNEDDS), and self-micro emulsifying drug delivery systems (SMEDDS), for the purpose of drug delivery of bioactive compounds and plant extracts have been identified and studied. These approaches have proven to be one of the most efficient and reliable drug delivery systems in the field of pharmaceutical nanotechnology; because they increase solubility, absorption, pharmacokinetics and bioavailability and act as a protector against toxicity. Therefore, nano-sized drug delivery systems in the field of medicinal plants have the potential to increase the performance of herbal medicines and overcome the problems associated with herbal medicines. On the other hand, the integration of nanocarriers as a novel drug delivery systems (NDDS) with the traditional medicine systems is necessary to deal with chronic diseases such as asthma, diabetes, cancer and etc.

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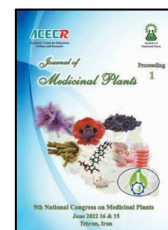
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## 9<sup>th</sup> National Congress on Medicinal Plants

15 & 16 June 2022  
Tehran, Iran



Oral Presentation ID: 196

### Cyanobacteria and Application in Production of Medicinal Plants, A New Approach to Increase Production and Economic Efficiency

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#### ARTICLE INFO

##### Keywords:

Antioxidant compound  
Cyanobacteria  
Bioelicitor  
Medicinal plant

#### ABSTRACT

Medicinal plants contain various valuable metabolites such as phenolic and flavonoid compounds and essential oil, which are the main components with antioxidant activity and medicinal properties in these plants [1]. These compounds can be extracted in different ways and can be used in various industries such as food and pharmaceutical industries. They reduce damages caused by free radicals in vital systems. Previous studies show that using some biostimulants increased effective metabolites amount in medicinal plants [2,3]. Cyanobacteria are an important group of microorganisms in microflora of plants bed soil, which can be used as biostimulants, and used to increase plant production efficiency. In this study, the effect of cyanobacterial elicitors on medicinal plants was subjected. Production efficiency along with amount of valuable metabolites in three medicinal plants including *Mentha piperita* L., *Plantago major* L. and *Matricaria chamomilla* L. were evaluated in this propose. At First, cyanobacterial suspensions were sprayed on the soil of treated plants at 20-day intervals. Two cyanobacterial taxa belonging to *Anabaena* and *Nostoc* genera were chosen for this study. These cyanobacteria were isolated and purified from bed soil of medicinal plants. For aromatic plants the essential oil was evaluated and treated plants were compared with control ones. For Non-Aromatic plants other phytochemical components were analyses and compared. The results showed that there was significant increase in mass production of plants moreover amount of phytochemical components compared to controls. phenolic and flavonoid compounds in *P. Major*, menthol and phytol in *M. piperita* and camazoline in *M. Chamomilla* are some of precious compounds in studies species which increased the antioxidant properties of some medicinal plants. Finally we can state that the cyanobacterial elicitors are able to significant increase in mass production and antioxidant potential of medicinal plants and therefore this is a safe and economic solution for environmental and economical viewpoint of the country.

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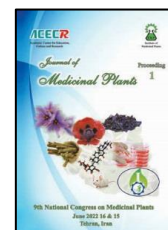
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Oral Presentation ID: 228

### Comparison of the Efficiency of Plant Essential Oils and its Nanostructured Lipid Carriers in the Healing of Infected Wounds

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Essential oil Nanostructured lipid carriers Infected wound healing Antimicrobial activity Collagen biosynthesis</p>	<p><b>Aim:</b> Medicinal plants have been utilized for the treatment of wounds. However, their uses have faced with limitations owing to their being their volatile nature. For that purpose, lipid-nanoparticles, especially nanostructured lipid carriers (NLCs), possess extremely useful characteristics such as biodegradability, biocompatibility and long-term stability, besides being suitable for drug delivery. This study aimed to compare the efficiency of plant essential oils in the healing infected wounds [1, 2].</p> <p><b>Methods:</b> This animal study was conducted on BALB/c mice infected with <i>Staphylococcus aureus</i> and <i>Pseudomonas aeruginosa</i> bacteria strains. The mice were treated with mupirocin® and ointments prepared from <i>Rosmarinus officinalis</i> essential oil (<i>R. officinalis</i>) and its loaded into nanostructured lipid carriers (<i>R. officinalis</i>-NLCs), peppermint essential oil (PPEO) and its loaded into nanostructured lipid carriers (PPEO-NLCs), Pennyroyal essential oil (PREO) and its loaded into nanostructured lipid carriers (PREO-NLCs), <i>Anethum graveolens</i> essential oil (<i>A. graveolens</i>) and its loaded into nanostructured lipid carriers (<i>A. graveolens</i>-NLCs), <i>Salvia officinalis</i> essential oil (<i>S. officinalis</i>) and its loaded into nanostructured lipid carriers (<i>S. officinalis</i>-NLC). A group was considered as control and did not receive any the treatment. The treatments were lasted for 12 days and wound contraction, total bacterial count and collagen were also evaluated. We also investigated MIC and MBC under in vitro condition [3, 4].</p> <p><b>Results:</b> The results showed that mice treated with free essential oils had lower antibacterial and wound healing activity compared with those treated with loaded essential oils (<math>P &lt; 0.05</math>). The results also showed that coated essential oils could compete with commercial ointment of mupirocin and healed wounds in shorter times. Bacteriostatic and bactericide activities of coated essential oils were higher than free essential oils. PPEO-NLCs, <i>R. officinalis</i>-NLCs, <i>A. graveolens</i>-NLCs, <i>S. officinalis</i>-NLCs, mupirocin, PPEO, <i>R. officinalis</i>, <i>A. graveolens</i> and <i>S. officinalis</i> ointments respectively showed greatest efficiencies in wound healing process and antibacterial activities. <b>Conclusion:</b> In sum, coating essential oils and their active compounds can increase wound healing activity and bactericide activity of essential oils under <i>in vivo</i> and <i>in vitro</i> condition.</p>

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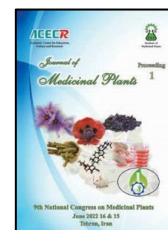
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Oral Presentation ID: 269

### Rapid Monitoring of Complex Alkaloids in Plants by Desorption Electrospray Ionization Mass Spectrometry (DESI-MS)

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> DESI-MS Opium Cannabinoids Herbicides and pesticides Bacteria</p>	<p>Desorption electrospray ionization mass spectrometry (DESI-MS) is a high-tech ambient mass spectrometry that can analyze any material in real-time without any prior sample preparation. This technology is now being used to monitor contact pesticides and herbicides in fruits and vegetables, as well as to identify microorganisms that are detrimental to plants and to detect pharmaceuticals derived from plants. Thus, this system is critical for the agricultural industry [1], [2]. To examine the alkaloids in <i>Papaver somniferum</i> and Cannabinoids in <i>cannabis</i>, a homemade DESI source was used in combination with a time-of-flight mass spectrometer (Waters LCT, Milford, MA). The charged droplets were transported by N<sub>2</sub> as a nebulizing gas with a flow rate of 7–10 μL/min at 100–120 psi toward the surface. All compounds were fixed on microscopic glass slides. Mass spectrometry analysis in positive mode was carried out. The DESI-MS mass spectrum revealed that in addition to the major alkaloids based on M/Z (morphine=286.6494, codeine=300.5716, thebaine=312.4781, papaverine=339.8238, and noscapine=414.8238), Papaver sub-alkaloids (canadine=340.3085 and narcotoline=400.8142) can be discovered much more quickly than with HPLC since HPLC for separation needs an ion pair agent, which takes a lengthy time. Therefore, this approach may be utilized to monitor these chemicals quickly without the need for sample preparation. Furthermore, this method demonstrated the quick detection of cannabinoids in cannabis, based on M/Z (CBD=315.1153 and THC=315.6352), which previously required separation and identification used in mass spectrometry. Therefore, plant alkaloids in <i>Papaver somniferum</i> and Cannabinoids in <i>cannabis</i> were identified in the quickest time (under one minute) and the lowest amount (LOD&lt;10ng) feasible using DESI-MS.</p>

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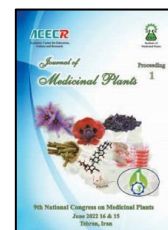
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## 9<sup>th</sup> National Congress on Medicinal Plants

15 & 16 June 2022  
Tehran, Iran



### Oral Presentation

## Biochemical Differentiation in the Germplasm of Iranian Tea

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### ARTICLE INFO

#### Keywords:

Tea, Morphology  
attributes  
Ecophytochemical  
diversity  
Active ingredients

### ABSTRACT

Tea (*Camellia sinensis* L.) is a woody and perennial plant belonging to the Theaceace family. Tea, made from the fresh leaves of this plant is one of the most popular healthy beverages in the world. At present, tea cultivation is largely confined to a few popular high yielding varieties from vegetatively propagated materials. This widespread cultivation of clonal tea would diminish the genetic diversity. Therefore, identification of germplasm accessions for inclusion in the breeding programmes is vital to widen the genetic base of the cultivated gene pool, aiming at genetic enhancement in increasing the quantity and quality of the product. Rational utilization of the available germplasm in breeding programmes depends largely on the knowledge and understanding of the relevant characteristics and the genetic diversity of the collection. Therefore, an understanding of the morphological, agronomical and biochemical diversity among the germplasm accessions is important if the best results are to be obtained from crop improvement programmes. In this study, we evaluated the diversity of tea plant ecotypes from Langroud, Lahijan and Siahkal regions (ten ecotypes in each region) as three major tea growing regions in Iran during 2019. Traits such as fresh and dry weight, chlorophyll a, b and total, caffeine, polyphenols were measured. The analysis of variance showed a significant difference ( $P \leq 0.01$ ) between tea ecotypes for all traits. The highest dry and fresh leaf weight was obtained in Siahkal ecotype (code 11). Siahkal ecotype (code 13) had the highest percentage of caffeine (7.63%), whereas Lahijan ecotype (code 21) represented the maximum amount. The highest amount of chlorophyll a and total chlorophyll was observed in Siahkol ecotype (code 18) and the highest amount of chlorophyll b was observed in Lahijan ecotype (code 30). The maximum (9.45%) and minimum (3.1%) polyphenols (9.45%) were obtained in Siahkal (code 16) and Lahijan (code 21), respectively. In general, ecotypes belonging to Siahkal region (codes 11, 13, 16 and 18) can be used in planning breeding projects and deciding to select suitable parents in hybridization to increase tea yield and phytochemical properties [1,2].

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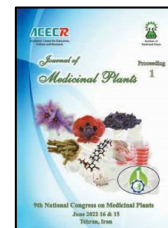
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Oral Presentation ID: 270

### Medicinal and Aromatic plants in Labiatae family in Iran

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#### ARTICLE INFO

*Keywords:*

#### ABSTRACT

Labiatae family with Botanical Characters: Herbs or shrubs, stems often 4-angled. Leaves exstipulate, simple, sometimes pinnate, always opposite. Inflorescence of cymes borne in the axils of bracts or upper leaves and usually contracted to form false whorls (verticillasters), is one of the largest plant families with ca. 48-50 Genus and ca.400 often aromatic species in Iran. The largest genus in the family are Nepeta 79 species, Salvia 61 species, Stachys 35 species, Scutellaria 27 species, Phlomis 19 species, Eremostachys 17 specie Between plants of the Labiatae family there are some Genus and species which are used in traditional medicinal plants in Iran before being acquaint with modern Medicinal plants and some of them are used by local people as vegetable. Most famous of them are:

Dracocephalum / Badranj bu, Hyssopus / Zufa, Lavandula, Marrubium/Frasiun, Melissa / Faranjmoshk, Mentha / Pune, Ocimum, Origanum / Marzanjush, Otostegia / Golder, Kase Gol Perovskia, Salvia, Satureja / Marze, Teucrium / Maryam Nokhudi, Thymus / Avishan Zataria/ Avishane Shirazi, Zhumeria Mure Khush, Ziziphora / Kakuti

In folk medicine people are believed that most of the plant species in Labiatae family have sweet odor, but there are some genus which are foetid and with unpleasant odor as:

Nepeta, Stachys, Scutellaria, Phlomis, Eremostachys

Maybe we say that all of the Salvia species have pleasant odor if rather bitter and pungent.

Here we refer to some well-known medicinal Genus and species of Labiatae plant family

Dracocephalum Moldavica / Badranj buyem, Badrashbi	Hyssopus angustifolius / Zufa
Lallemantia iberica / Balangu	Lamium album / Gazane sefid
Lavandula spp. / Ostokhuddus	Marrubium vulgare / Frasiun
Melissa officinalis / Faranjmoshk, Varang bu	Mentha spp. / Pune
Nepeta Cataria / Pune saye Gorbeii	Ocimum Basilicum / Reihan
Origanum vulgare / Marzangush, Marzanjush	Otostegia persica / Golder, Kase Gol
Perovskia abrotanoides / Berazambal	Rosmarinus officinalis / Romaran, Rosmary
Salvia officinalis / Maryam Goli	Satureja hortensis / Marze
Stachys lavandulifolia / Chaye Kuhi	Teucrium poliu / Maryam Nokhudi
Thymus vulgaris / Avishane Baghi	Zataria multiflora / Avishane Shirazim, Saatar
Zhumeria Majdae / Moure khush	Ziziphora tenuior / Kakuti

Beside to introduction of Medicinal plant for better acquaintance we show some powerpoints and speaking about most famous usage of these plants.



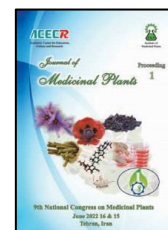
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Oral Presentation ID: 274

### Medicinal Plants Against Influenza Virus

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#### ARTICLE INFO

##### Keywords:

Antiviral activity  
Influenza A virus  
Medicinal plants  
South Africa

#### ABSTRACT

Influenza A virus (IAV) infection remains a serious public health threat for animals and humans, which crucially requires effective antiviral remedies. Due to drug resistance and side effects of the conventional antiviral drugs and weak points of vaccines, the usage of herbal medications as readily available alternatives for their compatibility with the body and fewer side effects compared to the synthetic chemical treatments has attracted researchers' attention. In this brief report, a summary of my studies on influenza A virus using natural compounds of medicinal plants indigenous to South Africa is presented. First, medicinal plants with ethnopharmacological background usage for the treatment of inflammatory and respiratory diseases (namely *Tabernaemontana ventricosa*, *Cussonia spicata*, *Rapanea melanophloeos*, *Pittosporum viridiflorum* and *Clerodendrum glabrum*) were collected from the Pretoria National Botanical Garden, South Africa in the summer months and voucher specimens were deposited in the HGWJ Schweickerdt Herbarium (PRU), University of Pretoria, South Africa. The crude methanol, ethanol (100% and 30%), acetone, hot and cold water extracts of the powdered plants leaves were prepared and screened for their antiviral activity using basic virology methods. The cytotoxicity was determined by the MTT colorimetric assay on MDCK cells. The non-cytotoxic concentrations below CC50 values were tested for antiviral activity against influenza A virus (IAV) in different combination treatments. The effect of extracts on viral surface glycoproteins and viral titer were tested by HI and HA virological assays, respectively. Then, the promising extracts were evaporated to dryness and subjected to silica gel column chromatography chloroform/ methanol (gradient 0 to 100% methanol) to prepare the fractions. The best fractions with antiviral capacity were purified twice on Sephadex LH-20 column chromatography using MeOH to obtain pure compounds. They were characterized by nuclear magnetic resonance (NMR) (1D and 2D) spectroscopic and mass spectrometry and tested for antiviral evaluation looking at more details of cellular and molecular interactions.

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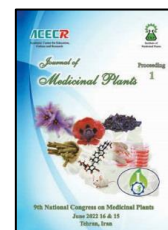
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Oral Presentation ID: 277

### From Traditional Persian Medicine Manuscript to New Pharmaceutical Findings

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ARTICLE INFO	ABSTRACT
<p><i>Keywords:</i> Persian medicine Deaddicta Marhame-Mafasel Nejabel Capsule</p>	<p>Persian medicine dating back to ten thousand years, has ability to solving some of the present medical problems. In recent years, many studies have been conducted to investigate the effects of various drugs of Persian medicine on special symptoms and different diseases. Due to undesirable side effects of synthetic drugs, moving towards the use of reverse pharmacology to produce a less costly, effective, and low-risk drug is inevitable. In the field of diagnosis and treatment of diseases, including addiction, depression, and inflammation, this study was done by looking at the original manuscript of traditional Persian Medicine (PM), animal studies and clinical trial of the effects of Deaddicta, Marhame-Mafasel and Nejabel Capsule for treatment of disease.</p> <p>Deaddicta's toxicology studies did not show any side effects and tissue damage. Animal studies did not show a significant difference in the total score between the methadone group and Deaddicta group. The effect of Deaddicta as a preservative in people with opioid abuse reduced craving, anxiety, and depression over time [1].</p> <p>Marhame-Mafasel ointment containing <i>Arnebia euchroma</i> using Persian medicine and reverse pharmacology with positive anti-inflammatory and analgesic effects on patients with knee osteoarthritis, was more tolerable, with no considerable side effects, it leads to increase the patient quality of life [2].</p> <p><i>Melissa officinalis</i> is one of the main ingredients of Nejabel Capsule. <i>M.officinalis</i> improved learning and memory in diabetic rats, which may have occurred by increasing brain-derived neurotrophic factor and nitric oxide synthase gene expression. Result of clinical studies showed lyophilized aqueous extract of <i>M. officinalis</i> leaves may be a safe herbal drug for the treatment of benign palpitations. Seven-day treatment with 1.5 g/day dried leaf powder of <i>M. officinalis</i> appeared to reduce the levels of anxiety and improve the sleep quality in patients after coronary artery bypass surgery.</p>

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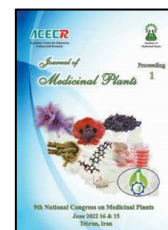
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Oral Presentation ID: 279

### Iranian Lichens as an Untapped Source of Biological Activities with Biopharmaceutical Potential and Industrial Importance

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#### ARTICLE INFO

##### Keywords:

Medicinal lichens  
Bioactive compounds  
Secondary metabolites

#### ABSTRACT

Lichens are complex organisms composed of a fungus (the mycobiont) and a photosynthetic partner (the photobiont) which is usually either a green alga or cyanobacterium. These composite organisms have been used for centuries as traditional medicines, rich in secondary metabolites, and have been described as potent drugs by numerous pharmacopoeias around the world. Interest in lichens as a source of bioactive molecules has been renewed and growing over the past few decades. Photoprotection, anticancer, antihepatotoxic, antidiabetic, allelopathic, immunomodulatory, enzyme inhibitory, antimicrobial, antifungal, antiviral, anti-insecticidal, anti-inflammatory, analgesic, antipyretic, antiproliferative cytotoxic and antioxidant activities are some of the biological roles that have been reported from lichens [1, 2].

This study summarizes the present status of Iranian medicinal lichens as an untapped source of biological activities. A brief description of important Iranian medicinal lichens, morphological characterization, potential nutritional values, pharmaceutical properties and their relevant applications, their distributions in Iran and their traditional utilization among Iranian nomadic groups are provided.

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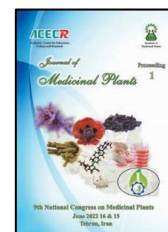
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### Manifestations of Nature's Creativity in the Biosynthesis of Unusual Skeletons in Native Plants of Iran

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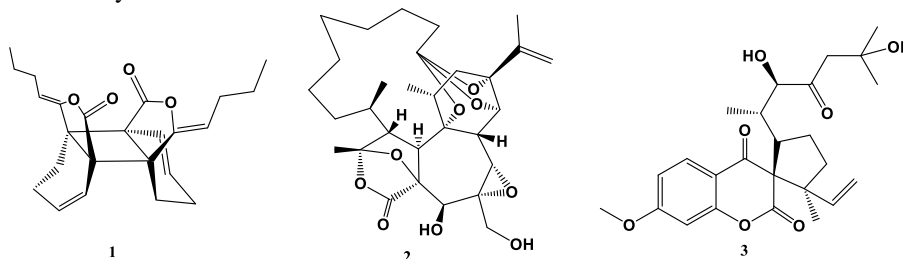
#### ARTICLE INFO

*Keywords:*

Drug discovery  
Lead compound  
Structure elucidation  
Biological activity

#### ABSTRACT

A huge diversity of molecular skeletons found in natural products enables finding better lead compounds to develop clinically useful entities. Plants are able to produce chemical metabolites with unique structures and specific properties, and therefore have always been considered as an important source for discovering new drugs or even finding suitable lead compounds [1]. Due to the increasing discovery of new drugs from plants and unique structures of biologically active natural compounds, progress in the field of separation and structure elucidation of these compounds is very important [2]. Our recent studies, aimed at identifying structurally interesting and bioactive metabolites from the Iranian endemic species, resulted in the isolation of several new compounds; some of them possess unusual and unique structures (1-3). The structures were elucidated by a combination of 1D and 2D NMR, HRESIMS, and X-ray crystallographic analyses. Plausible biosynthetic pathways toward these new skeletons were proposed. Biological properties of the new compounds were also investigated. Some of these compounds showed good *in vitro* antiplasmodial and anticancer activities at submicromolar concentrations and were subjected to semisynthetic modifications in order to improve their activity.



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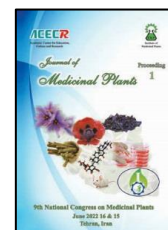
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Oral Presentation ID: 289

### LC-PDA-MS Detection of Anticancer and Antibacterial Metabolites from Sponge-associated Actinobacteria in the Persian Gulf

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#### ARTICLE INFO

#### ABSTRACT

Cancer is a major cause of death in many countries. In addition, infectious disease caused by different microorganisms is nowadays a major threaten for the human being's health. Marine natural products (NP) attracted the attentions of different scientists from various disciplines to search them for drug development. Especially, the recent advances in different branches of sciences and technology enabled us to collect diverse group of organisms from the bottom of oceans in order to isolate bioactive NPs with unique chemical structures from these organisms. The Persian Gulf is a shallow (mean 35 and deepest point 120 m) hot body of water resulted from the extension of the Indian Ocean that is separated from the Gulf of Oman via the Hormuz Strait<sup>1</sup>. The specific ecological conditions, including high salinity and sharp sun light make it as marvellous waters to be the origin of biodiversity among the seas. In our research group, we have focused on isolation of antidiabetic metabolites from brown and red algae<sup>2</sup> and anticancer and antibacterial metabolites from the sponges<sup>3</sup> or their associated microbiomes<sup>4</sup>. In addition to a safe host for macro organisms such as sea stars, crabs, etc. the sponges have a symbiotic relationship with the microorganism such as bacteria and fungi. In this presentation, I describe isolation of bacteria from *Haliclona caerulea* collected from the Larak Island in winter (WHL) and autumn (AHL) in which we identified 14 and 33 bacterial isolates, respectively, and identified those isolates based on some morphological, biochemical, and physiological characteristics. The isolated strains were belonged to *Streptomycetaceae*, *Vibrionaceae*, *Bacillaceae*, *Pseudomonadaceae* families. Among the tested bacteria those belong to *Streptomyces* were more active against cancer cell lines: HCT 116 (IC<sub>50</sub> = 373.5± 22.81 µg/mL for WHL 4) and HT-29 (IC<sub>50</sub> 1.9 to 61 µg/mL for AHL series) in MTT cytotoxic test and also the AHLs showed antibacterial activities against *Micrococcus luteus* with inhibition zones of 11-19 mm in agar disk diffusion method. The LC-ESI MS analyses resulted in identification of major constituents in the ethyl acetate crude extracts and CH<sub>2</sub>Cl<sub>2</sub> and MeOH fractions of the crude extracts of bioactive bacteria. The compounds belong to different classes of natural products including alkaloids, sterols and terpenoids.

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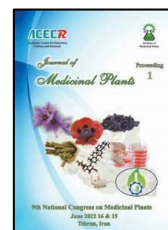
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# **Poster Presentation**



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Poster Presentation ID: 2

### Fatty Acids Profile and Essential Oil Constituents of *Cynara Scolymus* L. Seed Identified by GC-FID and GC-MS Analytical Techniques in the Western Area of Isfahan Province, Iran

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#### ARTICLE INFO

##### Keywords:

*Cynara scolymus* L.  
Essential oil  
Extraction  
Fatty acids  
Flowering period

#### ABSTRACT

One of the most important components of the nutrient sources have been fats and oils since many years ago; which based on the several studies in the field of nutrient sciences, they are usually derived from plant and animal sources [1]. Among that, the omega-3, omega-6 and omega-9 fatty acids compositions are belonged to the two major classes of the mentioned compounds namely poly unsaturated fatty acids (PUFAs) and mono unsaturated fatty acids (MUFAs). This means that the PUFAs group must be obtained from the diet and the MUFAs group could be produced by the human body [2]. The current study was conducted with the following objectives. The first purpose of this study was to obtaine and identify the fatty acids profile content of *Cynara scolymus* L. seed through the extraction of its oil with petroleum ether (40-60°C) using Soxhlet extractor and examining by GC/FID. The second purpose of the study was to isolate and identify the essential oils of the mentioned plant seed using hydrodistillation method via Clevenger-type apparatus and analyzing by GC/MS. All the studies mentioned have performed in a research farmland situated in the west part of Isfahan province, Iran. In this regard, *Cynara scolymus* L. seed was collected from the mentioned research farmland at the end of the flowering period. then, the collected samples were separated, air dried, milled and weighed in the certain quantity for the both experiments, separately. The results of the first purpose indicated that there were six fatty acids compound in the extraction of *Cynara scolymus* L. seed that the major ones were linoleic acid (53.27 %), oleic acid (30.71 %) and palmitic acid (12.02 %), respectively. It is worth mentioning that, the obtained results showed that the compounds identified correspond to their standards available. Following that, the results of the second part of the current study showed that, the number of 41 compounds belonged to two main chemical groups including hydrocarbons (aliphatic, cyclic and aromatic) and ester form of fatty acids; these compositions coupled with a few number of the other chemical compounds were idetified in *Cynara scolymus* L. seed essence. Therefore, the major compounds were Linoleic acid, methyl ester (18.47 %), Cyclohexane (15.35 %), Cyclopentane, methyl (13.08 %), 8-Octadecenoic acid, methyl ester (9.21 %) and 2-Methylpentane (6.33 %), respectively.

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Poster Presentation ID: 3

### Identification of Essential Oil Constituents of *Kelussia Odoratissima* Mozaff. Seed at the End of Maturity Period in Its Major Habitats Situated in the Western Area of Isfahan Province, Iran

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#### ARTICLE INFO

##### Keywords:

Essential oil  
Functional groups  
Habitat  
*Kelussia odoratissima*  
Mozaff.  
Maturity

#### ABSTRACT

In a general perspective, studying and discovering the capacities and actual and potential capabilities of the medicinal plants could be a great step to achieve an everlasting sustainable development and it is very important issue in terms of the origin of the mentioned plants in all over the universe [1]. *Kelussia odoratissima* Mozaff. is a native perennial and very aromatic medicinal plant that which belongs to Apiaceae family. Moreover, it has not been reported evidence of its existence in other parts of the universe so far [2]. Also, it is well-known and endangered medicinal plant in central Zagros region, Iran and it is usually grow in the elevations and snow-covered areas with a minimum altitude of 2500 m above the sea level that average annual rainfall is 470 mm because it is mostly snowy. The current study was carried out to isolate and identify the essential oils of *Kelussia odoratissima* Mozaff. seed at the end of maturity period in one of its major habitats located in the western part of Isfahan province, Iran. In this regard, *Kelussia odoratissima* Mozaff. was collected at the end of the maturity period from its natural habitats. After the plant collection, healthy plant seeds were separated, air dried, milled and weighed in the certain quantity. Following that, the essential oil of the plant was isolated by hydro–distillation method using Clevenger-type apparatus and analyzed by GC/MS device. The results showed three major chemical functional groups namely terpenoids, hedrocarbons, some of the fatty acids compositions and some other compounds belonging to the other functional groups were found in the essential oil of *Kelussia odoratissima* Mozaff. seed. Meanwhile, the major compounds of the above chemical functional groups were 13-Octadecenoic acid, methyl ester (18.67 %), Linoleic acid, methyl ester (12.49 %), Pentane, 2-methyl (5.78 %), Hexahydrobenzene (5.72 %) and *E*-Ligustilide (5.12 %), respectively. Finally, it is worth mentioning that the differences between constituents of the various ecotypes of the medicinal plants which have different vegetative conditions must be considered in relevant studies, particularly.

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Poster Presentation ID: 4

### The Effect of *Parrotia persica* C.A.Mey. as Host Species on Quantity and Quality of Triterpene Acids of *Viscum album* L. In Different Seasons

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#### ARTICLE INFO

##### Keywords:

Anticancer  
Harvesting time  
Mistletoe  
*Parrotia persica*  
Triterpene acids

#### ABSTRACT

*Viscum album* L. (Santalaceae) is a perennial, evergreen and hemi-parasitic plant used in pharmaceutical industry and medicine mostly for its anti-diabetes and anticancer activity. The effects may be related to the presence of triterpene acids, such as oleanolic (OA) and betulinic (BA) acids [2]. Mistletoe is growing on various tree species as well as some endemic species of Hyrcanian forests of Iran such as *Parrotia persica* (Persian ironwood) [1]. In our investigations the content of triterpene acids including oleanolic (OA), betulinic (BA) and ursolic acids (UA) in *V. album* from *Parrotia persica* C. A. Mey. as host tree depending on the season of harvest was determined. Mistletoe plant parts were collected from three bases of host species in Daeiz forest of Hyrcanian forests of Iran. The samples were dried and extracted with ethyl acetate using ultrasound energy. Diversity in the content of both compounds was noted; however, OA was the dominant triterpene acid and the amount thereof was 10 times higher than that of BA. The analysis of changes in the amount of triterpene acids during the spring-winter period revealed the highest content of OA in summer (12.38 mg/g dry weight). In turn, in the other seasons of harvest, the content was 7.71, 8.17 and 7.47 mg/g dry weight for spring, autumn and winter, respectively. The highest and lowest content of BA was observed in summer (1.68 mg/g dry weight) and autumn (0.61 mg/g dry weight), respectively. UA was not detected in any samples. The highest amount of the investigated compounds was found in summer; thus, this period seems to be optimal for acquisition of plant material rich in triterpene acids.

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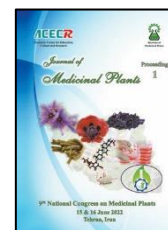
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Poster Presentation ID: 5

### Effect of Plant Density on the Production of Licorice (*Glycyrrhiza glabra* L.) Root Collected from Three Sites in Gol Gohar of Sirjan

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#### ARTICLE INFO

*Keywords:*

Medicinal Plant  
Root Biomass  
Plant Populations  
Soil Properties

#### ABSTRACT

Licorice is an herb that grows in parts of Europe and Asia [1], especially in semi-arid to humid weather conditions like the steppes and mountainous regions of Iran. Licorice root contains glycyrrhizin, which is used for stomach cures traditionally. The chemicals in licorice are thought to decrease swelling, decrease cough, and increase the chemicals in our body that heal ulcers [2]. There is interest in using Licorice for several other purposes and harvesting of this plant becomes increasing day by day from farms or natural vegetation. From the commercial point of view, it is important that harvesting be an economic activity, and this issue is related to the amount of Licorice root production directly. In this research Licorice (*Glycyrrhiza glabra* L.), root production was investigated in the Gol Gohar regions of Sirjan. Root biomass as the main economic product was collected in a three different part of Gol e Gohar rangelands. For this purpose, in the first step density of Licorice was estimated by using 30 one square meter plots at each site. Roots and rhizomes were collected by 30 cm soil digging and finally weighted. Some physicochemical soil properties were calculated by at least five samples, which are collected randomly and analyzed by standard laboratories methods. Results showed that Maximum root and rhizome production (55.4 gr/m<sup>2</sup>) was achieved with plant populations above 2.3 plants/M<sup>2</sup> at site 3 meanwhile in sites 1 and 2 density were 1.35 and 1.62 plants / m<sup>2</sup> respectively, the root and rhizome production were 122.3 and 146.3 gr/m<sup>2</sup>. Low Licorice density caused to decrease in root production and high Licorice density is affected by soil physicochemical properties. According to the results, there is a statistical difference between soil properties at three different sites and high production occurs in Sandy Clay Loam soil which has low Ec (3.73 dS/M) and moderate pH (7.23) whereas in all studied sites the amount of lime (CaCO<sub>3</sub>) was noticeable. Compared to other research, root production in Licorice's natural habitat is much less than farm production in different parts of the world. For more income from Licorice root harvest, it is necessary to strengthen the soil with fertilizer and regular irrigation on the farm, and planting Licorice as a crop Agriculture should be considered.

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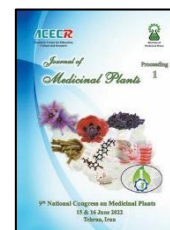
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Poster Presentation ID: 6

### Cytotoxic Effect of *Iris germanica* L. rhizomes Extract on Human Melanoma Cell Line(A375)

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#### ARTICLE INFO

Keywords:

Melanoma

*Iris germanica*

A375 Melanoma Cell

Line

Cytotoxicity

#### ABSTRACT

Melanoma is the leading cause of 80% of skin cancer worldwide due to its high proliferation rate, metastatic nature, and limited effective therapies. Given the rapid increase in its incidence compared to other skin cancers, new therapeutic agents are needed to control the disease. Scientists are interested in medicinal plants due to their anticancer properties. The rhizomes of the *Iris germanica* L., known as “Irsa”, is one of the herbs used in traditional Persian medicine for the treatment of various skin cancers. This study aimed at investigating the cytotoxic effects of *Iris germanica* on A375 melanoma and AGO-1522 normal human fibroblast cell lines for the first time. The ethanolic extract was prepared by the maceration method. Cell viability and cytotoxic activities were assessed through 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) and flowcytometric assay, using annexin V/propidium iodide (PI) staining. IC<sub>50</sub> values were estimated for the A375 melanoma and the AGO-1522 normal cell lines. We revealed that the IC<sub>50</sub> for the A375 melanoma was 0.0438 mg/mL and for the AGO-1522 normal cell line was 0.8494 mg/mL after 48 hours of treatment. Furthermore, flow cytometry analysis illustrated that 0.125 mg/mL of the *Iris germanica* extract could lead to 55.24% apoptosis of the A375 melanoma cell line. The same concentration of the *Iris germanica* extracts only lead to 8.76% apoptosis in the AGO-1522 cell line. In conclusions *Iris germanica* extract has considerable cytotoxic effects on the human melanoma cell line. Further studies are required to demonstrate the therapeutic effects of *Iris germanica* on melanoma cancer.



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Poster Presentation ID: 7

### Setting-Up a Validated Process for Qualitative and Quantitative Determination of Fatty Acids in the Oil of Medicinal Plants and Herbal Products

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ARTICLE INFO	ABSTRACT
<p><i>Keywords:</i> Fatty acid Gas chromatography Vegetable oils Non-polar column Peak separation</p>	<p>Vegetable oils are a combination of triglycerides, saturated and unsaturated fatty acids. Unsaturated (PUFAs with two to six double bonds). They are classified as cis or trans based on dual link configuration. Fatty acids have significant beneficial effects on the skin and body health. Common methods for the analysis of fatty acid methyl esters are usually gas chromatography (GC) with polar capillary columns (cyanopropyl and polyethylene glycol). However, not all polar columns have sufficient separation power to separate geometric isomers of unsaturated acids, and on the other hand, the cost of preparing these columns is high and they are sensitive to device conditions. It is also not possible to analyze long acids (&gt; C28) with polar columns. With non-polar columns, partial separation of many saturated, unsaturated, and long-chain fatty acids is performed, but complete separation is not possible for some compounds. Therefore, in this study, a method was developed by gas chromatography with non-polar column with the help of chemometric methods to separate the peaks in order to completely separate and accurately identify fatty acids and quantify them. Using this method to identify the complete fatty acid profile of sesame seed oil (<i>Sesamum indicum</i> L), black seed (<i>Nigella sativa</i>), anise (<i>Pimpinella anisum</i>), flax (<i>Linum asitativissimum</i> L), sage (<i>Silybum marianum</i>) (Lallemantia) and bitter almonds (<i>Amygdalus communis</i> L. var. Amara) and sweet (<i>Amygdalus communis</i> L. var. Dulcis) were treated. For all these oils, the exact percentage of saturated and unsaturated 18-carbon fatty acids that are present in most oilseeds was obtained accurately and in similar amounts to what has been confirmed by official sources. Also, the total percentage of fatty acids detected increased from 1 to 6% after separation of the peaks compared to the initial data.</p>

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Poster Presentation ID: 8

### Determination of Main Components and Quantitative Evaluation of Herbal Medicinal Products Made of *Cassia angustifolia* Available in Iranian Pharmaceutical Markets

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ARTICLE INFO	ABSTRACT
<p><i>Keywords:</i> Senna Natural products Physicochemical properties Microbial control Extraction Active ingredients</p>	<p>Currently, there are many herbal medicines on the markets that are supplied from different sources. Therefore, drug manufacturers are required to perform all physical and chemical quality control tests of drugs in order to ensure that their drug quality is high. Senna is one the most widely used plants in herbal medicinal products, which are mainly marketed in the form of syrups, capsules and tablets. Senna species also have a laxative effect. In this study, medicinal forms containing this plant of senna (which are available in the form of syrups, tablets and capsules) were purchased from pharmacies in Tehran province and physical control tests and chemical was performed based on the standards and information obtained from the Food and Drug Administration in order to ensure the high quality of the product. In the physical control test of the product such as color, odor, taste, pH, stability evaluation and sugaring (syrup) and hardness, friability and disintegration time (tablets) were investigated. Also, other physicochemical tests, microbial control and especially measurement of the active substance were evaluated by validated extraction and analysis. In all senna products, the reported amount of total sennosides for standardization does not match the values obtained. Other physicochemical properties were confirmed. Don't mentioning the amount of active ingredient in some products alone is considered a weakness in providing information and packaging. It is recommended to be more careful in making and controlling herbal medicines and performing similar tests for better and more appropriate supply and consumption of herbal medicines.</p>

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Poster Presentation ID: 9

### Estimating Toxicity Efficiency of Microcapsules Aqueous Extract of Egyptian Silk on *Siphoninus phillyreae* in Sparrow Tongue Tree

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#### ARTICLE INFO

##### Keywords:

White-winged fly  
*Caesalpinia gilliesii*  
Herbal formulation  
Urban environment

#### ABSTRACT

*Siphoninus phillyreae* (Halliday) pest in urban green lands and trees, so estimation of the lethal dose of pesticide with herbal compound due to the other contaminating environment is vital in Tehran that in this survey owing to controlling. In this study, aqueous extract Egyptian silk plant *Caesalpinia gilliesii* (seeds and pods) on microcapsules were obtained from AREEO Institute. The whitefly sparrow tongue. A sampling of leaves of the leaf sparrow tongue infected was conducted in Panize Park of 17<sup>th</sup> District Municipality, Tehran. Bioassay experiments were carried out at lethal concentrations for 24 hours *in vitro* (15-30 °C, %65 ± 5 RH, and 16:8 L:D). The foliar application was done on a life cycle whitefly on leaves by the spray tower. The experiment was performed in three replications with a concentration of 1000-5000 ppm of the microcapsule composition of the plant and compared with the control. Statistical analysis was accomplished using Polo-PC software (Version: 2.0). The LD<sub>50</sub> levels in the nymphs 1,2,3 and pupae are 1.510,1.518, 1.532 ppm and 1.613 ppm, respectively. According to the data controlling effects of herbal aqueous extract in the concentration of 5000 ppm at the pupae stage as an environmentally friendly method achieved in *Siphoninus phillyreae* white-winged fly. Although it has a minute deformation in structure in accordance with the decline in used dosage, this compound is willing to substitute chemical toxins for urban environmental usage.

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## 9<sup>th</sup> National Congress on Medicinal Plants

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Tehran, Iran



Poster Presentation ID: 11

### Comparison of some Ecological and Plant Parameters of Licorice (*Glycyrrhiza glabra* L.) Habitat in Taleghan Region

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#### ARTICLE INFO

##### Keywords:

Plant Density  
Soil Properties  
Rainfall  
Temperature

#### ABSTRACT

Licorice; (*Glycyrrhiza glabra* L.) from Fabaceae is a perennial plant species including medicinal and commercial constituents. Glycyrrhizic acid and glabridin which have been widely used for medicinal, flavoring and confectionary purposes since early civilization are obtained from licorice [1]. Licorice; be seen from southern Europe to central Asia between the two latitudes 30–45 degrees north and it's cultivated in Europe countries such as Great Britain and France, Germany, Italy, and Greece. The plant is wildly grown in many areas of Iran especially in Fars province. *Glycyrrhiza glabra* is one of the important species which is threatened by overharvesting and its habitats in Iran are under human activities pressures. In this study, four populations of the licorice plant in different Taleghan regions were compared from some habitats parameters point of views such as Rainfall, temperature, and soil properties to determine the favorite ecological condition for licorice growth. for this purpose, four study sites with unequal altitudes include Gelinak (1601 m), Fashandak (1954 m), Varkesh (2014 m), and Minavand (2230M)villages were selected. at least 25 one square meter plots for each site were used for estimating Licorice density, Bush height, and canopy diameter. Soil sampling also was done by digging the soil to 60 cm depth and some physicochemical soil properties were calculated by at least five samples and analysed by standard laboratories methods. Statistical Analysing showed there is a significant difference between some soil properties in different sites meanwhile all sites are in the same category in terms of rainfall, Ec, and pH. Maximum plant density and Bush height respectively with values of 3.2 plant/m<sup>2</sup> and 91.32 cm occurred in Fashandak which had more nitrogen and organic (0.35 %) matter (1.2 %) in the soil. in the other sites, plant density differed from 1.01 to 1.08 plant/M<sup>2</sup> but canopy diameter in Varkesh village with the value of 32.1 cm was more than all studied sites. Plant density has a major influence on the root and rhizome yields with yields continuing to rise as plant densities increased [2] in the other hand high Licorice density is affected by soil physicochemical properties. Results showed Licorice grows naturally in Taleghan where the mean annual rainfall varies from 471 to 549 mm, the mean annual temperature is 11.4 °C, and the soil pH varies from 6.5 to 7.2, but it grows best in dry, sunny, semi-arid climates with Optimal altitude 1800 to 2000 m, fertile soil and adequate soil moisture.

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Poster Presentation ID: 12

### Investigation of Antibacterial Activity of Natural Essential oil-based Chitosan nanoemulsion using an Efficient Microfluidic System

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#### ARTICLE INFO

##### Keywords:

Microfluidic chip  
*Bacillus atropheus*  
Antibacterial activity  
Chitosan/Satureja  
Khusitanica  
Essential oil

#### ABSTRACT

The aim of the present study is to evaluate the antibacterial activity of chitosan/Satureja Khusitanica essential oil (ch/SKEO NE) against a Gram-positive (*Bacillus atropheus*) bacterium using microfluidic systems and conventional methods. The effect of different residence times and concentrations on the antibacterial activity of nanoemulsion was studied by incorporating some tests, including release of cytoplasmic proteins, nucleic acids, potassium, and also minimum inhibitory concentration (MIC), minimum bacterial concentration (MBC) and time killing assays. Remarkable intensification was observed by employing microfluidic chip owing to the providing a high-contact surface area between nanodroplets and bacterial membrane [1]. The MIC and MBC values for *B. atropheus* in conventional method was obtained 0.31 mg/ml. whereas these values reduced to 8, 25 and 50 µg/ml concentrations using microfluidic system. The results showed that the cell membrane wall began to rupture quickly after 5 min treatment, and the bacterial activity was nearly entirely inhibited in a 18-min residence time as compared to the conventional method for 5 h operation. Furthermore According to the Zeta potentials analysis the surfaces of SKEO/chitosan and SKEO nanoemulsions have a positive and negative charge about +29 mV and -11 mV, respectively. It is suggested that the antibacterial activity of ch/SKEO NE was directly proportional to zeta potential. Increasing the surface charge increases the interaction of nanoparticles with the bacterial membrane and thus increases the antibacterial property [2].

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Poster Presentation ID: 13

### Extraction of Berberine from Root of *Berberis Vulgaris* using Ionic Liquids

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#### ARTICLE INFO

*Keywords:*

Berberine

*Berberis vulgaris*

Carbamate ionic liquid

Extraction

#### ABSTRACT

Berberine as a natural alkaloid with chemical formula  $C_{20}H_{18}NO_4^+$  and yellow color exists in different parts of plants, such as leaves, stems, barks and roots. This compound has many applications in traditional and modern medicine. For example, berberine has been effective in reducing cholesterol and obesity and treating diabetes and has proven its antioxidant and anticancer effects [1]. Various methods have been reported to extract berberine from plants, mainly including classical and modern extraction methods. In these methods, organic solvents are often used which limits its uses because of the presence of solvent residue in extracted berberine from environmental and health point of view. Recently, the use of ionic liquids as green solvents in the extraction of organic compounds is becoming more common and is developing [2]. Carbamates ionic liquids are a subset of ionic liquids that are liquid at ambient temperature and possess good polarity to extract and dissolve organic compounds. In this research, carbamate ionic liquid N, N-dipropyl ammonium N', N'-dipropyl carbamate (DPCARB) was synthesized from the reaction of the second type of dipropylamine with dry ice (solid  $CO_2$ ) and characterized by FTIR spectroscopy. Then the berberine in root of *Berberis Vulgaris* (South Khorasan province) was extracted using DPCARB. For this purpose, the plant samples grinded and mesh sized, then the appropriate amounts were selected and extracted by Soxhlet apparatus as well as by multi-stages counter current extraction method using DPCARB as ionic liquid solvent and methanol for comparison. The results showed that DPCARB ionic liquid could extract berberine efficiently (yield 2.1%) but it had lower extraction efficiency than methanol (yield 2.5%). UV-Vis spectrophotometry and HPLC were used for determining of the concentration of berberine in extracted sample.

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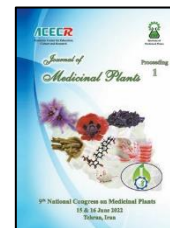
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Poster Presentation ID: 14

### Investigation of Antibacterial and Antibiofilm Activity of Nanoemulsified Essential oils of *Thymus daenensis* and *Mentha piperita* using Microfluidic Systems

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#### ARTICLE INFO

Keywords:

Microfluidic chip

*E. coli*

Antimicrobial activity

Nanoemulsions

*Thymus daenensis*

#### ABSTRACT

The application of essential oil nanoemulsions are growing to overcome the serious problem of antibiotic resistance. In this research, two different nanoemulsions using *Thymus daenensis* and *Mentha piperita* essential oils (EOs) were prepared and characterized. Then, the antibacterial activity of EOs and their formulations were evaluated according to with the effects of various residence times and concentrations on the antibacterial activity of nanoemulsion was studied by incorporating some tests including release of cytoplasmic constituents comprising of protein, nucleic acid, potassium, and also minimum inhibitory concentration (MIC), minimum bacterial concentration (MBC) and time killing. MIC concentrations of nanoemulsions and bulk oils were then evaluated for eradication and prevention of *Escherichia coli* biofilm formation. Remarkable intensification was observed by employing microfluidic chip owing to the providing of high-contact surface area between agents. The most frequently reported mechanism of antibacterial action of essential oil nanoemulsions involves the disruption of bacterial membrane leading to bacterial lysis and leakage of intracellular contents resulting in death [1]. The results showed that nanoemulsions could improve the antibacterial activity of nanemulsions compared to bulk oils. The results showed that the cell membrane wall began to rupture quickly after 6 min treatment, and the bacterial activity was nearly completely inhibited in a 24-min residence time as compared to the conventional method for 3 h operation.

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Poster Presentation ID: 16

### Natural Pigments from Pomegranate Juice: Isolation by Macroporous Resin and Characterization by Mass Adsorption/Desorption

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#### ARTICLE INFO

##### Keywords:

Macroporous resin  
FRAP  
Anthocyanins  
Batch system

#### ABSTRACT

Color plays an important role in human life and different industries, including food, cosmetics, and pharmaceuticals. Synthetic pigments in spite of providing variety in color, high yield and low price, always being a concern in different industries. For this purpose, natural pigments, due to their biologically and environmentally safe feature, attracting a considerable attention to using them in the food products.[1] Anthocyanins (ACNs) are water-soluble natural pigments responsible for producing various colors in flowers, fruits, and vegetables. Pomegranate juice (PJ) is a beverage rich in ACNs compounds that shows high antioxidant activity compared to other fruit juices and beverages. This study aimed to separate the ACNs as natural red pigment from PJ using LXA-10 macroporous resin in a batch system.[2] All adsorption and desorption processes on the resin have been optimized for maximum separation efficiency. The ACNs maximum adsorption condition (contact time: 40 min, pH: 2.5, a PJ to resin ratio: 30 ml/0.7 g), and ACNs maximum desorption (contact time: 8 min and a 6-bed volume solvent) were obtained as optimum operating conditions. In which the maximum of 94.0% adsorption and 93.3% desorption percentage of ACNs were achieved. The different adsorption isotherms models were tested which results concluded that Freundlich model with  $R^2 = 0.96$  fitted adequately with the experimental data. A kinetic study was carried out that showing the ACNs adsorption data correctly adjusted by an equation corresponding to a pseudo-second-order chemical reaction with  $R^2 = 0.99$ . The constituents and the contents of the purified products were analysed, and the antioxidant activities were determined using FRAP test. The purified product contained five major ACNs in PJ and showed strong antioxidant activity (440 mM Fe (II)/mg sample) in comparison with initial PJ (70 mM Fe (II)/mg sample). In conclusion, purification by LXA-10 macroporous resin was a highly efficient and economical method for purification red natural pigment from PJ.

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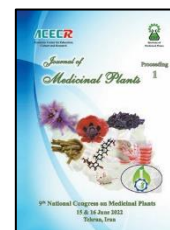
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Poster Presentation ID: 18

### Antiviral Activity of Chloroform and Methanol Extracts of some Indigenous Iranian Plants Against Influenza A Virus (H1N1)

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#### ARTICLE INFO

*Keywords:*

*Stachys*

Influenza virus

Antiviral effect

Medicinal plant

#### ABSTRACT

Influenza is an acute respiratory infectious disease caused by the influenza A virus (H1N1). Influenza is a significant threat to human health, which causes high mortality rates. The currently approved classes of small molecule drugs for the treatment of influenza viral infections include neuraminidase inhibitors (zanamivir and oseltamivir) and M2 channel blockers (amantadine and rimantadine) [1]. Resistance to both classes is a steady problem that has been reported in several cases [2]. Therefore, there is a significant unmet medical need for novel effective antiviral drugs to combat this disease. The present study aimed to evaluate the antiviral activity of different extracts of four Iranian medicinal plants against influenza A virus (H1N1, PR8/34), including *Stachys byzantina*, *S. schtschegleevii*, *Phlomis olivieri*, and *P. herba-venti* sub sp. *Lenkoranica*. Basic virological methods like hemagglutination assay (HA) and cytotoxicity assay (MTT) were used in this study. Madin-Darby Canine Kidney (MDCK) cell culture by using the MTT assay was conducted to evaluate the 50% cellular cytotoxicity (CC<sub>50</sub>) and 50% effective (EC<sub>50</sub>) concentrations. The selectivity index (SI) was determined by the ratio of CC<sub>50</sub> to EC<sub>50</sub>. The cells were treated with EC<sub>50</sub> of the extracts and 100TCID<sub>50</sub> of the virus in different combined treatments including pre-inoculation, co-inoculation, and post-inoculation treatments. The data were evaluated by HA and MTT assays. Based on the results, six of these extracts displayed moderate to potent antiviral activities against H1N1 with EC<sub>50</sub> ranging from 35.15 µg/ml to 428.88 µg/ml in different combined treatments. According to the results, chloroform extract of *S. schtschegleevii* (EC<sub>50</sub>=13.98 µg/ml, SI=16) and methanol extract of *S. byzantina* (EC<sub>50</sub>=311.96 µg/ml, SI=2) possessed only a slight anti-influenza virus activity in post-inoculation and pre-inoculation treatments, respectively. The present study highlighted that chloroform extracts of *P. olivieri* (EC<sub>50</sub>=428.88 µg/ml, SI=2) and *S. byzantina* (EC<sub>50</sub>=269.70 µg/ml, SI=4) exhibited the most potent activity against H1N1 in co-inoculation treatment. These extracts have the potential for detailed study to find active compounds and suggest them as alternatives to other chemical drugs for future epidemics or pandemics.

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Poster Presentation ID: 19

### Neuroprotective Effect of *Allium hirtifolium* and *Astragalus hamosus* Against Amyloid beta in the Hippocampus Tissue

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#### ARTICLE INFO

Keywords:

Persian Medicine

Neuroprotection

*Allium hirtifolium*

*Astragalus hamosus*

Apoptosis

#### ABSTRACT

*Allium hirtifolium* Boiss. and *Astragalus hamosus* L. have been recommended in Persian medicine references against dementia with features and symptoms similar to those of Alzheimer's disease (AD). In this study, the neuroprotective effect of these herbs has been evaluated as new therapies in neurotoxicity model. Two separate groups of rats were fed with *A. hirtifolium* or *A. hamosus* extract (100 mg/kg/day) from 7 days before amyloid beta (A $\beta$ ) injection, for 16 consecutive days. One day after the last oral administration, behavioral tests were done. The effect of these two extracts were assessed in anxiety-like behavior test using elevated plus maze. Moreover, molecular pathways involved in apoptosis were assessed by Western blotting analysis. The results showed that oral administration of both *A. hirtifolium* and *A. hamosus* decreased anxiety-like behavior and ameliorated the effect on apoptosis factors including Bax, Bcl-2 and caspase-3 in the rats with intra-hippocampal injection of A $\beta$ . The results of this study revealed the potential neuroprotective properties of *A. hirtifolium* and *A. hamosus* as herbal remedies that could play a role in fostering healthy aging and be considered as useful candidates in decreasing AD-related symptoms.

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Poster Presentation ID: 20

### Effects of Adding Canola Peptides on the Growth Performance and Intestinal Bacteria of Broiler Chickens

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#### ARTICLE INFO

##### Keywords:

Antibiotic  
Broilers  
Canola peptides  
Growth performance

#### ABSTRACT

The final goal of rearing poultry in commercial farms is supplying healthy food for human. Due to bacterial antibiotic resistance, poultry nutritionists are searching for suitable alternatives to ensure natural defense system efficiency of the body and producing a safe food for human. Today, feed additives are used with the purpose of increasing feed efficiency for domestic animals. Herbal peptides are one of the feed additive candidates that can be added to poultry diet in order to promote their growth performance, immunity system responses, nutrient digestibility, and decrease intestinal pathogens. There are different methods to extract peptides from the herbal proteins, such as microbial fermentation, enzymatic, alkali or acid hydrolysis [1]. These peptides have 2 to 20 amino acids, and they have different bioactivity and functionality. Herbal peptides have antioxidative, antimicrobial, antihypertensive, cytomodulatory, and immunomodulatory activities. The characteristics of herbal peptides depend on their size, composition, and sequence of their amino acids [2]. This study was done to evaluate the effects of adding Canola peptides on the growth performance and intestinal bacteria of broiler chickens. A total of 200 one-day-old Ross 308 male broiler chicks were randomly allocated to 5 dietary treatments with 4 replicates of 10 birds per each. Dietary treatments included 5 different levels of Canola peptides (0, 100, 150, 200, 250 mg/kg) that fed to birds from 1 d to 42 d. Results showed that feeding broilers with Canola peptides during growth period (11 to 28 d) increased body weight gain compared to control group. Adding 250 mg Canola peptides to broiler diets caused 220.23 g higher body weight at 42 d. Feeding broilers with Canola peptides during growth period (11 to 28 d) decreased feed conversion ratio of the birds compared to control group. Canola peptides at the level of 250 mg/kg diet decreased feed conversion ratio of the broilers about 0.155 from 1 to 42 d. Also, using 250 mg Canola peptide increased and decreased *Bacillus* and *Coliforms* count of the ileum of the broilers, respectively. In conclusion, results of the present study showed that adding 250 mg Canola peptide to broiler diets increased body weight gain and intestinal *Bacillus* count, however it decreased feed conversion ratio and the birds intestinal *Coliforms*.

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Poster Presentation ID: 22

### Autobiographic Investigation of Antioxidant and Female Hormone interaction of Several *Marrubium vulgare* Extracts

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#### ARTICLE INFO

Keywords:

*Marrubium vulgare*

TLC

Female hormones

Anticancer

#### ABSTRACT

*Marrubium vulgare*'s (white horehound herb) antioxidant and anticancer properties have been estimated in numerous studies [1,2]. In this study, the white horehound was used because it is commonly used as a medicinal plant in female hormone disorders research. To ensure that all of the beneficial phytochemicals contained within the white horehound herb could be extracted, various routine extraction methods used different organic, and non-organic solvents such as methanol and ethyl acetate n-hexane, acetone, and water were used in five distinct extractions. HPTLC separation method optimized with different solvent ratios to reach the maximum possible separation for qualitative phytochemical constituent analysis. Each extraction was subjected to an HPTLC analysis to compare the pickets in the subsequent step. Antioxidants (DPPH assay) and female hormones (including LH, FSH, testosterone, estradiol, and progesterone) using autobiographies were used to identify phytochemicals that positively affected the environment female hormones interaction and hypothesized regulation. It found that *Marrubium vulgare* acetone and ethyl acetate extract had antioxidant properties and could either control or interact with female hormones, as a free radical formation is a factor in cancer disease. The HPTLC autobiographic results found that among prepared *Marrubium vulgare* extracts, methanol and acetone had the compound interacting with all studied female hormones, and water extract had a compound interacting with LH and FSH.

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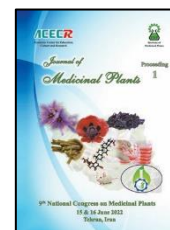
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Poster Presentation ID: 23

### Effects of saponin-enriched extracts from quinoa seed on some germination indices of sesame (*Sesamum indicum*) under salinity stress

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#### ARTICLE INFO

##### Keywords:

Sesame  
Saponin  
Titicaca  
Growth index

#### ABSTRACT

Sesame (*Sesamum indicum*) is one of the oldest cultivated plants in the world and belongs to the Pedaliaceae family [1]. Numerous studies have shown that seed priming reduces the adverse effects of salinity stress under both optimal and unfavorable conditions and increases seed germination [2]. Saponin is one of the compounds that in addition to industrial uses, has been used as a priming and a factor to increase tolerance to salinity stress, especially in the seed germination stage [3]. In this study, in order to investigate the effect of different concentrations of saponin extracted from quinoa seed (*Chenopodium quinoa*. Var. Titicaca) on germination of Iranian sesame, priming seed sesame seeds of Khatam Yazd population for 4 hours in four levels including concentrations of 20% and 40% solution Saponin, double distilled water without priming was performed as a control. After washing the seeds of each priming group with distilled water, the seeds were kept in the refrigerator for 24 hours with four replications separately on wet filter paper. Then, using natural saline water ( $EC=59dSm^{-1}$ ) prepared from Saghand region of Yazd province ( $32/5294480^{\circ}N$   $55/2418040^{\circ}E$ ), three levels of salinity treatment including 4, 8 and  $12dSm^{-1}$  with control surface (urban drinking water with  $EC=1.03dSm^{-1}$ ) was applied to the seeds in four replications. The treated seeds were stored in a dark environment at  $25^{\circ}C$  until the radicle length was 2mm. Although in this study, the highest percentage and germination rate were observed in the priming treatment of 20% and the control level of salinity treatment (97.5 and 6.5, respectively), but the results showed no significant difference in salinity of  $8dSm^{-1}$  with the control in the same the priming level (87.5 and 5.8, respectively) was for these two indicators. Also, the lowest percentage and germination rate (50 and 3.33, respectively) were related to 40% priming and  $12dSm^{-1}$  salinity. The above results were also true for the germination time, so that the most time for germination was allocated to  $12dSm^{-1}$  plants with 40% priming, and the control salinity and  $8dSm^{-1}$  treatments also had the shortest time to germination in 20% priming. In terms of radicle length, the highest lengths were related to levels 4 (1.24), control (1.20) and 8 (1.10)  $dSm^{-1}$  20% of priming, which were not significantly different from each other in this regard. In general, the results of this study showed the effectiveness of saponin priming on sesame seeds in reducing the adverse effects of salinity stress on germination indices.

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Poster Presentation ID: 24

### Effect of Dietary Enrichment with *Echium amoenum* and *Linum usitatissimum* Seeds Oil on the Serum Level of Cholesterol and Triglyceride in Japanese Quail

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#### ARTICLE INFO

##### Keywords:

Echium oil  
Flaxseed oil  
Cholesterol  
Triglyceride  
Quail

#### ABSTRACT

Polyunsaturated fatty acids (PUFAs) have beneficial effects on human and animal health. Moreover, the imbalance of the omega-3/omega-6 ratio leads to many physiological disorders. Poultry products are the main source of fatty acids. The dietary enrichment with oils containing PUFAs is one of the most effective solutions to increase the level of essential fatty acids in poultry products and consequently improve the health of poultry and humans as consumers [1]. The last studies reported that PUFAs supplementation reduced total cholesterol and triglycerides in poultry products [2]. Recently the vegetable oils such as flaxseed and echium oils have been considered as supplementation in the poultry diet [3,4]. This study evaluated the effect of enrichment of finisher diet with *Echium amoenum* and *Linum usitatissimum* (flaxseed) seeds oil and their combination on the serum level of cholesterol and triglyceride in Japanese quail. The study included 4 groups (n=10) as follows; 1.Basal diet, 2.Basal diet + flaxseed oil (4%), 3.Basal diet + echium oil (4%), 4.Basal diet + (flaxseed oil (2%) + echium oil (2%). The serum level of triglyceride in group 4 significantly decreased compared to groups 2 and 3 (P<0.05). Furthermore, the reduction of serum level of cholesterol was observed in all treatment groups which was significant in group 3 (P<0.05). Overall, it seems the supplementation of quail's finisher diet with the combination of echium and flaxseed oils improves the level of serum lipid.

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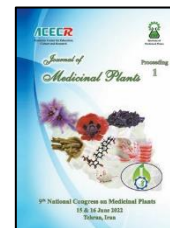
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Poster Presentation ID: 26

### Phytochemical Contents of two Quinoa (*Chenopodium quinoa*) Cultivars: Seeds and Leaves

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#### ARTICLE INFO

Keywords:

Titicaca

Multi-headbulk

Antioxidant properties

Soxhlet

#### ABSTRACT

Quinoa (*Chenopodium quinoa*) is a member of the Amaranthaceae family that is known as the mother of edible seeds due to its extraordinary seed properties. Many studies have shown that the seeds of this plant, in addition to minerals and nutrients, contain high amounts of phenolic and flavonoid compounds and on the other hand, the high content of these compounds in quinoa seeds guarantees its high antioxidant and antimicrobial effects.[1] In the present study, in order to compare the phytochemical properties of leaves and seeds of two quinoa cultivars including Titicaca and Multi Headbulk cultivars, leaf and seed samples from the study of Ranaiezadeh et al. (2022)[2] in the research farm of Yazd University in the cropping year of 2020-2021 were collected and extracted using Soxhlet and 70% ethanol solvent method. In this study, total phenol and flavonoid contents, reductive and antioxidant properties (free radical scavenging by DPPH) at concentrations of 100, 250, 500 and 1000 mg/ml were investigated using a spectrophotometer. The calibration curve from quercetin was used as a standard and its adsorption rate was read at 507 nm and then the curve was plotted based on the adsorption rate at different concentrations. Based on the results of analysis of variance, the interaction of cultivar and plant type at all concentrations of the recorded characteristics except 100 µg/ml was reported to be very significant ( $P < 0.001$ ). Accordingly, the content of phenol, (5050.24, 2777.74, 69436.17.35), flavonoids, (0.073, 3987.63) DPPH, (29.808, 18.622, 45.156, 11.289) and reductive (0.109, 0.42, 0.242, 0.06) properties of Titicaca cultivar in all measured concentrations was significantly higher than that of Multi Headbulk cultivar. In addition, the results of the present study showed a significant superiority of these four indices in the seed sample of Titicaca cultivar compared to multi-headbulk cultivar. Regarding the interaction between cultivar and plant sample type, according to the results of mean comparison of the recorded traits, although the leaf sample of Titicaca cultivar showed a significant advantage in terms of DPPH content compared to other plant samples in both cultivars, but in terms of phenol and flavonoid contents and reducing properties, the seeds of Titicaca cultivar were significantly superior to the leaves of the same cultivar and leaf and seed samples of Multi Headbulk cultivar. In general, based on the results of this study, it seems that the seeds of Titicaca cultivar can be used for studies to reduce the effects of toxicity caused by diseases.

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Poster Presentation ID: 27

### Investigation The Need to Create Home-Based Businesses and small businesses in the form of quick return plans (processing, packaging and marketability of medicinal plants)

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#### ARTICLE INFO

##### Keywords:

Employment  
Production  
Small businesses  
Entrepreneurship  
Home-based businesses

#### ABSTRACT

One of the most important issues in the world today is the rising unemployment rate. Creating sustainable employment and reducing unemployment is effective in solving these problems. Undoubtedly, the prerequisite of any comprehensive and feasible plan in any country to reduce the unemployment rate and increase employment requires careful and expert examination of existing facilities and capacities. Home-based business is one of the most important types of business and is a business that is done in a private residence and is based on a home-based foundation. By examining the factors affecting the improvement of employment conditions, a suitable position can be reached in the field of business. In this study, a simple random sampling method was used so that all members of the statistical community have an equal chance in choosing a statistical sample. Sampling was done randomly. After careful study, we came to the conclusion that starting a simple, easy and fast-paying business requires a proper platform, and factors such as culture building, capacity building and entrepreneurial empowerment are the most important drivers of business development. Small are easy in the home business sector. This type of business can act as one of the economic development strategies and is a good ground for earning income. Also, the results of the test comparing the means between the two independent societies show that there is a significant relationship between the variables of gender and marriage with the motivation of home-based businesses. Conversely, financial incentives are stronger in men than women. The results of this study show that the most important variables that cause the development of home-based businesses: having skills, expertise, introduction and meeting role models and successful people. The most important variables from the experts' point of view: holding training classes, meeting the financial needs of people, especially women, creating local markets or virtual marketing to sell products. As a result, given the current economic situation in the world, home-based businesses can be significantly effective in solving many of the existing economic and financial problems.

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Poster Presentation ID: 28

### Microencapsulation of Saffron Extract Using Spray Drying Technique and Natural polymers as Wall Materials

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#### ARTICLE INFO

*Keywords:*

Microencapsulation  
Saffron  
Spray drying  
Biopolymers  
Crocin

#### ABSTRACT

Encapsulation technology has been widely applied to protect active compounds from environmental conditions. Saffron as the world's most expensive spice is very sensitive to the harsh conditions. In this work, microencapsulation of saffron extract by various biopolymers was studied as an effective way to improve stability of its active compounds. Emulsions with a constant ratio of saffron extract/wall material of 1:4, were prepared using a homogenization and then spray dried. Powders were characterized in terms of encapsulation yield, efficiency, and stability. The amount of picrocrocin, safranal and crocin after spray drying was analyzed by UV analysis at 250, 308 and 440 nm, respectively and confirmed by HPLC. The stability and release of loaded crocin, safranal, and picrocrocin in multiple emulsions were investigated over time and different storage conditions. The result showed the emulsion also provided a high protection of crocin, safranal, and picrocrocin in the gastric condition. In conclusion by using of this technique the stability of saffron extract has been improved [1,2].

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Poster Presentation ID: 29

### Study of the Effect of Cinnamon Oil Nanoemulsions for Inhibition of Helicobacter Pylori

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#### ARTICLE INFO

##### Keywords:

*Helicobacter pylori*  
Antimicrobial activity  
Nanoemulsions  
Cinamon oil  
Microfluidic chip

#### ABSTRACT

*Helicobacter pylori* is a gram-negative, microaerophilic spiral bacterium whose ecological environment is the human stomach. This bacterium is involved in most gastric diseases such as gastric ulcer, chronic gastritis, atrophic gastritis, gastric cancer and other gastric diseases and is classified as a carcinogen by the WHO[1]. Due to the proven effect of cinnamon bark essential oil on *Helicobacter pylori* and elimination, in this study, in order to increase the bioavailability and efficiency of cinnamon essential oil, nanoemulsions containing cinnamon essential oil have been used [2]. In this research, nanoemulsions containing natural and synthetic essential oils and Cinnamaldehyde have been designed and characterized. Then, the antibacterial activity of EOs and their formulations were evaluated using a microfluidic chip. The effects of various residence times and concentrations on the antibacterial activity of the nanoemulsions was studied by incorporating some tests including release of cytoplasmic constituents comprising of protein, nucleic acid, bacterial concentration and SEM. The results showed that nanoemulsions can improve the antibacterial activity of nanoemulsions compared to the bulk oil. Also it is noteworthy that reducing the size of particles containing essential oils, the effectiveness increases significantly. The results showed that the cell membrane wall began to rupture quickly after 2.5 min treatment, and the bacterial activity was nearly completely inhibited in a 45-min residence time.

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Poster Presentation ID: 30

### Microencapsulation of Anthocyanins in Saffron Petal Extract Using Spray Drying Technique

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#### ARTICLE INFO

##### Keywords:

Microencapsulation  
Anthocyanin  
Spray drying  
Saffron petal

#### ABSTRACT

Saffron petals contain anthocyanins, which have many biological properties, including anti-cancer and anti-diabetic activity. According to the present study, anthocyanins were stable in the simulated acidic conditions of the stomach and highly unstable in the simulated intestinal juice (SIJ), i.e. 41% and 89.5% degraded in pH=6.8 and pH=7.8, respectively. Therefore, to protect anthocyanins, microencapsulation technique was used by a spray dryer. Hydroxypropyl methyl cellulose (HPMC), gum arabic (GA) and maltodextrin (MD) were used as encapsulating polymers and the resulting microparticles were characterized in terms of shape, size and size distribution and release profile in simulated gastrointestinal fluids. The results showed that microencapsulation can protect anthocyanins in SIJ [1,2,3].

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Poster Presentation ID: 31

### Randomized Controlled Trial for Comparing Pomegranate Peel Efficacy with Mefenamic Acid on Treatment of Menorrhagia

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#### ARTICLE INFO

##### Keywords:

Menorrhagia  
Pomegranate peel  
Mefenamic Acid  
Persian Medicine

#### ABSTRACT

Menorrhagia is regular menstrual cycles lasting more than 7 days and/or blood loss over 80 cc [1]. One of the herbs recommended in Persian medicine for menorrhagia treatment is extract of pomegranate peel [2]. This study is a randomized clinical trial conducted on 60 patients at the age of 20 to 50 which randomly divided into two groups. One group was treated 250 mg capsule extract of pomegranate peel (PP) and control group was treated by 250 mg capsule of Mefenamic Acid (MA), both were consumed after each meal in 7 days of menstruation for three cycles. Patient's bleeding was evaluated by the pictorial blood loss assessment chart (PBAC), before and in each of the three treatment cycles. Quality of life was evaluated by menorrhagia questionnaire (MQ) at the beginning and the end of the study for each patient. The mean of PBAC scores significantly decreased before and after three cycles from 352(33.2) to 166/84(27/41) in PP group (P<0.001) and from 303/18(24/84) to 171/03(27/31) in MA group (P<0.001) but there was no significant difference between two groups (P<0.6). Quality of life was significantly improved in extract of PP group from 54.2(16.31) to 41.5(12.64) (P<0.02). in comparison with MA group which was changed from 52.67(12.67) to 42.14(18.80) (P<0.014) but there was no significant difference between two groups (P<0.835). The mean of duration of menstrual bleeding decreased before and after three cycles from 8(1.54) to 7/68(2/08) in PP group (p=0.475) and from 7/67(1/57) to 6/79(1/64) in MA group (P=0.020) but there was no significant difference between two groups (P=0.860). Hb level in PP group increase after three cycles from 12/15(1.48) to 12/70(1/25) in PP (P<0.001) and increase after three cycles from 11/92(1/13) to 12/37(1/12) in MA (P=0.016) but there was no significant difference between two groups (P=0.359). Both of products were effective in menstrual bleeding reduction but extract of pomegranate peel is more effective in improving the quality of life and reducing the duration of menstrual bleeding. So extract of pomegranate peel as a drug could be introduced as a good initial choice for menorrhagia treatment.

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Poster Presentation ID: 34

### Isolation and Identification of Plant Growth Promoting Rhizospheric and Endophytic Bacteria from Natural Habitat of Licorice (*Glycyrrhiza glabra* L.)

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#### ARTICLE INFO

Keywords:

Biofertilizer

Indole Acetic Acid

Licorice

PGPB activity

*Pseudomonas* sp.

#### ABSTRACT

The symbiotic relationships of microbes - plants and using these biological relationships such as Plant Growth Promoting Bacteria (PGPB) can be one of the ecofriendly methods in sustainable agricultural systems [1,2]. In this regard, a study was carried out to investigate the possibility of introducing the potent PGPB of the main natural habitats of *Glycyrrhiza glabra* L. in the Doshmanzeyari, in Northwest of Fars province, Iran. The rhizospheric soil and plant rhizome were sampled in order to isolate and identify bacterial isolates in 2018 and then were evaluated for their ability to withstand abiotic stresses as well as PGPR properties. According to the results, a total of 189 bacterial isolates were isolated and purified from the rhizosphere and histosphere of licorice (100 rhizospheric and 89 endophytic bacterial isolates). Four superior selected bacteria isolate which were identified based on 16S rRNA sequencing were *Pantoea agglomerans* and *Serratia rubidaea* (two endophytic isolates) and also *Pseudomonas azotoformans* and *Pseudomonas frederiksbergensis* (two rhizospheric isolates). The results revealed that the selected bacterial strains have high tolerance to salinity and drought stresses as well as high potency in Indole Acetic Acid (IAA) and siderophore production, nitrogen fixation and solubilization of inorganic phosphate. Due to the multiple properties mentioned in the selected isolates, it seems these isolates can be used as potential alternatives (such as biofertilizer) to increase growth and yield of licorice in agricultural systems.

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Poster Presentation ID: 35

### Growth Performance of Three Ecotypes of Licorice (*Glycyrrhiza glabra* L.) Under Electrical Conductivity (EC) of Nutrient Solution in Hydroponic Culture

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#### ARTICLE INFO

##### Keywords:

Antioxidant activity  
Licorice  
Morphological criteria  
Nutrient solution

#### ABSTRACT

Licorice (*Glycyrrhiza glabra* L.) belongs to Fabaceae is an economically important medicinal plant with important active substances such as glycyrrhizin and glabridin. In order to investigate growth characteristics of licorice ecotypes under different Electrical Conductivity (EC) levels of the nutrient solution, a factorial experiment based on randomized complete block design with three replications was conducted in Research Greenhouse of Department of Horticultural Science and Landscape Engineering, University of Tehran in 2018. Three licorice ecotype (Baft and Lalehzar from Kerman province and Eqlid from Fars province) and four levels of Electrical Conductivity (1.5, 2, 2.5 and 3 dS.m<sup>-1</sup>) of the nutrient solution were considered. Growth criteria, yield and total antioxidant activity were evaluated. Results revealed that the main and interaction effects of ecotype and EC of the nutrient solution significantly affected most of the studied traits. Increasing of EC level in nutrient solution more than 2 dS.m<sup>-1</sup> resulted in negative effects on plant height and diameter, internode length, leaf area, root diameter, root fresh weight and herbal dry weight in all three ecotypes. The highest plant height and stem diameter, root diameter and root dry weight observed in Baft ecotype at EC of 1.5 and 2 dS.m<sup>-1</sup>. Also, at EC of 1.5 and 2.5 dS.m<sup>-1</sup> internode length performed better in Baft ecotype and herbal dry weight was superior at EC of 2 and 2.5 dS.m<sup>-1</sup> in Baft and Eqlid ecotypes, respectively, while the number of lateral branches increased in EC of 2 dS.m<sup>-1</sup> in both Baft and Eqlid ecotypes. Application of 1.5 dS.m<sup>-1</sup> EC of the nutrient solution resulted in the higher stem diameter and root length in Eqlid ecotype. Also, electrical conductivity level of 3 dS.m<sup>-1</sup> resulted in the highest percentage of total antioxidant activity. According to the results, it seems licorice growth criteria performed better at lower EC of the nutrient solution compared to higher EC at 2.5 and 3 dS.m<sup>-1</sup>.



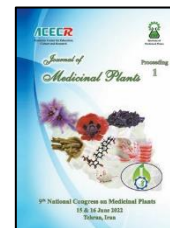
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## 9<sup>th</sup> National Congress on Medicinal Plants

15 & 16 June 2022  
Tehran, Iran



Poster Presentation ID: 36

### Optimizing Vegetative Propagation of Licorice (*Glycyrrhiza glabra* L.) by Application of Different Planting Media

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#### ARTICLE INFO

##### Keywords:

Growing media  
Licorice  
Morphological traits  
Rooting criteria

#### ABSTRACT

Licorice (*Glycyrrhiza glabra* L.) is a perennial herb which belongs to the Fabaceae family and is used worldwide in pharmaceutical, food, cosmetic and health industries. In order to investigate the best planting media in vegetative propagation of licorice (using rhizome), an experiment was conducted based on completely randomized design with four replications in Research Greenhouse of Department of Horticultural Science and Landscape Engineering, University of Tehran in 2019. Treatments were consisted of soil (100%), cocopeat - perlite (1: 1), cocopeat-perlite + cow manure (2: 1), cocopeat-perlite + vermicompost (2:1), sand (100%), sand + vermicompost (2: 1), soil + sand + vermicompost (1: 1: 1), soil + sand + cow manure (1: 1: 1), soil + sand + leaf litter (1: 1: 1). The rhizomes of Lalehzar ecotype (from Kerman province) containing 3 buds, were planted in defined planting media. Some morphological and rooting characteristics were measured. According to the results, planting media treatments significantly affected most measured criteria. Application of cocopeat+perlite, sand, soil+ sand+ leaf litter and soil+ sand+vermicompost showed the best performance in both above and belowground plant parts such as number of roots and root dry weight. Otherwise, soil and combination of cocopeat-perlite+cow manure had not remarkable effects on growth parameters and rooting percentage of licorice plants in which resulted in the lowest rooting percentage of rhizomes. In general, among applied planting media, cocopeat+perlite and soil + sand + leaf litter, performed relatively better regarding to licorice herbal growth and rooting criteria, although further experiments is needed for more reliable results.



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Poster Presentation ID: 37

### The Effect of LIPEXAN Traditional product on Blood lipids Indicators in Patients with Hyperlipidemia

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#### ARTICLE INFO

**Keywords:**

Lipexan  
Gemfibrozil  
Cholesterol  
Triglyceride  
LDL  
HDL

#### ABSTRACT

**Introduction:** Increased blood lipids, especially cholesterol and triglycerides are two very dangerous risk factors for cardiovascular disease and heart attack in human and because mortality from lipoprotein metabolic disorders is on the rise, lipoprotein studies have become increasingly important today. The aim of this study was to investigate the effect of Lipexan traditional medicine product on blood lipid indices in patients with hyperlipidemia compared with placebo [1,2]. **Materials and Methods:** In this study, 109 patients were randomly divided into two groups receiving lipexan (The plant and traditional composition contains garlic, sumac, dill and fenugreek.) capsule with gemfibrozil and placebo capsule with gemfibrozil. The duration of drug administration was 40 days and the lipid profile of patients was evaluated before and after drug administration. After collecting information and entering the data into the computer for analysis of qualitative variables, frequency and frequency percentage and for quantitative variables, the average and standard deviation will be calculated. Independent sample t-test was used for quantitative analysis in the groups under study, paired sample t-test was used for parameter changes in one group, and McNemar's chi-square test was used for qualitative values. Also, the effect of multivariate effects of the drug was investigated using analysis of covariance. **Results:** The results of this study show that in Lipexan treatment group, the mean TG of blood before medication was 355.1 mg / dl, which reached 250.4 mg / dl after medication. Also, the mean blood cholesterol before and after medication the drug was 201/4 and 187.7 mg / dl, respectively. There was a statistically significant decrease in TG, LDL, HDL, cholesterol, FBS and ALK after medication Lipexan (P <0.05). **Discussion and Conclusion:** The present study shows that Lipexan herbal capsule is effective in reducing blood lipids and lipid profile in hyperlipidemic patients in comparison with placebo capsules.

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Poster Presentation ID: 38

### Histological Morphological Effects of Garlic and Yellow Citrus Extract on Quadriceps Abdominal Wound in Rat

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#### ARTICLE INFO

##### Keywords:

Burns

Rat

Restoration

Garlic and Yellow

Garlic Oil

#### ABSTRACT

Due to the prevalence of burns and the need for attention to low \_level herbal remedies in the treatment of burn wound this study was designed to investigate the effect of garlic and yolk on second degree burn wounds in adult mice. In this experimental study, 30 adult female rats weighing 220 g were used. animals we anesthetized after receiving a second degree burn of wet burn type at 10% of body surface area by random sampling of three groups treated with garlic oil and turmeric treated 1% phenytoin and normal saline an three groups were visited daily and dressed with the desired medication. animals on day 30 were killed with ether gas and then sampled from similar section in all groups for histopathologic examinations. the main indicates of the healing process were epidemis, blood vessels and numerical density of blood vessels. Microscopic examination showed burn wound healing in turmeric and turmeric oils compared to other groups. morphotogical study showed a significant difference between the treated group with garlic and yellow oil compared to the other groups and the area of wound was reduced ( $P < 0/05$ ). This study showed that garlic and turmeric oil had a significant effect on the healing process of second degree burn wound in mice.





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Poster Presentation ID: 39

### Checking the Effect of Topical Bitter Almond Oil in the Process of Wound Healing in Rats

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#### ARTICLE INFO

##### Keywords:

Bitter Almond Oil  
Wound Healing  
Rats

#### ABSTRACT

Wounds have been studied in various aspects, including accelerated healing. The incidence of these wounds and the deaths rate are high. . Currently there is no material available to accelerate the healing of the lesion with minimal side effects. Therefore, it is very important to find a substance that can heal the complications of this wound. In this study, we evaluated the local effect of Bitter Almond Oil on wound healing. 21 Wistar rats weighing 25 grams were used. After general anesthesia, the dorsal surface of the rats was prepared and scraped from the shoulder to the ileum bone and a 5 mm diameter circular wound was created in the area behind the mice in this area. Rats were randomly divided into three groups of control, Bitter Almond and 1% Phenytoin treatment. On 3,7,14, and 21 days after surgery, the area was measured and tissue samples were taken from the wound site. Tissue sections were stained with the normal Hematoxylin-Eosin method. The results showed that the wound level in the Bitter Almond Oil and Phenytoin 1% groups were close and there was a significant difference with the control group ( $P < 0/05$ ). Appropriate epithelial tissue formation was evident in the two groups treated with Bitter Almond Oil and Phenytoin 1%. The findings suggest that topical consumption of Bitter Almond Oil will accelerate wound healing, which appears to be Oleic and Linoleic Fatty Acid.



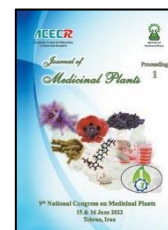
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Poster Presentation ID: 40

### The Effect of Eyaraj Fighara Traditional Medicine Product on the Treatment of Mild and Moderate Constipation in Adults

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#### ARTICLE INFO

Keywords:

Eyaraj Fighara  
Constipation  
Placebo  
Defecation

#### ABSTRACT

**Introduction:** Constipation is usually referred to as difficult or incomplete long-term difficult defecation, which reduces the quality of life and efficiency. Constipation is one of the most common causes of patients referring to general practitioners and internal medicine specialists (1). Constipation using the Rome III model is divided into two syndromes: functional constipation and irritable bowel syndrome with the predominance of constipation. In the sources of traditional Iranian medicine for natural defecation and defecation, features have been listed that include: paste consistency, yellow or light brown color, being fragrant but free from the smell of infection and persistence, not accompanied by excessive noise defecation, easy exit and Voluntary, uniform and fragmented form, feeling of lightness after defecation, lack of foam with feces, regular defecation and mild anal burning after defecation (2). **Materials and Methods:** In this study, 81 patients with chronic constipation were randomly divided into treatment and control groups. The treatment group received one Eyaraj Fighara capsule daily with 5 ml of lactulose syrup and the control group received one placebo daily capsule with 5 ml of lactulose syrup daily for two weeks. Disease status was recorded at the end of the first and second weeks and for analysis of quantitative values in the studied groups, independent t-test was used, for changes in parameters in one group, paired t-test was used and for qualitative values, Chi-square and McNemar test were used. Also, the effect of multivariate effects of the drug was investigated using analysis of covariance. **Results:** The results of this study show that in the control group 19 patients (73.1%) and in the treatment group 23 patients (82.1%) had a decrease in the severity of the bowel movement symptom, which was statistically significant ( $P < 0.01$ ). The effect of the drug on other parameters such as decrease Incomplete disposal, stool consistency, anal obstruction, manual relief and stool pain and increasing the frequency of defecation was statistically significant ( $P < 0.01$ ). **Discussion and Conclusion:** Based on the results of the study, Eyaraj Fighara herbal capsule is effective in reducing strain during defecation and other parameters, as well as increasing the frequency of defecation compared to placebo capsules.

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Poster Presentation ID: 41

### Effect of Hydro Alcoholic Extract of Oregano on Hippocampal Histological Structure of Ovariectomized Rat

**Mohammadhossein Etesamnia<sup>1</sup>, Ali Anbarloo<sup>1,\*</sup>, Marjan Zandi<sup>1</sup>**

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#### ARTICLE INFO

*Keywords:*

Hippocampus  
Oregano  
Ovaryectomy  
Rat

#### ABSTRACT

The hippocampus is part of the limbic system and plays an important role in memory . menopause causes memory failure in women. nowadays, herbal remedies are used in the treatment of diseases due to the few side effects the aim of this study was to investigate the effect of hydro alcoholic oregano on hippocampal histological structure in ovariectomized rats. A total of 21 adult female rats weighing 220 gr were anesthetized and ovariectomized. They were then randomly divided in to three groups. control, ovarian and treated. the hydro alcoholic extract of pane was ingected daily for 20 days brain tissue samples were taken and sent to the pathology laboratory. In the ovarian control group , there was a significant difference in the degenerated cells in CA1 and DG, and in the orthodontic group, these change were prevented and decreased significantly. Post ovarian oregano in the hippocampus of mice appropriate drug to improve memory and learning in post menopausalwomen.



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Poster Presentation ID: 42

### Evaluation of the Restorative Effect of Asparagus Extract on Acute Tendonitis in Rats

**Ali Anbarloo<sup>1,\*</sup>, MohammadhoseinEtesamnia<sup>2</sup>, Marjan Zandi<sup>2</sup>, Mostafa Saketyazdi<sup>1</sup>**

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#### ARTICLE INFO

*Keywords:*

Asparagus  
Histopathology  
Tendon  
Rat

#### ABSTRACT

Asparagus is one of the most important antioxidant herbs that can be effective alternative to chemical drugs .the purpose of this study was to evaluate the effect of hydro alcoholic extract of asparagus root on acute tendonitis in rats. The study was performed on 28 adult wistar rate weighing 200 gr, 10 weeks of age approved by the shahrekord animal health center mice were divided to 4 groups of 7. including control and positive and experimental groups reciving doses of 200 and 400 mg/kg body weight all prescriptions were done by gavage for 28 days and at the end of the period the samples were taken from the tendon tissue and sent to the pathology laboratory. In the experimental group 400 mg/kg of asparagus extract showed a significant increase compared to the control and positive control groups ( $P<0.05$ ). The saponin antioxidant compounds in the extract of asparagus root resulted in better tendon healing at 400 mg doses.



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Poster Presentation ID: 43

### The Effect of Plant Extract *Lavandula angustifolia* on the Restoration Acute Tendonitis in Rats

Sajjad Asadi<sup>1,\*</sup>, Shakiba Shirzad<sup>1</sup>, Ali Anbarloo<sup>1</sup>

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#### ARTICLE INFO

##### Keywords:

Lavandula  
Histopathology  
Tendonitis  
Rat

#### ABSTRACT

Tendon rupture is one of the most common cases in animals. Different ways for treatment and repair such ruptures has been used. Prevalence of such ruptures and being time consuming method used today made us that followed find a new way four faster treatment of animal. In this study twenty adult rats approximate weight 250gr in term of health and nutrition were approved by laboratory animal center they were selected at random and were divided in to four groups of six numbers, include two groups, group treatment and control group. By using acepromazine with dose /2 mg/kg and diazepam with dose 2mg/kg rats were sedated. Done general anesthesia by im injection ketamin with dose 50 mg / kg before surgery after anesthesia with blood clasp was injured to achilles tendon in the first stage in the treatment group (1) hydroalcoholic extract lavandula with dose 300mg/ kg and in the treatment group (2) extract lavanula with dose 600mg / kg it was injected one day zero. Seven, fourteen, and twenty one day after re injected and after comfortable dead by human way. Samples were taken from the tendon the histopathologic results of this study indicate significant differences and beneficial effect extract lavandula with dose 300 mg / kg this is the research so that the amount of collagen fibers in the tissue in the treatment group very impressive and it was similar to the positive control group (receive dexametazone) finally it became clear extract lavandula with dose 300 mg/ kg within twenty one days has beneficial effects one tendon rupture.



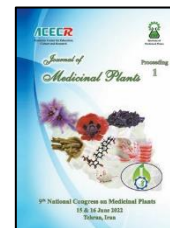
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Poster Presentation ID: 44

### Isolation and Identification of Ethyl acetate Extract of *Dorema ammoniacum*

Maryam Kharatha<sup>1</sup>, Mostafa Alilou<sup>2</sup>, Mahdi Moridi Farimani<sup>1,\*</sup>

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#### ARTICLE INFO

Keywords:

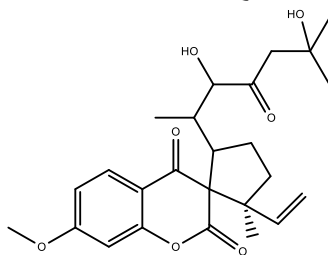
*D. ammoniacum*

Ethyl acetate extract

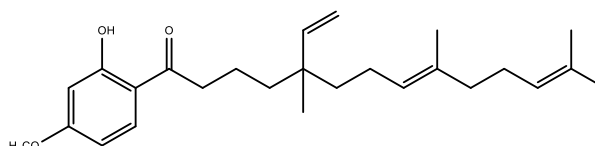
Coumarins

#### ABSTRACT

The genus *Dorema* (Apiaceae) comprises 12 accepted species, mainly growing in Asia and particularly in Iran, where *D. ammoniacum* and *D. aucheri* are the most used species in cuisine and folk medicine. The *Dorema* species are traditionally applied in the treatment of catarrh, asthma, chronic bronchitis, as carminative, mild diuretic and anthelmintic agents. Phytochemical previous studies on *D. ammoniacum* gum resin led to the isolation of six compound including (2'S,5'S)-2'-Ethenyl-5'-(3-hydroxy-6-methyl-4-oxohept-5-en-2-yl)-7-methoxy-2'-methyl-4H-spiro[chromene-3,10-cyclopentane]-2,4-dione, Doremone A, Dshamirone, Ammodoremin, Ammosesinol and 7-Hydroxyferprenin [1]. Phytochemical investigation on ethyl acetate extract of *D. ammoniacum* gum resin via Open Column Chromatography, Sephadex LH-20, and Reversed-phase high-performance liquid chromatography led to the isolation of four compounds. Among them, compounds A and B due to the existence of different functional groups on their chemical scaffold were reported as new compounds. Identification of these compounds was conducted by NMR experiments such as <sup>1</sup>H-NMR, <sup>13</sup>C-NMR, HSQC, HMBC, and NOESY.



A



B

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Poster Presentation ID: 45

### Phytochemical Investigation of Secondary Metabolites from *Kelussia odoratissima* Mozaff.

**Azadeh Khademian<sup>1</sup>, Mostafa Alilou<sup>2</sup>, Javad Alikhah<sup>1</sup>, Mahdi Moridi Farimani<sup>1,\*</sup>**

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#### ARTICLE INFO

Keywords:

*Kelussia odoratissima*

Mozaff.

Apiaceae

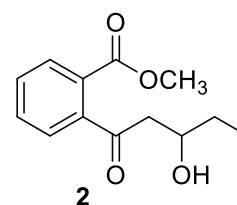
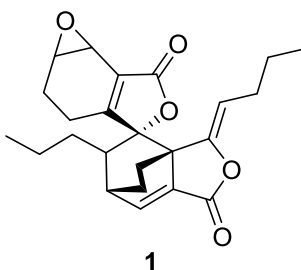
NMR

Phthalides

Ligustilide

#### ABSTRACT

*Kelussia odoratissima* Mozaff. (family Apiaceae) is a monotypic and self-growing medicinal plant which is endemic to cold temperate zone of Iran restricted to the central region of the Zagros Mountains. It is a perennial and aromatic plant, which is known as “Karafs-e-koochi” or “keloss” in Persian. The aerial part of the plant is utilized by local people as a common garnish, wild vegetable, and traditionally consumed as a medicinal plant to treat hypertension, inflammation, ulcer, and cardiovascular diseases, along with applying as an anti-ache and anti-cough agents [1,2]. We have undertaken a phytochemical investigation on ethyl acetate extract of *Kelussia odoratissima* to discover novel metabolites. Fractionation of the ethyl acetate extract by a combination of open column chromatography on silica gel and semi-preparative RP-HPLC afforded eight compounds including two new structures (**1**, **2**). Their structures were established on the basis of extensive spectroscopic data, including <sup>1</sup>H NMR, <sup>1</sup>H-<sup>1</sup>H COSY, HSQC-DEPT and HMBC.



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Poster Presentation ID: 47

### Secondary Metabolites from the Ethyl Acetate Extract of *Hypericum scabrum* Roots

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#### ARTICLE INFO

Keywords:

*Hypericum scabrum*

Hypericaceae

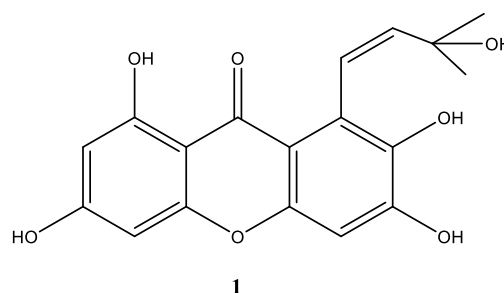
NMR

Xanthones

Fluoroglucinols

#### ABSTRACT

*Hypericum scabrum* belonging to the genus *Hypericum* and the Hypericaceae family has global distribution in temperate regions. *H. scabrum* is known as “Gol-e -raee- dihimi” in Persian and is mostly restricted to the northern, central, and western regions of Iran. The plant has been utilized in Iranian folk medicine as a painkiller for headaches, anti-inflammatory, antiseptic, and sedative. Prior Phytochemical studies on aerial parts of *H. scabrum* have demonstrated that this species is rich in secondary metabolites, especially xanthones, monocyclic and polycyclic fluoroglucinols with unusual derivatives [1, 2]. This study aimed to isolation and identification of secondary metabolites from ethyl acetate extract from the roots of *H. scabrum*. Fractionation of the extract by a combination of open column chromatography on silica gel and semi-preparative RP-HPLC led to the isolation of 10 metabolites including one novel structure of xanthone derivatives (1). Structure elucidation was performed via extensive 1D and 2D NMR spectroscopy.



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Poster Presentation ID: 48

### Response of Hydroponically Grown Licorice (*Glycyrrhiza glabra* L.) to Different Concentrations of Calcium and Magnesium

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#### ARTICLE INFO

*Keywords:*

Calcium nitrate  
Licorice  
Magnesium nitrate  
Nutrient solution  
Root yield

#### ABSTRACT

Due to worldwide economic and pharmaceutical importance of Licorice (*Glycyrrhiza glabra* L.), optimization of its production condition under hydroponic culture is an important issue to achieve an efficient and sustainable yield. In this regard, the effect of Calcium (Ca) and Magnesium (Mg) in the nutrient solution on licorice morpho-physiological criteria was evaluated based on a randomized complete block design experiment with four replicates in Research Greenhouse of Department of Horticultural Science and Landscape Engineering, University of Tehran in 2021. Treatments were different concentrations of calcium nitrate (1.5, 2.5, 3.5, 4.5, 5.5 and 6.5 meq L<sup>-1</sup>) and magnesium nitrate (0, 0.5, 1, 1.5, 2 and 2.5 meq L<sup>-1</sup>) in nutrient solution composition. Rhizomes of Abarkooh ecotype (from Yazd province) were planted in cocopeat-perlit media (1:1) and after around 4 months, some growth parameters such as plant height and diameter, number of lateral branches per plant, shoot fresh and dry weight, root and rhizome fresh and dry weight, root+rhizome to shoot ratio and harvest index (HI) were measured. Results revealed significant effect of nutrient solution on most measured traits except plant diameter, number of lateral branches per plant and root+rhizome to shoot ratio. Increasing the concentration of Ca and Mg in nutrient solution caused the significant reduction in most measured criteria, in which, root and rhizome dry weight decreased by 60 and 73% in highest concentration of Ca and Mg compared with control, respectively. In spite of root and shoot dry weight increment with slight increase of Ca and Mg in nutrient solution, but they didn't show significant difference with the lowest concentration of Ca and Mg in nutrient solution (control). Based on the present results, it can be concluded that licorice showed feasible performance under low concentrations of Ca and Mg in nutrient solution, however, further researches are needed for more accurate results to optimize Ca and Mg concentration in licorice hydroponic culture system.



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Poster Presentation ID: 49

### Comparison of Different *Rosa damascena* Mill. Genotypes for Pollen Germination

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#### ARTICLE INFO

Keywords:

*Rosa damascene*  
Pollen germination  
Hybridization  
Pollination

#### ABSTRACT

Allogamous behavior of Damask rose (*Rosa damascena*) plants is the main reason to study how germination of pollens in different genotypes to handle hybridization in breeding programs. So, in this study, pollen seed stock was first prepared from 16 genotypes of damask rose collection at the University of Tehran from swollen buds before flower opening. The flower anthers of each genotype were separated from the rest of the flower components and then dried at 25 °C for 24 hours and stored at 4 °C. The pollens were grown on a culture medium containing calcium nitrate, boric acid, potassium nitrate, sucrose, and agar [1,2]. After 24 hours, the percentage of live bud pollen was measured using an optical microscope with 100× magnification. All the measured data were analyzed based on a one-way ANOVA. The results showed that the studied genotypes have different pollen germination percentages that should be considered in controlled pollination. The highest (80%) and lowest (21%) germination percentages belonged to genotypes of 23 and 25, respectively.

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Poster Presentation ID: 50

### The Effects of Scarification, Moist Chilling, and Gibberellic Acid on Breaking Seed Dormancy in *Rosa damascena* Mill.

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#### ARTICLE INFO

Keywords:

*Rosa damascene*  
Seed germination  
Scarification  
Gibberellic acid

#### ABSTRACT

The germination of Damask rose (*Rosa damascena*) seeds is of great importance in the breeding programs, because propagation through seeds due to the cross-pollination of the plant has a high genetic diversity and is a good genetic source for commencing breeding processes [1,2]. Damask rose seeds have physical and physiological dormancy, and the germination of the seeds occurs rarely in nature. In the present study, three genotypes with three seed dormancy breaking methods were used in a factorial experiment based on CRD. The seeds obtained from open pollination among the genotypes were collected in October 2021 from the damask rose collection of University of Tehran. Seed dormancy breaking was induced using applying three methods including scratching using concentrated sulfuric acid for 10 minutes, wet heating for two weeks to remove the seed coat, gibberellic acid at concentrations of 500, and 1000 ppm, and moist chilling for 1, 2, and 3 months to meet the cold needs of the seeds. The results showed that the highest germination percentage in all the genotypes occurred by application of the concentrated sulfuric acid, gibberellic acid of 1000 ppm, and wet cooling for three months. The highest germination percentage was related to the genotype of three (70%). Also, the highest germination rate of five seeds per day was done in the mentioned methods.

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Poster Presentation ID: 52

### Study on Chemical Composition in Different Parts of *Pycnocycla aucheriana* Decne.

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#### ARTICLE INFO

##### Keywords:

*Pycnocycla aucheriana*

Apiaceae

$\alpha$ -phellandrene

p-cymene

Harvest year

#### ABSTRACT

*Pycnocycla* genus belong to Apiaceae family and contain eight perennial species which all of them are endemic in Iran [1]. In order to study chemical composition, plant samples were collected from Hormozgan province, Haji Abad area at flowering and seeding stage during 1396 and 1397 years. Essential oil of aerial parts (shoot and leaf), inflorescence and seed were isolated by hydro distillation method with Clevenger apparatus recommended by British Pharmacopia. Measurement of chemical compound percentage and identification of constituents were conducted by Gas chromatography (GC) and Gas chromatography/Mass spectrometry (GC/MS). The number of chemical compounds varied among 22-28 and contain 86.31-98.3 of total compounds. The main chemical compounds that identified in different organs were  $\alpha$ -phellandrene, p-cymene, trimethylbenzaldehyde, elemol, E-elmicin and E-isoelemicin.  $\alpha$ -phellandrene and p-cymene. The highest  $\alpha$ -phellandrene (16 %) was found in inflorescence and the maximum p-cymene (27.4 %) was identified in shoot and leaf at first year. Trimethylbenzaldehyde was recognized only in second year in shoot and leaf (13.32 %) and seed (5.87 %). The content of elemol and E-elmicin were increased in second year and the highest elemol (6.69 %) and E-elimicin (25.89) was seen in seed. Also, E-isoelemicin was introduced as main compound in inflorescence organ. Our results are in agreement with those of perfectly with the study conducted by Teimouri [2]. According to result,  $\alpha$ -phellandrene and p-cymene were identified in all plant organs during two years. However, the content of other main compounds related to plant organs and harvest year.

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Poster Presentation ID: 53

### Effect of Domestication on Essential Oil Content and Chemical Compounds of *Achillea millefolium* Subsp *Elbursensis*

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#### ARTICLE INFO

##### Keywords:

*Achillea millefolium*  
subsp *Elbursensis*  
Domestication  
Chamazolene  
Camphor  
Borneol

#### ABSTRACT

*Achillea millefolium* subsp. *Elbursensis* is an endemic medicinal plant which arise in Dizin mountain of Tehran province [1]. Chamazolene was identified as main compound in previous research [2] which has antioxidant and anti-inflammatory properties [3] [4]. In this research, effect of cultivation density (5, 8, 12 shrub per m<sup>2</sup> and cultivation year (2017 and 2018) on essential oil percentage and main chemical compounds were investigated. For this purpose, seeds were collected from natural habitat and cultivated in research field of Alborz station, Research Institute of Forests and Rangelands. Essential oil extraction of flowering shoots was done through hydrodistillation method. Determination of percentage and identification of chemical compounds were done by Gas chromatography (GC) and Gas chromatography mass spectrometry (GC-MS), respectively. The highest essential oil percentage was found in 12 shrubs per m<sup>2</sup> density during two examined years. Chamazolene, camphor and borneol was determined as main compounds. In all treatments effect of year and cultivation density on main compounds were significant. The highest camphor (7.4 %) and borneol (8.66 %) was observed in 5 shrubs per m<sup>2</sup> density and the maximum chamazolene was obtained in 12 shrubs per m<sup>2</sup> density. Therefore, harvesting of flowering shoots in second year and cultivation of plants at 12 shrubs per m<sup>2</sup> density is recommended in order to obtain maximum essential oil percentage and chamazolene content in this plant.

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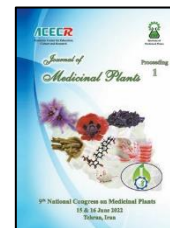
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Poster Presentation ID: 54

### Chemical Composition of *Centaurea hyrcanica* Essential Oils from Iran

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#### ARTICLE INFO

##### Keywords:

*Centaurea hyrcanica*  
Asteraceae  
Spathulenol  
Caryophyllene oxide

#### ABSTRACT

*Centaurea hyrcanica* is an endemic species belongs to Asteraceae family which distributed in North and North-East of Iran [1]. The essential oil of this species are used in food, cosmetics, and pharmacology industries. The aim of this research was to identify chemical composition of essential oil in different plant parts of *C. hyrcanica* that collected from four localities in Mazandaran, Tehran and Semnan Provinces in May and June 2016. The plant parts of *C. hyrcanica* were collected at flowering stage and plant parts including of stem plus the leaf [SL], inflorescence [IF] and root [R]. The essential oils were obtained by hydrodistillation method and determination of their percentage and identification of compounds was done by gas chromatography (GC) and gas chromatography–mass spectrometry (GC/MS) instruments. The essential oils yield (w/w dried weight) of stem plus the leaf, inflorescence and root from different localities varied in range of 0.03-0.14%, 0.03-0.28% and 0.02 -0.77%, respectively. The major constituents of essential oils obtained from different parts of *C. hyrcanica* populations were caryophyllene oxide, spathulenol,  $\beta$ -eudesmol,  $\gamma$ -eudesmol and Ethyl tetradecanoate. Our results are in agreement with those of perfectly with the study conducted by [2]. which indicated that these values of essential oils were observed in [SL] and [IF] of *C. zuvandica* in different localities. Similarly, in a study performed by [3] caryophyllene oxide was 6.8% and 13.4% in [SL] and [IF] essential oils of *C. pterocaula* and 17.9% and 25.7% in [SL] and [IF] essential oils of *C. urvillei*, respectively and also [4]. 1-Hexadecene and borneol were major compounds in essential oils of Pol sefid samples. Cis-pinene was dominated in root organ of all populations. According to result of this study, variation in chemical composition of essential oil in *C. hyrcanica* was approved.

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Poster Presentation ID: 55

### Distribution and Richness Maps of *Ferula gummosa* Boiss (Galbanum).

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#### ARTICLE INFO

Keywords:

*Ferula*

Galbanum

Richness

Distribution

Iran

#### ABSTRACT

*Ferula gummosa* is a source of galbanum oil which has valued as a medicinally important species. This species has phylogenetically placed within sect. *Merwia* of subtribe Ferulinae from Apiaceae family. It has distributed in the Irano-Turanian region specifically in mountainous areas of Iran and Turkmenistan. Species distribution and richness maps of *F. gummosa* were determined through 57 recorded points with DIVA-GIS program. The results showed that the communities of *F. gummosa* have a disjunctive distribution between Alborz and North Zagros Mts. populations with Khorassan-Kopet Dagh populations. These areas encompass hotspot regions with the highest species richness in Central Alborz and Khorassan-Kopet Dagh Mts. According to AOO criterion of IUCN, *F. gummosa* has been categorized as EN (endangered) that need severely to conserve due to unlimited harvesting for economical usage.

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Poster Presentation ID: 56

### Enrichment of Total Steviol Glycosides in *S. rebaudiana* Extract Using Polymeric Adsorbents

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#### ARTICLE INFO

##### Keywords:

*S. rebaudiana* Bertoni  
Stevioside  
Rebaudioside A  
Polymeric adsorbent resin  
Adsorption and desorption  
Enrichment

#### ABSTRACT

*Stevia rebaudiana* Bertoni, a perennial herb belonging to the family *Asteraceae*, is become a major source of high potency commercial sweetening agent. *Stevia* is known to have originated from Paraguay. The leaves of *S. rebaudiana* possesses zero calories sweetening agent, ent kaurene diterpene glycosides commonly known as steviol glycosides which are many fold sweeter than sugar [1]. Adsorption separation technology of macroporous adsorption resin (MAR) is a relatively new separation method and displays an obvious superiority in industrial production since MAR has a high adsorption capacity, certain selectivity, low cost, easy regeneration and has a good stability [2]. Therefore, in this study, enrichment of glycosidic compounds of *S. rebaudiana* (Stevioside & Rebaudioside A) was investigated by using four MARs. In this method, after extraction process, four adsorption resins were used to enrich the glycosidic compounds. Adsorption and desorption process for each resin were investigated and optimized. Finally by using this method the purity of steviol glycosides was increased from 22.31% in total crude extract to 83.56% in total at the end of the fourth MAR.

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Poster Presentation ID: 57

### The Effect of Thymoquinone on Renal Fibrosis in a Rat Model of Unilateral Ureteral Obstruction

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#### ARTICLE INFO

##### Keywords:

Unilateral Ureteral  
Obstruction  
Thymoquinone  
Fibrosis

#### ABSTRACT

Kidney fibrosis is the final event in many kidney diseases. Thus, experimental models that induce kidney fibrosis can be useful for investigating the effects of different compounds on renal fibrosis. Unilateral ureteral obstruction (UUO) is a well-established experimental model to evaluate renal interstitial fibrosis (1). Thymoquinone is the main constituent of *Nigella sativa* and has many pharmacologic properties (2). Current study is aimed to investigate the effects of thymoquinone against kidney fibrosis following UUO in rats. In this study the rats received intraperitoneal injection of thymoquinone (10 mg/kg) for 18 consecutive days. At the 4<sup>th</sup> day of the experiment, laparotomy was performed and the left ureter was ligated. Sham-operated animals received saline as vehicle and laparotomy without ureteral ligation was done. Masson's trichrome staining was used to visualize localization of extracellular matrix (ECM) components. UUO was associated with significant increase in ECM deposition in kidney which associated with fibrosis. However, administration of thymoquinone significantly attenuated the nephrosclerosis scores when compared to UUO group. Thus, thymoquinone, a potent antioxidant and anti-inflammatory herb, could be a therapeutic agent to treat the UUO-induced kidney fibrosis.

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Poster Presentation ID: 58

### Enrichment of Saffron's Crocin and Picrocrocin by Macroporous Resin

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#### ARTICLE INFO

*Keywords:*

Chromatography

Saffron

Isotherms

Macroporous resin

#### ABSTRACT

Crocin as the most important carotenoid glycoside is the color agent of saffron. Due to its major role in the treatment of diseases, enrichment and purification of its metabolites are valuable. Cost-effective crocin purification is a major industry concern. The use of porous resins is an efficient method for enriching and purifying compounds from natural sources and plant extracts. Polystyrene-based vinyl benzene-based polymer resins can be used to purify carotenoids. In this project, we used HP20 resin and investigate the optimal concentration and loading, and desorption conditions by static systems. The results have shown that crocin has higher adsorption and desorption percentage than picrocrocin due to its non-polar chain and the similarity of its structural polarity to the resin used. Under the obtained optimal conditions, the percentage of adsorption for crocin was  $81.48 \pm 0.10\%$  and for picrocrocin was  $76.17 \pm 0.10\%$  and the rate of desorption for crocin and picrocrocin was  $88.71 \pm 0.20\%$  and  $78.13 \pm 0.20\%$ , respectively. Isotherm studies have shown that the Langmuir model is highly consistent with experimental data for crocin with  $R^2 = 0.98$  and picrocrocin with  $R^2 = 0.96$ , and proves that the adsorption process is integral. Also, according to the kinetic studies, crocin and picrocrocin adsorption data were correctly adjusted by the pseudo-second-order model with  $R^2 = 0.99$ .

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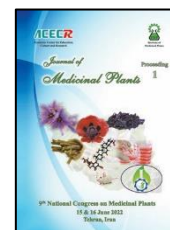
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Poster Presentation ID: 59

### Effects of Encapsulated Oregano Essential Oils on Performance and Immunity of Broiler Chickens

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#### ARTICLE INFO

##### Keywords:

Broiler  
Humoral Immunity  
Oregano Essential Oils  
Performance

#### ABSTRACT

An experiment was conducted to investigate the effect of encapsulated oregano essential oils (*Origanum vulgare*) on performance and humoral immunity of broiler chickens. This experiment was conducted based on a completely randomized design with 400 Arian broiler chicks, four treatments and five replicates of 20 birds per each. Dietary treatments were including control, diet containing 150 mg/kg probiotic Protexin, diet containing 150 mg/kg of antibiotics Avilamycin and diets containing 1 g/kg of encapsulated oregano essential oils. The chickens reared for 42 days. Feed and water were provided for birds *ad libitum*. At the age of 35, blood sample were collected from three birds per each replicate to evaluate humoral immune response to sheep red blood cell (SRBC) in serum. There was no significant difference between dietary treatments regarding to productive traits including body weight, feed intake and liveability in the whole period of experiment ( $P>0.05$ ). Encapsulated oregano essential oils tended to increase antibody titer against SRBC injection compared to the other treatments ( $P=0.07$ ). Presence of carvacrol in oregano essential oils along with protected form of this product can be some reasons for observed immunity enhancement [1,2]. So dietary supplementation of encapsulated oregano essential oils could not affect on performance, but enhanced humoral immunity of broiler chickens.

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Poster Presentation ID: 60

### Effects of Oregano Essential Oils on Immunity and Blood Parameters of Broiler Chickens

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#### ARTICLE INFO

*Keywords:*

Blood factors  
Broiler  
Humoral Immunity  
Oregano Essential Oils

#### ABSTRACT

An experiment was conducted to investigate the effect of oregano essential oils (*Origanum vulgare*) on humoral immunity and blood factors of broiler chickens. This experiment was done based on a completely randomized design with 500 Arian broiler chicks, five treatments and five replicates of 20 birds per each. Dietary treatments were including control, diet containing 150 mg/kg probiotic Protexin, diet containing 150 mg/kg of antibiotics Avilamycin and diets containing 200 and 400 mg/kg of oregano essential oils. The chickens reared for 42 days. Feed and water were provided for birds *ad libitum*. At the age of 35, blood sample were collected from three birds per each replicate to evaluate humoral immune response to sheep red blood cell (SRBC) and some blood factors in serum. There was no significant difference between dietary treatments regarding to the antibody titer against SRBC ( $P>0.05$ ). Cholesterol, triglycerides, HDL, LDL, calcium, phosphorus, total protein, albumin and globulin of blood samples (sera) were not affected by different dietary treatments used in this experiment ( $P>0.05$ ). Various results have been reported about the effects of oregano essential oils on broiler chickens [1,2]. So dietary supplementation of oregano essential oils could not improve humoral immunity or alter concentration of evaluated blood factors in broiler chickens.

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Poster Presentation ID: 61

### Effects of Ajowain Essential Oils on Carcass Characteristics and Cecal Microbial Flora of Broiler Chickens

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#### ARTICLE INFO

##### Keywords:

Ajowain Essential Oils  
Broiler  
Carcass Characteristics  
Cecal Microbial Flora

#### ABSTRACT

An experiment was conducted to investigate the effects of ajowain essential oils (*Trachyspermum ammi*) on carcass characteristics and cecal microbial flora of broiler chickens. This experiment was done based on a completely randomized design with 500 Arian broiler chicks, five treatments and five replicates of 20 birds per each. Dietary treatments were including control, diet containing 150 mg/kg probiotic Protexin, diet containing 150 mg/kg of antibiotics Avilamycin and diets containing 200 and 400 mg/kg of ajowain essential oils. The chickens reared for 42 days. Feed and water were provided for birds *ad libitum*. At the age of 42, three birds from each replicate were killed to evaluate carcass yield and relative weight of breast, thigh and abdominal fat pad. Also the cecal contents were collected and immediately frozen for the consequent counting the population of *Lactobacilli* and *E. coli* in ceca. The results showed that none of the carcass characteristics was not affected by dietary treatments used in this experiment ( $P>0.05$ ). Meanwhile, dietary supplementation of 400 mg/kg of ajowain essential oils could significantly reduced the population of *E. coli* in broiler chickens ceca ( $P<0.05$ ). It can be attributed to the presence of thymol in this product. The Anti pathogenic effects of thymol have previously been showed [1,2]. So dietary supplementation of ajowain essential oils in the level of 400 mg/kg could reduce the number of *E. coli* in the ceca of broiler chickens.

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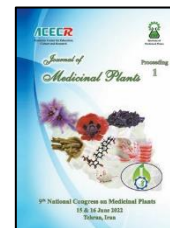
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Poster Presentation ID: 62

### The Effect of *Brassica oleracea* on Biofilm Production in *Escherichia coli* & *Pseudomonas aeruginosa*

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#### ARTICLE INFO

Keywords:

*Pseudomonas aeruginosa*  
*Escherichia coli*  
Biofilm  
*Brassica Oleracea*

#### ABSTRACT

Aerobic Gram-negative *Pseudomonas aeruginosa* bacteria is rod shaped and it is often able to grow in vivid circumference. Gram negative bacilli are of Enterobacter Jasmin's family, this bacteria commonly exists in hot beast's bowels, and it is one of the infection bacteria's, the reason for urinary tract infection is this bacteria. The ability of different sorts of biofilms make both these bacteria's be able to live in hard and poisonous circumference. Utilizing bactericidal materials can be an effective treatment for removing infections which we can mention broccoli, broccoli's ethanol and methanol have been used in the recent project. The purpose of that recent research is to check the effect of Broccoli Extract in biofilm production in *Escherichia coli* bacteria and *P. aeruginosa* bacteria. In the recent study of McFarland firstly, *E.coli* bacteria, secondly, *P. aeruginosa*, thirdly, biofilms of both *E.coli* bacteria and *P. aeruginosa* bacteria were provided, and the method of the wells were used to determine the sensitive patterns of every anti- microbe materials toward planktonic form and both *E.coli* bacteria and *P. aeruginosa* bacteria after making 4 wells on plate (*E.coli* bacteria and then *P. aeruginosa*), the first well is witness, the other third wells are respectively by volume in 100, 150, 180  $\mu$ l, one time by broccoli ethanol's extract and another time by broccoli methanol's extract were filled in. the result which we get, is that broccoli ethanol's extract and methanol's extract have a inhibition effective on *E.coli* bacteria and *P. aeruginosa* bacteria and their biofilms, and also the well by volume in 180  $\mu$ l has more effect than two other wells by volume in 100  $\mu$ l, it shows that by increasing the volume of Anti microbe material, its effect will be further. And according to the result which we get of changing average of the halo chart, biofilm's growth is less than planktonic form. In addition, broccoli ethanol's extract has more effect on the planktonic form of *E. coli* than methanol's extract, and broccoli methanol's extract has more impact on the planktonic form and *P. aeruginosa*'s biofilm than broccoli ethanol's extract (1,2,3) .

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Poster Presentation ID: 63

### Effects of *Thymus kotschyanus* on Broiler Chickens Infected with *Eimeria tenella*

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#### ARTICLE INFO

##### Keywords:

Broiler chicken  
Coccidiosis  
*Eimeria tenella*  
*Thymus kotschyanus*  
Performance

#### ABSTRACT

Coccidiosis is one of the most economically devastating enteric diseases for the poultry industry worldwide. *Eimeria tenella* is an important cause of coccidiosis in chickens, causing cecal coccidiosis, high morbidity and mortality rates and economic losses. In recent years, *Eimeria* species seemed to become resistant against common drugs used to prevent and control coccidiosis (coccidiostats). Furthermore, the remaining of these drugs is an issue for human's health and food safety. Therefore, finding suitable alternatives is an important challenge. Herbal compounds are the groups of feed additives that have been reported to have a potential for extenuating coccidiosis. Effects of a plant extract on broiler chickens infected with *E. tenella* is reported here. A total number of 180 broiler chickens (Ross 308) were divided into 6 treatment groups at 14 days of age. Each treatment group consisted of 3 replicates, each containing 10 animals. Chickens in 5 groups were experimentally infected with  $3 \times 10^4$  sporulated oocysts of *Eimeria tenella* at 14<sup>th</sup> day of age. Groups include: not infected and no drug or herbal extract was given (C-), infected and no drug or herbal extract was given (C+), infected and ethanolic extract of *Thymus kotschyanus* was added to drinking water of 3 treatment groups from day 1 to 35 of rearing for 8 hours/day at rates of 0.05% (G1), 0.1% (G2) and 0.2% (G3) and the anticoccidial drug (lasalocid sodium) were administered at 75 mg/kg for the drug treatment group (G4). Throughout the experimental period from day 1 to day 35, performance parameters including body weight gain, feed intake, feed conversion ratio, mortality, cecal lesion score and bloody diarrhea were recorded. Dietary supplementation with *T. kotschyanus* attained higher body weight gain and lower feed conversion ratio values than the C+ group. The G4 and C- groups exhibited body weight gain and feed conversion ratio values that did not significantly differ from each other and were significantly better than all the *T. kotschyanus* treatment groups (G1, G2 and G3). Bloody diarrhea observed in all herbal treatment groups except for the G3 where it was mild. The mortality and cecal lesion scores in the C+ group showed that using this plant extract had significant effects on these parameters. Results indicate that *T. kotschyanus* exerted an admissible effect on *E. tenella* infection. This effect was, however, significantly lower than that exhibited by lasalocid sodium [1,2].

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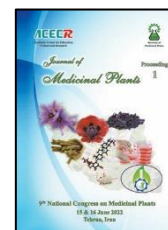
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Poster Presentation ID: 64

### Effect of Light Intensity on the Amount of Phenol and Flavonoids in *Satureja hortensis*

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#### ARTICLE INFO

Keywords:

*Satureja hortensis*

Antioxidant

Phenol

Flavonoid

#### ABSTRACT

Light has two large roles in plant development: as an energy source for photosynthesis and as a signal to govern plant growth, regulate flowering time, morphogenesis and so on (2,3). Therefore, light stresses can significantly affect the agronomic property in plants through inhibiting their physiological metabolic actions like photosynthesis, antioxidant system, and nitrogen and carbon fixation (1, 4). Most of studies about light, are on light quality and different spectrums of light. However, less attention has been paid to the light intensity factor which the plant faces in greenhouses and indoor systems as well as under canopy trees. In this study, which was performed on *Satureja hortensis* plant, the effect of different intensities of natural light on antioxidant content of plant were measured. The amount of phenol and flavonoid were evaluated. Greenhouse shades with different thicknesses were used to create 20%, 50%, 70% of light intensities. The plants were under treatment for 2 month. The results showed that there is a significant difference in antioxidant components contents between different treatments. In low light intensity (20%), the quantity of antioxidants were the least, 3.12 and 1.53 mg/gFW for phenol and flavonoid respectively. Two antioxidants did show the same reaction to increasing light intensity. First, quantity of phenol and flavonoids increased as light intensity augmented (5.45 and 2.45 in 70% of light intensity), but in full light intensity (100%) were decreased (3.89 and 2.29). In general, it can be said that with increasing light intensity, the amount of phenol and flavonoids increases. In the other hand, full light intensities resulted to degradation of phenol and flavonoids their amount is reduced.

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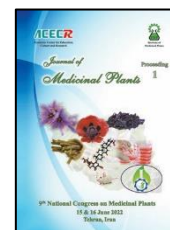
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Poster Presentation ID: 65

### Effects of of Methyl Jasmonate on Polyphenols Production in *Origanum vulgare* Hairy Roots

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#### ARTICLE INFO

Keywords:

Hairy root

Methyl jasmonate

Polyphenols

*Origanum vulgare*

#### ABSTRACT

*Origanum vulgare* L. an herbaceous belonging to the Lamiaceae and native to the Mediterranean and Northern- Northwest regions of Iran, is widely used throughout the world as spice and medicinal plant, representing a remedy in various traditional healing systems [1]. Longstanding use of this plant in traditional medicine encourages more interest in designing new medicinal formulations in various fields. Polyphenols including flavonoids and phenolic acids are one of the most important compounds in *O. vulgare* plant [2]. Hairy root culture is controllable, sustainable and successful biotechnology method and for these has been put to use to extract the valuable phytochemicals that are significantly important for their economical and pharmacological properties [3]. In this study, Different strains of *Agrobacterium rhizogenes* (A4, A13 and ATCC15834) were used for induction of hairy roots in *in vitro* grown tissues of the plant. The highest frequency of transformation was achieved when the shoot was inoculated A13 strain for 10 min cultivated MS medium no supplemented with acetosyringone. The hairy roots induction was confirmed by the amplification of the *rolB* gene. Hairy root line with the highest biomass, were elicited with methyl jasmonate at 0, 0.1, 0.2 and 0.5mM concentrations. The results revealed that JA-elicited hairy root cultures significantly produced a higher amount of total phenolic and flavonoid at 0.1 and 0.2mM concentrations. By increasing concentration of elicitor, the amount of these compounds decreased to the amount of the control sample. The results of this study can be useful to develop commercial production of polyphenols in *O. vulgare* hairy root cultures in scaled-up systems and bioreactors.

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Poster Presentation ID: 66

### *Haplophyllum tuberculatum* (Forssk.) A. Juss. from Spreading the Flood of Garebaigan Fasa: its Essential Oil Analysis and Polyphenolic Constituents

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#### ARTICLE INFO

Keywords:

*Haplophyllum*

*tuberculatum*

Essential oil

Chemical composition

Polyphenol content

Garebaygan

#### ABSTRACT

*Haplophyllum tuberculatum* belongs to the Rotaceae family and is one of the most important medicinal species of the genus *Haplophyllum*, which has 9 native species in Iran. Its highest distribution is in the southern provinces, especially Fars, and this species has a higher amount of essential oil (EO) compared to other species of this genus. The aim of this study was to investigate the chemical composition of EO and polyphenol content (PC) of *H. tuberculatum* in flood spreading conditions in Garebaygan, Fasa, located 50 km southeast of Fasa city in Fars province. The plant was harvested in the flowering stage in late May 2021. The EO was analyzed using gas chromatography (GC) and gas chromatography mass spectrometry (GC/MS) and PC identified with HPLC analysis. The content of EO was calculated based on the weight of the ground dry plant. The EO was pale yellow color at a yield of 0.08% (w/w). The results of this study showed that the main constituents of *H. tuberculatum* EO at the flowering stage were  $\beta$ -pinene (10.2%), limonene (9.9%), 1,8-cineole (8.4%), *p*-cymene (7.8%),  $\beta$ -pinene (7.3%), (*E*)-caryophyllene (6.6%), germacrene D (5.7%), sabinene (5.6%), terpinolene (5.5%), myrcene (5.3%), camphene (3.8%),  $\alpha$ -phellandrene (3.2%) and  $\alpha$ -Terpineol (2.4%), respectively. Eugenol (0.94 mg/g), rosmarinic acid (0.83 mg/g), *p*-coumaric acid (0.57 mg/g), thymol (0.36 mg/g), quercetin (0.29 mg/g), vanilin (0.29 mg/g) and carvacrol (0.11 mg/g) were the main PC in *H. tuberculatum* methanolic extract [1,2].

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Poster Presentation ID: 69

### Antibacterial Evaluation and Antioxidant Activity of Leaves of *Datura stramonium* L. from Tonekabon - Iran

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#### ARTICLE INFO

Keywords:

*Datura stramonium* L.

TFC

TPC

DPPH<sup>0</sup>

Antibacterial Activity

#### ABSTRACT

Plants are a rich source of phytochemical compounds such as flavonoids, alkaloids, tannins, and terpenoids, which have antibacterial and antioxidant properties. Antioxidant activity from natural compounds has been shown to protect the human body from the effects of free radicals, preventing oxidative stress and related diseases [1–3]. The aims of this study were to investigate the preliminary phytochemical screening, antioxidant activity and antibacterial activity of methanolic extract of leaves of *Datura stramonium* L. belonging to family *Solanaceae*. The dried leaves of *Datura stramonium* L. were collected and subjected to successive extraction by microwave assisted extraction (MAE) method. The present study for total phenolic contents (TPC) and total flavonoid contents (TFC) of the extracts were then measured using Folin Ciocalteu Reagent (FCR) and aluminum chloride colorimetric methods, respectively. And total antioxidant activity was assayed by DPPH<sup>0</sup> free radical scavenging assay method. Later, the antibacterial activity of the leaves of *Datura stramonium* L. was tested using both gram positive as well as gram negative bacteria i.e. *Staphylococcus aureus* (ATCC 25923) and *Escherichia coli* (ATCC 25922), respectively. Methanolic extract of leaves of *Datura stramonium* L. showed total phenolic contents of (74.63±0.11) mg GAE/g dry plant material respectively. Total flavonoid contents of methanolic extract of leaves of *Datura stramonium* L. was (68.30±0.02) mg QE/g dry plant material, respectively. The antioxidant activity of the investigated methanolic extract of leaves of *Datura stramonium* L. was scavenging ability of DPPH<sup>0</sup> radical scavenging activity (91.25%). Whereas, the IC<sub>50</sub> of methanolic extract of leaves of *Datura stramonium* L. for DPPH<sup>0</sup> assay was (1.33±0.10) mg/ml respectively. The methanolic extract of leaves of *Datura stramonium* L. showed significant antibacterial activity against both (Gram positive) and (Gram negative) bacteria. Thus, the study showed that the plants are a source of significant natural antioxidant and may be beneficial in protection against oxidative stresses. Hence, there is necessity to explore the applicability of these plant resources which are rich in phytochemical/flavonoid may have been beneficial effects of health.

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Poster Presentation ID: 70

### Phytochemical Screening, Total Flavonoids and Phenols Contents and Antioxidant Activities of Seeds of *Hyocymus niger* L. from Chalus - Iran

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#### ARTICLE INFO

Keywords:

*Hyocymus niger* L.

MAE

Alkaloids

TFC

Folin Ciocalteu

Reagent

#### ABSTRACT

The value of medicinal plants in drug discovery is known to us well and the human being used them for various purposes from the beginning of the human history. Over the years, medicinal plants have been useful sources of several active compounds of recuperative value and it is used as a substitute medicine for treating numerous diseases. Medicinal plants are very important to the health of individuals and communities. These plants have some phytochemical components with their medicinal value that produce a physiological action on the human body [1-3]. The aims of this study were to investigate the preliminary phytochemical screening, antioxidant activity of ethanolic extract of seeds of *Hyocymus niger* L. belonging to family *Solanaceae*. The dried seeds of *Hyocymus niger* L. were collected and subjected to successive extraction by microwave assisted extraction (MAE) method. The present study for phytochemical screening method of phytoconstitute by Trease and Evans, Sofowara and Harbone were followed. Whereas, the total phenolic contents (TPC) and total flavonoid contents (TFC) of the extracts were then measured using Folin Ciocalteu Reagent (FCR) and aluminum chloride colorimetric methods, respectively. Then, antioxidant activity was assayed by DPPH<sup>0</sup> free radical scavenging assay method. The ethanolic extract of seeds of *Hyocymus niger* L. contains (Phenols, Flavonoids, Alkaloids, Steroids and Saponins). Ethanolic extract of seeds of *Hyocymus niger* L. showed total phenolic contents of (42.76±0.3) mg GAE/g dry plant material respectively. Total flavonoid contents of ethanolic extract of seeds of *Hyocymus niger* L. was (58.27±0.04) mg QE/g dry plant material, respectively. The antioxidant activity of the investigated ethanolic extract of seeds of *Hyocymus niger* L. was scavenging ability of DPPH<sup>0</sup> radical scavenging activity (86.43%). Whereas, the IC<sub>50</sub> of ethanolic extract of seeds of *Hyocymus niger* L. for DPPH<sup>0</sup> assay was (3.58±0.16) mg/ml respectively. Therefore, *Hyocymus niger* L., seeds can be explored as a promising source of antioxidants compounds in pharmaceutical industry.

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Poster Presentation ID: 72

### Anticancer Activity of Hydroalcoholic Extract of Seeds of *Polylophium involucreatum* (Pall). Boiss. from Ramsar - Iran

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#### ARTICLE INFO

Keywords:

*Polylophium involucreatum* (Pall). Boiss.

K562 Cell Line

MTT

Coumarins

#### ABSTRACT

Leukemia is a leukocyte cancer that is characterized by anarchic growth of immature immune cells in the bone marrow, blood and spleen. There are many forms of leukemia, and the best course of therapy and the chance of a patient's survival depend on the type of leukemic disease. Different forms of drugs have been used to treat leukemia. [1,2]. *Polylophium involucreatum* (Pall). Boiss. is a medicinally essential plant used for the treatment of diverse infectious diseases [3]. This project determines the anti cancer effect of seeds hydroalcoholic extract of *Polylophium involucreatum* (Pall). Boiss. (Apiaceae) from Ramsar – Iran in chronic human myelogenous leukaemia (K562) cell line by MTT Test. The present study revealed that the phytochemicals analysis of ten different chemical compounds terpenoids (Salkowski Test), flavonoids (Alkaline Reagent Test), phenols (Ferric Chloride Test), coumarins (sodium hydroxide Test), tannins (Ferric Chloride Test), phlobatannins (HCl Test), cardiac glycosides (Keller-Killani test), quinones (H<sub>2</sub>SO<sub>4</sub> Test), and saponins (Foam Test) were tested in hydroalcoholic extract. Our preliminary phytochemical analysis of seeds extract using hydroalcoholic as solvent confirmed the presence of (Flavonoids, Terpenoids, Coumarins, Phenols, Cardiac glycosides, Quinones and Saponins). Also, the hydroalcoholic extract of seeds of *Polylophium involucreatum* (Pall). Boiss. exhibited good anticancer potential against on K562 Cell Line. Hence, more research is needed to elucidate these medicinal plants extracts and their active compounds potential for chemo-preventive and chemotherapeutic treatments by using cell line and animal studies, as well as clinical trials.

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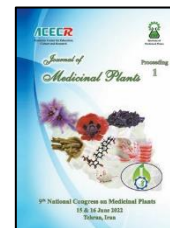
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## 9<sup>th</sup> National Congress on Medicinal Plants

15 & 16 June 2022  
Tehran, Iran



Poster Presentation ID: 73

### Stabilization of oil in water (O/W) nanoemulsion based on date palm (*Phoenix dactylifera*) kernel oil by extracted saponin from *Anabasis setifera* plant

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#### ARTICLE INFO

##### Keywords:

*Anabasis setifera*

Oil

Emulsion

Date palm

Saponin

#### ABSTRACT

*Anabasis setifera* belonging to the Chenopodiaceae family, locally named "Goamich" is widely grown in the Baluchestan region of Iran. Because of the cleaning power, foam production, and anti-inflammation properties [1], the plant has been used traditionally by local people as a skin caring and washing agent. The cleaning power of the *Anabasis setifera* plant is due to the presence of saponin [1]. Saponins have surface-active properties, so they have been considered the natural stabilizers for dispersed systems such as various emulsions. Date palm kernel oil is classified as valuable vegetable oil due to its richness in fatty acids, antioxidants, and phenolic compounds with high thermal and oxidative stability [2]. In this work, the oil and saponin were extracted from the date palm (*Phoenix dactylifera*) kernel and *Anabasis setifera* plant respectively. In continuous, the extracted oil as the lipid phase and extracted saponin as the stabilizer were employed for the evaluation of stabilization of O/W emulsion. The properties of the emulsion were determined by the dynamic light scattering (DLS) technique. The DLS results showed at CMC of saponin and 1.5% w-w concentration of oil, emulsion droplet size value is 41.7 nm and PDI = 0.1.

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Poster Presentation ID: 74

### Extraction and purification of colchicine from *Colchicum autumnale*

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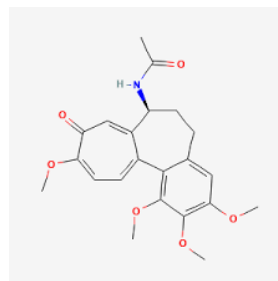
#### ARTICLE INFO

##### Keywords:

Colchicine  
Extraction  
Purification

#### ABSTRACT

Colchicine, is the main alkaloid contained in *Colchicum autumnale*. This plant is present in the mountainous regions of Iran in the Zagros and Alborz regions. Colchicine is used effectively in the treatment of gout and corona Virus. Although various research have been done on this plant, The amount of Colchicine in these species has not been studied and the research has been done at the laboratory level and mainly the quantification by HPLC and the purification process of the effective substance has not been done. In this project, Colchicine was collected from several regions of Iran and according to the studies, the best example of this plant in terms of purity is related to the city of Shahr e Kord. In this study, different parameters of temperature, time and solvent were investigated to extract Colchicine, among them, reflux conditions with methanol were selected for 30 min for extraction. In this research, water and chloroform were used to remove more impurities and for final purification, chromatographic columns and mixtures of different solvents were used. Finally, the optimal conditions for the separation of colchicine were selected.



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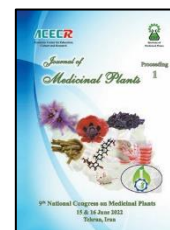
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## 9<sup>th</sup> National Congress on Medicinal Plants

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Poster Presentation ID: 75

### Bioactive Diterpenoids in Roots of the Wild Populations of *Salvia abrotanoides* (Kar.) Sytsma from Khorasan Razavi Province.

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#### ARTICLE INFO

##### Keywords:

Caspian Russian sage  
Environmental factors  
Phytochemical  
variation  
Population  
Tanshinone

#### ABSTRACT

*Salvia abrotanoides* (Kar.) Sytsma is a medicinal plant in Lamiaceae family which commonly known as “Caspian Russian sage”. This species grows in various regions of Iran including Khorasan, Esfahan, Golestan and Semnan provinces [1]. An important and valuable class of abietane diterpenes called tanshinones are found in the roots of this plant. Some of the biological properties including antioxidant, leishmanicidal and cytotoxic activities are related to tanshinones [2]. This study was aimed to investigate the accumulation of cryptotanshinone, tanshinone I and tanshinone IIA in roots of three wild populations of *S. abrotanoides* collected from Kalat, Dargaz and Torogh regions in Khorasan Razavi province. The amounts of these compounds were assessed by HPLC method. The correlation analysis was carried out to determine the effect of climate and soil factors on the content of tanshinones. According to the results, significant differences ( $p < 0.05$ ) in tanshinones contents were observed among different populations. The content of cryptotanshinone, tanshinone I and tanshinone IIA ranged from 227-392  $\text{mg} \cdot 100\text{g}^{-1}$  DW, 5-12  $\text{mg} \cdot 100\text{g}^{-1}$  DW and 6-14  $\text{mg} \cdot 100\text{g}^{-1}$  DW, respectively, which indicates that the level of cryptotanshinone is much higher than those of tanshinone I and tanshinones IIA. In general, Kalat population had the highest ability to accumulate all the three types of tanshinones. This study also showed that the high accumulation of tanshinones in the roots of Kalat population seems to be related to the environmental conditions regarding to the positive correlation between altitude, minimum temperature and soil calcium concentration with the contents of three examined tanshinones.

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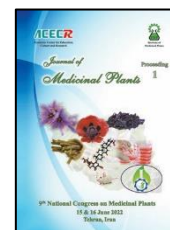
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Poster Presentation ID: 76

### Identification of P450 Enzyme Gene Responsible for Stylophine Alkaloid Synthase in Greater Celandine (*Chelidonium majus* L.) by Transgenic *Pichia pastoris* Yeast

Mahdi Yahyazadeh<sup>1,\*</sup>, Samaneh Asadi-Sanam<sup>1</sup>, Kamkar Jaimand<sup>1</sup>, Najmeh Hadi<sup>1</sup>

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#### ARTICLE INFO

##### Keywords:

Isoquinoline alkaloids  
Microbial production  
P450 enzymes  
*C. majus*  
Yeast

#### ABSTRACT

Plants are the main sources of secondary metabolites with high medical value. The most important member of these valuable compounds are alkaloids with different drug purposes [2]. Concerning the limited production of some of these metabolites in plants, these medicinal compounds can be produced naturally and commercially by identifying and transferring alkaloids-producing enzymes corresponding plant genes to the microorganisms as an alternative method. In this way, the characterization of the corresponding genes is the first step. Among the different enzymes involved in the alkaloid biosynthesis, the cytochrome P450 enzymes play an important role. Due to the endoplasmic reticulum (ER) localization of these enzymes and their glycoprotein characters, they cannot be expressed functionally in the standard bacterial systems. Consequently, the heterologous expression aimed to verify the enzymatic activity can favourably be performed using the eukaryotic systems, like yeast or insect cells [1]. Herein, in this study, with employing a phylogenetic comparison of stylophine synthase sequence of *Eschscholzia californica* and comparing the sequence with the homolog amino acid sequences of *Chelidonium majus* L. achieved from bioinformatics databases, six cytochrome P450 enzymes responsible for stylophine synthase in greater celandine (*Chelidonium majus* L.) were identified. For proving their stylophine synthase activity practically, the enzyme genes were cloned in pPIC3.5 vector, and then stylophine microbial production by *Pichia pastoris* containing recombinant plasmids was tested by adding cheilanthifoline alkaloid to its media. Results indicated that among the cloned genes of the enzymes in the specific vector and introduced transgenic vector to yeast, C1128 only had stylophine synthase activity.

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Poster Presentation ID: 77

### Extraction of Phenyl ethyl alcohol from distilled water of *Rosa damascena* Mill.

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#### ARTICLE INFO

##### Keywords:

*Rosa damascena* Mill.  
Water distillation  
Essential oil  
Phenyl ethyl alcohol

#### ABSTRACT

The genus *Rosa* belong to the *Rosaceae* family, includes 200 species and more than 18.000 cultivars [1]. One of the most important *Rosa* species is *Rosa damascena* Mill. which some of its varieties are very important for essential oil production and others are widely cultivated as garden roses [2]. The main compound of the *Rosa damascena* Mill, water (hydrosol) and residue water was phenylethyl alcohols, which are solubility in water. Therefore probably rose water better represent the natural fragrance of the oil-bearing rose due to its very high phenylethyl alcohol content. In this study, in the early spring of 2021, some *Rosa* flowers were prepared from Alborz Research Station in Karaj then collected the 10 liters of residual water was taken from the distillation pot and extracted with two non-polar solvents, as diethyl ether 0.1g and ethyl acetate 0.15g. The extracted material was then examined by gas chromatography (GC) to measure the compounds obtained. The amount of phenyl ethyl alcohol obtained with diethyl ether was 70.3% and ethyl acetate was 92.4%. In fact, the water in the distillation pot is no longer used after extracting the essential oil and rose water. However, after extracting the essential oil and rose water with a non-polar solvent, the phenyl ethyl alcohol compound can be separated from the water in the distillation pot and used.

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Poster Presentation ID: 78

### Investigation of Essential Oils of *Rosa damascena* Mill. in East Azarbaijan Province

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#### ARTICLE INFO

Keywords:

*Rosa damascene* Mill.

Water distillation

Essential oil

East Azarbaijan  
proveance

#### ABSTRACT

The genus *Rosa* belong to the *Rosaceae* family, includes 200 species and more than 18.000 cultivars [1]. One of the most important *Rosa* species is *Rosa damascena* Mill. which some of its varieties are very important for essential oil production and others are widely cultivated as garden roses [2]. In this study samples were collected from cultivated in East Azarbaijan province. Essential oil of *R. damascena* was prepared by water distillation and the chemical compositions were determined following gas chromatography (GC) and gas chromatography-mass spectrometry (GC/MS) analysis. Samples of essential oils obtained from Ajab Shir and Gonbar Esco regions, which were obtained by water distillation, were collected from 10 tons of rosa flowers gives 1 kg of essential oils. Main components from Ajab shir were E- caryophyllene 14.9%, Geranyl acetate 12.1%, n- nonadecane 10.9% and Citronellol 10.9%. also sample from Ganbar Oskoo, main components were n- nonadecane 18.6%, n- heneicosane 16.0%, E- caryophyllene 15.4% and Citronellol 6.4%. Also, a sample from East Azarbaijan province was collected and transferred to the laboratory in the institute, Tehran and essential oil was collected by water distilation. The main components were: n- nonadecane 26.2%, n- heneicosane 22.9%, n- tricosane 9.7%, respectively. According to the our results, since the ratio of the combination of citronellol and geraniol as an indicator of rosa essential oil, and this ratio was very low in the tested samples. It can be concluded that a good essential oil has not been obtained.

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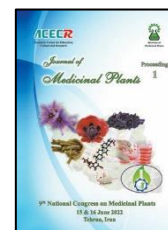
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Poster Presentation ID: 79

### Effect of different sources of nitrogen and biofertilizer on quantitative and qualitative characteristics of coriander (*Coriandrum sativum* L.)

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#### ARTICLE INFO

Keywords:

Nitrogen  
Coriander  
Biofertilizer

#### ABSTRACT

This study was performed as split plots in a randomized complete block design with three replications. The main plots include different feeding methods at five levels including 100% organic fertilizer, 100% nitrogen chemical fertilizer (urea fertilizer), 75% organic fertilizer with 25% chemical fertilizer, 50% organic fertilizer with 50% chemical fertilizers, 25% organic fertilizers along with 75% of chemical fertilizers (inoculation and non-inoculation) and sub-plots included two levels including inoculation of seeds with *Azotobacter crococom* and *Azospirillum brasiliens* and non-inoculation of seeds. Traits such as plant height, number of branches per plant, vegetative yield, seed yield components including number of umbrellas per plant, number of seeds per umbrella and 1000-seed weight and harvest index were measured. From the harvested seeds, a sample was considered to measure the yield of essential oil and the percentage of essential oil. Essential oil extraction was done by water distillation and by Clevenger apparatus. According to the results of this experiment, it was found that the effect of fertilizer, treatments on all studied traits was significant at the level of 1%. In all studied traits, 100% organic fertilizer treatment showed the lowest value and with increasing nitrogen fertilizer and decreasing organic fertilizer, an increasing trend was observed in most traits, so that in fertilizer treatment, 75% nitrogen+25% organic fertilizer reached a maximum, in all the traits except for the percentage of essential oil did not show a statistically significant difference between the treatment of 75% nitrogen+25% organic fertilizer and the treatment of 100% nitrogen. On the other hand, the effect of inoculation on the studied traits was significant at the level of 1% and this effect was greater in the presence of organic fertilizer and with decreasing the amount of organic fertilizer, the effect of inoculation was less. In general, according to these results and studies conducted by other researchers, it can be acknowledged that 75% nitrogen+25% organic fertilizer treatment is the best treatment for the region and that bacterial inoculation is recommended in coriander cultivation.

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Poster Presentation ID: 80

### Medicinal Forage and its Place in Sustainable Agriculture

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#### ARTICLE INFO

##### Keywords:

Medicinal forage  
Essential oil  
Medicinal plant

#### ABSTRACT

Providing animal protein requires the provision of appropriate inputs such as fodder and other plant inputs for livestock and poultry feed. This phenomenon requires proper management in the optimal use of natural resources (rangelands) and agricultural resources (forage production). Sources of fodder supply generally include three parts: pasture, fodder crops and by-products of agricultural production, among which the importance of fodder plants due to the role they play in the health of the digestive system of livestock. It is more important than the other two parts. In conventional agriculture, one of the most important pillars of increasing livestock production is the use of grain-rich diets or the use of silage plants and various concentrates along with growth-promoting supplements, antibiotics and chemical drugs. Side effects of such materials have greatly reduced the quality and health of livestock products. Many bio-agricultural standards in different countries emphasize that livestock should have access to medicinal species when free grazing in the pastures in order to receive their medicinal needs naturally. In this regard, a new idea called "drug forage" is proposed. Among the economic benefits of drug forage production is the reduction of the cost of drugs and chemical and synthetic supplements, and as a result, the reduction of production costs. Reducing the cost of production will lead to lower prices for livestock and dairy products and thus increase purchasing power. By increasing the consumption of these valuable food products, the level of public health increases. On the other hand, excessive use of hormones and chemical drugs and dietary supplements in cattle not only reduces the sensitivity of animals to antibiotics, which in turn leads to an increase in their susceptibility to various diseases. Another consequence of overuse of chemical drugs is the depletion of the nutritional value of dairy and meat products. Therefore, in this regard, reducing the use of antibiotics, changing the animal nutrition system, reducing the use of growth-promoting chemicals and replacing these harmful substances with substances of natural origin, less dangerous and more compatible with animal and human health at the top of the agenda. Expanding the idea of producing fodder for medicine not only ensures sustainability in the production of livestock products and maintaining the health of consumers, but can also have many ecological and economic benefits in the agricultural dimension.

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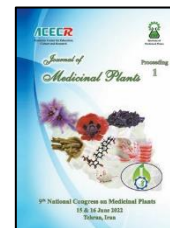
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Poster Presentation ID: 81

### Effect of Seed Position on Mother Plant on Percentage of Emergence, Vigor and Some Characteristics Related to Asafoetida (*Ferula assa-foetida* L.) Seeds

M. Mackizadeh Tafti<sup>1,\*</sup>, S. Fekri Qomi<sup>1</sup>, F. Sefidkon<sup>1</sup>, N. Hadi<sup>1</sup>, E. Sharifi Ashourabadi<sup>1</sup>, M. Yahyazadeh Balalami<sup>1</sup>

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#### ARTICLE INFO

*Keywords:*

Ferula

Seeds

Germination

#### ABSTRACT

Asafoetida is one of the most important species of apiaceae family whose seeds have a serious problem in germination. In order to investigate the effect of seed position on mother plant on germination percentage, strength and some characteristics related to Asafoetida seeds, seeds of this plant from Isfahan during two years it was gathered. Seed collection was done at different times according to seed moisture, seed position on the mother base and habitat height above sea level. Then in the laboratory, characteristics such as germination percentage, number of normal and abnormal seedlings, seedling length, fresh and dry weight of seedlings, seed vigor, hectoliter weight, etc. were measured. Because Asafoetida seeds are dormant during the laboratory experiment, various methods of breaking the dormancy include stratification, use of hormones and chemicals (potassium nitrate, gibberellins, ethylene, cytokinins, hydrogen peroxide and thiourea) and leaching were used. The results showed that the best treatment for germination of Asafoetida seeds is leaching treatment for 48 hours with prechilling for 30 days. The results showed that the upper seeds of the plant had less germination than the lower seeds of the plant. Also, in each umbrella, the outer seeds of the umbrella show more germination than the inner seeds.



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Poster Presentation ID: 82

### Evaluation of Efficacy and Safety of AKROPOL an Iranian Traditional Polyherbal Mixture in Type 2 Diabetic Patients: a Randomized Placebo Controlled Trial

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#### ARTICLE INFO

##### Keywords:

Diabetes mellitus  
Herbal extract  
Traditional medicine  
Clinical trial

#### ABSTRACT

Numerous medicinal plants are used in Iran alone or in combination for treatment of many diseases such as diabetes. These medicinal plants necessitate scientific and clinical studies to confirm their safety and effectiveness. The AKROPOL combination comprising *Cichorium intybus* (chicory), *Curcuma longa* (turmeric), *Urtica dioica* (nettle), *Trigonella foenum-graecum* (fenugreek) and *Vaccinium arctostaphylos* (whortleberry) have been used in the Iranian traditional medicine for the treatment of diabetic patients [1,2]. The aim of this study was to evaluate the safety and efficacy of AKROPOL, a Polyherbal mixture in the treatment of type II diabetic patients. Eighty six male and female patients, aged 40 - 60 years, registered at the Diabetic Clinic Registry of Baqiyatallah Hospital, in the city of Tehran, Iran were randomly allocated into two groups of 43 each. The AKROPOL group received one capsule (containing 500 mg of polyherbal mixture) and the placebo group received one capsule (containing 500 mg toast powder) in a daily bases additionally to their routine anti-diabetic medications for three months. The 12-hour fasting blood samples were collected at the baseline and also at the endpoint for determination of HbA1c and FBS level as primary outcomes, lipid profile as secondary outcomes and liver enzymes and renal function tests used as safety indices. Result indicated that, FBS, HbA1c, cholesterol and LDL blood levels in AKROPOL group were decreased significantly as compared with placebo and also compared to baseline. No notable hepatic, renal and, gastrointestinal side effects were observed during the study. In conclusion the results showed the potential effects of AKROPOL on lowering patients' blood sugar and lipid profile with no adverse effect to be reported.

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## 9<sup>th</sup> National Congress on Medicinal Plants

15 & 16 June 2022  
Tehran, Iran



Poster Presentation ID: 83

### Effects of Imfluna an Iranian Traditional Polyherbal Medicine on COVID -19 Symptoms: A Randomized Double-Blind Placebo-Controlled Clinical Trial

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#### ARTICLE INFO

Keywords:

Clinical trial

COVID-19

Polyherbal medicine

Imfluna

#### ABSTRACT

The current pandemic of Coronavirus disease 2019 (COVID-19) and severity of the infection and high mortality have almost unprecedented challenges in the health systems of most countries around the world. In Iranian traditional medicine a polyherbal mixture (Imfluna) containing *Echinacea angustifolia* aerial part, *Stachys lavandulifolia* aerial part, *Artemisia annua* aerial part, *Hyssopus officinalis* aerial part, *Polypodium vulgare* rhizome, *Alpinia officinarum* rhizome, *Zingiber officinale* rhizome and *Panax ginseng* root extract are used to treat a variety of ailments, including cough, immune system disorders, respiratory inflammatory diseases and immune system disorders [1, 2]. The present study aimed to evaluate the effect of Iranian traditional polyherbal medicine (Imfluna) on symptoms of COVID-19 infected patients. In this randomized double-blind placebo-controlled clinical trial a total of 60 voluntary confirmed COVID-19 patients were randomly assigned to placebo and Imfluna groups. Patients in each groups, in addition to receiving standard medications, took two 500 mg Imfluna capsules or placebo every 8 hours for 2 weeks. The patient's vital signs, chest CT scan, severity of shortness of breath, cough, body temperature and blood analyses for ESR, liver and kidney function tests, were evaluated. The results showed that patients in the Imfluna-treated group had significantly greater improvement in daily cough, shortness of breath and ESR compared with the placebo group. In addition, lung lesions improved in the Imfluna-treated group, although not significantly. Patients with COVID-19 who were treated with Imfluna for 2 weeks had better comfort and fewer symptoms associated with the disease with no drug side effects.

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Poster Presentation ID: 84

### Therapeutic Effects of Herbal Preparations Against RNA Viruses

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#### ARTICLE INFO

##### Keywords:

Viruses  
Coronaviruses  
Herbal extracts  
Phytochemicals  
Essential oils

#### ABSTRACT

Throughout history, the plant kingdom has been a source of medicine in almost all cultures. Nowadays, ensuring the safety, quality, and effectiveness of medicinal herbs and their products has become an essential issue in industrialized and developing countries. Phytochemicals are usually involved in pharmacological actions and are used worldwide for various purposes, including the treatment of infectious diseases. Although several therapeutics were designed to control infectious diseases, viral infections are still fatal. Currently, evidence extracted from in vivo, in vitro, and silico studies support the antiviral activity of many herbs scientifically; however, the therapeutic potential of many other herbs is still unknown. Plants and their products may potentially control the propagation of viruses in a variety of conditions. Data were extracted from PubMed, Scopus, Google Scholar, and Science Direct from 1983-2020. We gathered a list of plant extracts, phytochemicals, and herbal formulations that can inhibit RNA viral infections, mainly those are originated from the coronaviruses family. We also provided an overview of their inhibitory mechanism of actions. Plant families, including Lamiaceae, Asteraceae, and Myrtaceae, contain the highest number of species with anti-coronaviruses activities, respectively. It can be suggested that the combination of these antiviral ingredients with each other, any synthetic compound, or already approved drugs or inhibitors can be a novel approach for antiviral therapies [1].

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Poster Presentation ID: 85

### The Effect of Locality on Chemical Composition and Antimicrobial Activities of *Thymus daenensis* Essential Oil

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#### ARTICLE INFO

##### Keywords:

Antimicrobial  
Essential oil  
Geographical origin  
*T. daenensis*

#### ABSTRACT

The antimicrobial activity of essential oil depends on the chemical composition which is affected by different factors. The aim of this study was to determine the effect of geographical origin on the chemical composition and antimicrobial activity of *Thymus daenensis* essential oil. For this purpose, seeds of *T. daenensis* was collected from 8 geographical origins of Iran including Qazvin (Qazvin), Isfahan (Daran and Fridounshahr), Lorestan (Aleshtar and Khorram Abad), Markazi (Arak and Shazand) provinces and planted in the same condition. The chemical composition of the essential oils from the flowering aerial parts was analyzed by GC-MS. Antimicrobial activity was determined by disk diffusion. Seven compounds were common in the essential oil of tested essential from the different geographical origin, namely P-cymene (6.06-25.06%), 1, 8-cineol (0.78-4.74%),  $\delta$ -terpinene (1.59-7.67%), linalool (0.05-7.35%), thymol (43.24-72.49%), and carvacrol (3.25-5.89%). These difference indicates the importance of geographical origin on essential oil chemical composition. The statistical analysis showed the significance of microbial species, essential oil concentration, and their interaction on antimicrobial activity. There was more susceptibility in Gram positive bacteria in compared to Gram negative ones. *Pseudomonas aeruginosa* (inhibition zone:  $11.21 \pm 0.85$  mm) was the most resistant among tested microbial species. With the alteration of chemical composition, antimicrobial activity changed, too. In conclusion, the results are promising and can be used as a natural source to treat resistant microorganisms.

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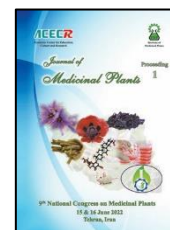
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Tehran, Iran



Poster Presentation ID: 86

### Composition and Antimicrobial Activities of Essential Oil of *Thymus transcaspicus*

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#### ARTICLE INFO

##### Keywords:

Essential oils  
Bacteria  
Minimum inhibitory  
concentration  
*Thymus*

#### ABSTRACT

Despite the medical discoveries of different medicines and advanced ways of treatment, statistics have shown that the number of patients is increasing. This may be due to chemical drugs used in healthcare, agriculture, and diets. This soaring demand in medicines urges us to look for natural sources such as aromatic plants and essential oils, which are rich in efficient compounds. Extraction of essential oils was performed using a Clevenger-type apparatus and its chemical composition was determined by GC and GC-Mass. The microdilution broth susceptibility assay was utilized to determine minimum inhibitory concentrations (MICs) against *Pseudomonas aeruginosa*, *Bacillus subtilis*, *Escheichia coli*, *Staphylococcus aureus* and *Candida albicans*. Our in vitro study demonstrated the antibacterial activity of the *Thymus transcaspicus* essential oil against the tested isolates at levels between 52.5 and 210 µg/ml. *P. aeruginosa* and *S. aureus* had the least and most sensitivity, respectively. The main components of the *T. transcaspicus* essential oil were carvacrol (40.41%), geraniol (23%), p-cymen (5.14%) and thymol (4.68%). The *T. transcaspicus* essential oil exhibited inhibitory effects against bacterial isolates and can be considered as a new source to combat antibiotic resistant bacterial isolate.

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Poster Presentation ID: 89

### Evaluation Quantitative and Qualitative Traits of *Lippia Citriodora* L. under Biochar, Vermi-Compost and PGPR's

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#### ARTICLE INFO

##### Keywords:

Essential oil  
Organic fertilizer  
Biofertilizer  
*Lemon verbena*

#### ABSTRACT

Lippie has more than 200 species that *Lippia citriodora* L. due to the medicinal properties of fever, painkillers, antifungals and aids in digestion and use in the food industry is particular importance. Its essential oil also has bactericidal and insecticidal properties and is used in perfume industry. Optimal use of organic and bio-fertilizers has beneficial effects on soil properties. These fertilizers are also economically, socially and environmentally beneficial and can be a good alternative to chemical inputs. This study was conducted to investigate the effect of organic fertilizers and growth promoting bacteria on the quantitative and qualitative yield of *Lippia citriodora* L. under field conditions at Research Institute of Forest and Rangelands in 2015. Experiment with 3 factors, vermicompost at 3 levels (0, 6 and 12 t/ha), biochar at 3 levels (0, 5 and 10 t/ha) and growth promoting bacteria at two levels (without inoculation and inoculation with three strains of Azotobacter, Azospirillum and Pseudomonas) were done. The experiment was conducted as a factorial in a randomized complete block design with 3 replications. Some traits such as essential oil yield, stem yield, plant height and leaf area, were measured. The results showed that interaction of vermicompost in biochar was significant on inflorescence yield, percentage and essential oil yield at 1% probability and on total dry matter yield at 5% probability. Vermicompost\* PGPR had significant effect on leaf yield, total dry matter yield and essential oil yield at 5% probability and essential oil at 1% probability. Triple interaction between vermicompost, biochar and PGPR on leaf yield, stem yield, inflorescence yield, total dry matter yield and essential oil yield was significant at 5% probability and on essential oil at 1% probability. Means comparison showed that the highest essential oil percentage (0.86%) in control treatment and the highest essential oil yield (3736.3 g/ha) were obtained from V<sub>2</sub>B<sub>3</sub>P<sub>2</sub> treatment. Application of vermicompost, biochar and inoculation of plants with growth promoting bacteria by increasing root growth and development and thus better absorption of water and nutrients from soil can increase yield and improve plant quantitative traits.



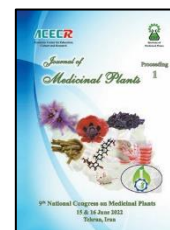
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Poster Presentation ID: 90

### Yield Comparison of Nine *Nepeta* Species under Field Conditions

**Bohloul Abbaszadeh<sup>1,\*</sup>, Fatemeh Sefidkon<sup>1</sup>, Masoumeh Layeghhaghighi<sup>1</sup>, Maryam Jebelly<sup>1</sup>, Meysam Ansari<sup>1</sup>, Behrouz Naderi<sup>1</sup>**

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#### ARTICLE INFO

**Keywords:**

Essential oil

*Nepeta*

Establishment

Ecological conditions

#### ABSTRACT

The wide geographical distribution of *Nepeta* species, has made the evaluation of genetic diversity and species compatibility of this species in different ecological conditions as one of the research priorities of the Iranian medicinal plants. Therefore, by comparing different species and accessions of ecological zones, it is possible to determine different characteristics, stability of each of the studied traits and also determine the response and adaptation of species and accessions to ecological conditions. In this study, seed of the species was collected from natural habitats and cultivated in greenhouse. After preparing the land, transplanting was done. The statistical format used in the field was randomized complete blocks with 3 replications. Nine species (1- *Nepeta meyeri* (East Azarbaijan), 2- *Nepeta meyeri* (Western Azerbaijan), 3- *Nepeta meyeri* (Qom Road), 4- *Nepeta assurgens* (Kerman), 5- *Nepeta cataria* (Gilan), 6- *Nepeta cataria* (Institute of Tehran), 7- *Nepeta crassifolia* (Alborz), 8- *Nepeta racemosa* (Esfahan), 9- *Nepeta pogonosperma* (Alamut)) were examined. Morphological traits (plant height, tiller number, number, length and diameter of inflorescence, leaf length, width and surface area, canopy diameter) were recorded at flowering stage (above 70% flowering). Plants harvested in the shade were air-dried and yield of inflorescence, leaf, stem and shoot were measured and calculated. Analysis of variance showed that plant height, large diameter, small diameter, plant canopy, establishment percentage, plant dry weight, tallest stem, number of flower, leaf length, leaf width, number of flowering shoots and essential oil percentage in different genotypes, were statistically significant differences. The highest plant height was observed in *N. meyeri* (1 (75 cm) & 2 (65.6 cm)). The highest canopy was observed in *N. cataria* (5) with an average of 198.3 cm. The highest survival rate (85.3%), dry weight of plant (120.4 g/plant), was in *N. cataria* (6). The highest percentage of essential oil was observed in *N. pogonosperma* (9) with average of 2% and then in *N. cataria* (6) with average of 1.7%. According to the results, *Nepeta cataria* was found to be the most suitable species for cultivation in terms of root yield and dry matter yield and vegetative form.



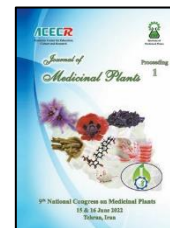
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Poster Presentation ID: 91

### Anti-inflammatory Effect of Hydroalcoholic Extract of *Viola odorata* and *Cassia fistula* on Acetic Acid-induced Colitis in Rats

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#### ARTICLE INFO

Keywords:

*Viola odorata*

*Cassia fistula*

Ulcerative colitis

Anti-inflammatory

Rat

#### ABSTRACT

Colitis is an inflammatory disease that can be treated with antioxidant and anti-inflammatory compounds. The aim of this study was to evaluate the anti-inflammatory effect of hydroalcoholic extract of *Viola odorata* and *Cassia fistula* in acetic acid-induced colitis. Phytochemical tests including total phenols, Alkaloids, Saponins, Anthraquinones and tannins were performed. The 28 male Wistar rats were divided into Four groups of seven rats. In all groups except the Shahed group, intrarectal colitis was induced using 1% acetic acid and distilled water was used in the Shahed group. Immediately after induction of colitis, for 6 days, the control group received distilled water, the Shahed group received normal saline, the standard group received 360 mg/Kg oral sulfasalazine, and the experimental group received a 2.0 mg/Kg mixture of hydroalcoholic extract of *Viola odorata* and *Cassia fistula*, and then animals were sacrificed. The severity of colitis was assessed. The results of phytochemical tests showed that *Viola odorata* extract contains alkaloid compounds, saponins and tannins and *Cassia fistula* extract contains alkaloid compounds, saponins and anthraquinones. Acetic acid caused thickening of the epithelial wall of the colon, edema and necrosis of the colon, and increased MPO enzyme activity in the animal model. The percentage of colon area affected by inflammation, colon weight per unit area and macroscopic score in the group treated with the combined extract of *Viola odorata* and *Cassia fistula* decreased better than the positive standard group. Despite the effect of the extract in reducing the activity of MPO enzyme compared to the control group, the sulfasalazine-treated group showed better effects. 200 mg/Kg of mixture of hydroalcoholic extract of *Viola odorata* and *Cassia fistula* can effectively reduce tissue damage and inflammation caused by acetic acid-induced colitis in the animal model. These results indicate the possible therapeutic effects of hydroalcoholic extract of *Viola odorata* and *Cassia fistula*'s fruit pulp in colitis, the extract of which can be used as a complementary drug in the treatment of IBD.



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### Variation in Phenolic Compounds of *Satureja khuzestanica* Jamzad by Using Different Nutritional Treatments

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#### ARTICLE INFO

##### Keywords:

Biological fertilizer

Carvacrol

Flavonoids

*Satureja khuzestanica*

#### ABSTRACT

*Satureja khuzistanica* Jamzad, is a relatively less-known aromatic plant of the Lamiaceae family. It grows endemically in the west and southwest of Iran [1,2] and is locally known to have medicinal properties, with a compound-rich essential oil. Due of high value of carvacrol (93%) as the main component of the oil, *S. khuzistanica* is used as an antibacterial, antifungal, antiparasitic, antioxidant, anti-diabetes and anti-inflammatory as well as anticoagulant agent [3,4]. This research aimed to evaluate the combined effects of chemical, biological and organic fertilizers on essential oil and phenolic compounds of *S. khuzistanica*. Spanning for two growing seasons (2017–2019), the experiments involved thirteen nutritional treatments, i.e. 1- C (control), 2- NPK (50-25-25 Kg.ha<sup>-1</sup>), 3- CM<sub>30</sub>, 4- CM<sub>60</sub> (CM: cattle manure: 30 and 60 ton.ha<sup>-1</sup>), 5- CM<sub>30</sub>+NPK, 6- CM<sub>60</sub>+NPK, 7- V<sub>5</sub> (vermicompost: 50 ton.ha<sup>-1</sup>), 8- V<sub>5</sub>+NPK, 9- GM (*Glomus mosseae*), 10- GI (*Glomus Intra*), 11- S<sub>0</sub>+T, 12- S<sub>250</sub>+T (S: sulfur: 0 and 250 Kg.ha<sup>-1</sup>, T: *thiobacillus*) and 13- V<sub>5</sub>+T. At full flowering stage, samples were taken from aerial segments of plants in all treatment groups. After shade-drying, the samples were hydro-distilled to obtain essential oil and were then evaluated by GC-MS. The interaction between year and fertilizer, as two treatments, had a significant effect (P≤0.01) on essential oil percentage, carvacrol, total phenols and flavonoids content of *S. khuzistanica*. GM and S<sub>0</sub>+T caused the highest oil percentage in the first (3.7%) and second year (3.9%), respectively. Carvacrol was highest in the first (92.1%) and second year (95.2%), as a result of using V<sub>5</sub>+T and NPK treatments, respectively. Application of S<sub>0</sub>+T significantly increased the total phenols (33.2 and 57.9 mg gallic acid/g dry matter) and total flavonoids (3.2 and 3.1 mg quercetin/g dry matter) contents in the first and second years, respectively. It was concluded that biological and vermicompost fertilizers improved the essential oil and phenolic contents.

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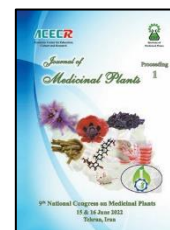
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Poster Presentation ID: 94

### Tumor Necrosis Factor- $\alpha$ (TNF- $\alpha$ ) Novel Inhibitors Discovery Using Molecular Docking and 3D-Quantitative Structure-activity Relationships (QSAR) Models

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#### ARTICLE INFO

##### Keywords:

Rheumatoid arthritis  
Auto-immune  
TNF-  $\alpha$   
Molecular docking  
3D-QSAR

#### ABSTRACT

Rheumatoid arthritis (RA) is an auto-immune and chronic disease. Various cytokines such as chemokines, interleukins, as well as tumor necrosis factors- $\alpha$  (TNF- $\alpha$ ) involve in RA. Inflammation, apoptosis, Carcinogenesis and viral replication hindrance are some substantial TNF- $\alpha$  roles. Plethora and disorder in TNF- $\alpha$  production cause common diseases, including cancer, Alzheimer's, inflammation also RA [1]. Infliximab, etanercept, tocilizumab, and adalimumab are FDA approve RA biological medication. Biologic treatments have been shown some side effects such as the body's immune system weakness besides disadvantages, namely losing initial results, high cost, storage, and injectable. Therefore, the researcher's concern is the discovery of alternative medicine with fewer side effects. Molecular docking and 3D-QSAR are applied to investigate protein-drug interaction and identify novel drugs [2]. This report used 573 natural compounds from the PubChem database to discover effective TNF- $\alpha$  inhibitors. Also, pIC<sub>50</sub>, central nervous system (CNS), permeability and toxicity were predicted. Eventually, delphinidin 3,5-diglucoside compound (PubChem ID: 10100906) from the database with an excellent docking score was introduced as a novel inhibitor.

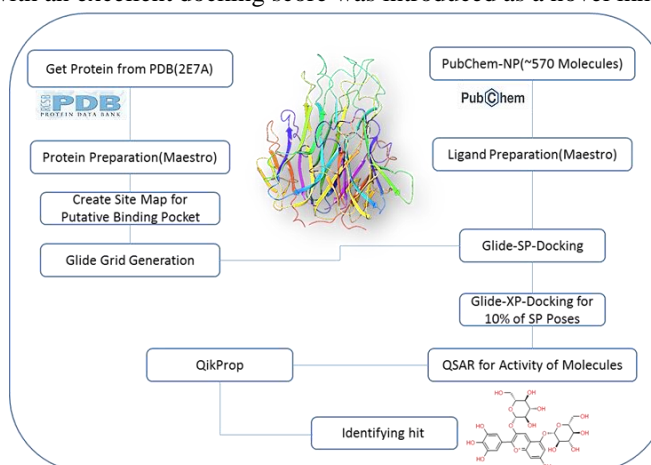


Figure 1. Screening protocol.

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## 9<sup>th</sup> National Congress on Medicinal Plants

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Poster Presentation ID: 95

### Changes in Phenolic Compounds and Photosynthetic Pigments of *Echinacea purpurea* L. under Different Fertilizer Sources

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#### ARTICLE INFO

**Keywords:**

*Echinacea purpurea*

Organic fertilizer

Protein

Total phenol

#### ABSTRACT

*Echinacea purpurea* L. is a perennial herbaceous plant from Asteraceae family, native to the eastern and central of United States [1]. Antibacterial, antiviral, antioxidant and anti-cancer properties [2] and increase the strength of the immune system against pathogens of the plant have been proven [3]. The environmental and health costs of chemical fertilizers have led researchers to meet the nutritional needs of plants using organic and biological fertilizers. Therefore, the present study was conducted to investigate the effects of organic and biological fertilizers on phenolic compounds and photosynthetic pigments contents in leaves of *E. purpurea*. Treatments included Nitrogen, Phosphorus and Potassium (NPK) (N<sub>50</sub>P<sub>25</sub>K<sub>25</sub>; N<sub>75</sub>P<sub>35</sub>K<sub>35</sub> and N<sub>100</sub>P<sub>35</sub>K<sub>35</sub> kg/ha), manure (30, 60 and 90 ton/ha), vermicompost (5, 10 and 15 ton/ha), N<sub>50</sub>P<sub>25</sub>K<sub>25</sub> fertilizer with 30 ton/ha manure, N<sub>50</sub>P<sub>25</sub>K<sub>25</sub> with 5 ton/ha vermicompost, biological fertilizers including *Glomus intraradices* + *G. mosseae*, *Azospirillum* + *Pseudomonas*, *Thiobacillus* with 5 ton/ha vermicompost and *Thiobacillus* with 250 kg/ha of sulfur. Biochemical parameters such as total phenol and flavonoid, protein and leaf chlorophyll and carotenoid composition were determined. In *Azospirillum*+*Pseudomonas* biotreatment, the highest content total phenol (41.3 mg gallic acid/ gr dry matter), total flavonoid (49.5 mg quercetin/ gr dry matter) and protein (33.9 mg/ gr fr wt) was also observed in the leaves of coneflower. Growth-promoting bacteria appear to increase phenolic and flavonoids compounds in plants by increasing nitrogen and phosphorus uptake [4]. N<sub>50</sub>P<sub>25</sub>K<sub>25</sub> with 5 ton/ha vermicompost combined treatment showed the highest chlorophyll a (1.05 µg/mL) and b (1.40 µg/mL) content in the leaves. The highest carotenoid content (0.775 and 0.750 µg/ml) was obtained in the control and 5 ton/ha vermicompost treatments. However, with increasing the amount of vermicompost, the carotenoids decreased in the leaves of *Echinacea*.

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### Antioxidant Properties of Ethanolic and Ethyl Acetate Extracts of *Artemisia absinthium*

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#### ARTICLE INFO

##### Keywords:

Polar  
*Artemisia*  
Non-polar  
DPPH  
FRAP

#### ABSTRACT

The geographical location of Iran, with a unique climatic diversity and ecological conditions, has led to the diversity and richness of plant species. Additionally, the National Document of Medicinal Plants and Traditional Medicine, compiled in 2013, demands efforts to create a database of medicinal plants and plant products of Iran and to support medicinal plants of other climates to plan for cultivating economically important species. *Artemisia* species are valuable plants that belong to the Asteraceae family and have a relatively wide distribution in different parts of Iran. The power of antioxidant activity depends considerably on the nature of the solvent and the extraction method of the plant collected from any region, including many parameters such as climate, altitude, and light [1, 2]. In this study, the medicinal plant *Artemisia absinthium* L. was collected from three different regions of Iran to evaluate antioxidant content of these ecotypes. Medicinal properties, including antioxidant content (by DPPH and FRAP methods), were evaluated in polar (ethanol) and non-polar (ethyl acetate) extracts. The ecotype of Guilan contains the highest level of antioxidants. As a non-polar solvent, ethyl acetate showed higher reducing activity, indicating that the type of solvent used in extraction is very effective on antioxidant activity [3]. This studied can result from different ecological, genetic, geographical, and nutritional factors.

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Poster Presentation ID: 97

### Efficacy and Safety of *Sophora alopecuroides* var. *alopecuroides* Seed Extract for Opioid Detoxification: A Randomized, Triple-blind and Placebo-Controlled Clinical Trial

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#### ARTICLE INFO

Keywords:

*Sophora alopecuroides*

Opioid

Withdrawal

Detoxification

#### ABSTRACT

The seeds of *Sophora alopecuroides* L. var. *alopecuroides* (*S. alopecuroides*) have alleviated morphine withdrawal in mice [1,2]. Therefore, in this study, the alkaloid composition of *S. alopecuroides* extract was determined by GC and GC-MS analysis. Moreover, fifty abstinent opium addicts consumed three 400 mg extract capsules once daily and 50 other patients took placebo for 8 days. At the baseline and days 3 and 8, the clinical opiate withdrawal scale (COWS) was used to assess withdrawal symptoms. At the baseline and day 8, the patients' blood levels of serum glutamate oxaloacetate transferase; serum glutamate pyruvate transferase; alkaline phosphatase; total, direct and indirect bilirubins; creatinine and blood urea nitrogen; complete blood count and prothrombine time were measured. The groups' parameters values were also compared. Sophocarpine, matrine and sophoramine were the major alkaloids respectively constituting 32.85%, 26.55% and 6.91% of the extract. The extract decreased the COWS score at the days 3 and 8 significantly compared to the placebo ( $P < 0.001$ ). The extract did not significantly affect the blood parameters' values compared with the placebo ( $P > 0.05$ ). There was no adverse drug effect. In conclusion, the extract reduces the acute opioid withdrawal symptoms and seems to have good safety and tolerability.

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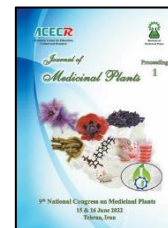
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Poster Presentation ID: 98

### Effects of *Antirrhinum majus* Powder on some Growth Factors of Common Carp Fish after Challenge with *Aeromonas Hydrophila*

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#### ARTICLE INFO

##### Keywords:

*Antirrhinum majus*  
Growth Factors  
Common Carp Fish  
*Aeromonas Hydrophila*

#### ABSTRACT

**Background.** One of the native medical plants in western Iran is *Antirrhinum majus*, which is used to treat inflammation and infection [1, 2]. **Objective.** The purpose of this study was to investigate the effects and medical properties of the *Anti. majus* on some growth indices (including initial weight, final weight, initial total length, final total length, body weight gain, specific growth index, nutritional conversion factor, average daily growth, and survival rate)[3]. **Materials and Methods.** For this aim, numbers of 240 *C. carpio* fishes were studied, 60 fish with 1% powder (first treatment), 60 fish with 2% powder (second treatment), 60 fish with 3% powders (third treatment) and 60 fish with normal feeding (control treatment). Comparison of mean results in control and treatment groups was performed using one-way analysis of variance (ANOVA). Significant differences between groups were performed by Duncan test. **Results.** The results of showed that using of 1 to 3 % per kg powder of *Anti. majus* for feeding had significant effects on some parameters hematological (P <0.05). **Conclusion.** It can be concluded that consumption of *Anti. majus* powder as a phytobiotic with the values of third treatment and using pellet method (unlike other stressful methods such as extract baths and essential oils due to insolubility and accessibility to other fish) also have an irritant effect on fish growth indices parameters.

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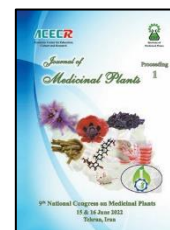
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Poster Presentation ID: 99

### The Evaluation of *Scrophularia striata* Powder on some Hematological Parameters of Common Carp in Experimental Infection

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> <i>Scrophularia striata</i> Hematological <i>Cyprinus carpio</i> L <i>Aeromonas Hydrophila</i> Bacteria</p>	<p><b>Background.</b> One of the native medical plants in western Iran is <i>Scrophularia striata</i>, which is used to treat inflammation and infection in humans, although its effects on fish are not clear [1]. <b>Objective.</b> The aim of this study was to evaluate the effects of the <i>S. striata</i> powder on some blood parameters (RBC, MCV, MCH, MCHC, lymphocytes, monocytes, neutrophils and eosinophils) after experimental Infection with <i>Aeromonas hydrophila</i> Bacteria in <i>Cyprinus carpio</i> [2, 3]. <b>Materials and Methods.</b> For this aim, numbers of 240 <i>C. carpio</i> fishes were studied, 20 fish in three replicates with 1% powder (first treatment), 20 fish in three replicates with 2% powder (second treatment), 20 fish in three replications with 3% powders (third treatment) and 20 fish in three replications with normal feeding (control treatment). Comparison of mean results in control and treatment groups was performed using one-way analysis of variance (ANOVA). Significant differences between groups were performed by Duncan test. <b>Results.</b> The results of showed that using of 1 to 3 % per kg powder of <i>S. striata</i> for feeding had significant effects on some parameters hematological (P &lt;0.05). <b>Conclusion.</b> Further studies are needed to evaluate the effects of <i>S. striata</i> powder under intensive stocking density and experimental infectious bacterial challenge for supporting our knowledge regarding the mode of action and optimum inclusion level.</p>

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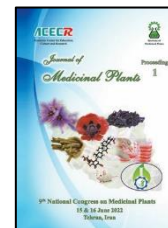
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Poster Presentation ID: 100

### *Nepeta* spp. as Promising Antimicrobial Agents

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#### ARTICLE INFO

Keywords:

*Nepeta*

Antibacterial

Antifungal

Methanol extract

#### ABSTRACT

Pathogenic microorganisms are more or less successfully treated by synthetic chemical compounds, whose residues often cause serious health problems. Plant specialized metabolites with antimicrobial properties have for a long time been in the focus of both medicine and pharmacology. The *Nepeta* genus (fam. Lamiaceae) diversity, species richness, and chemical properties have given rise to extensive research on this genus. Nepetalactones, iridoids and their glucosides, diterpenes, triterpenes, and phenolics are the major metabolites detected in various *Nepeta* species [1]. There is a plethora of scientific reports on biological activities of *Nepeta* secondary metabolites, which implies the importance of this genus. Iran is one of the main biodiversity hotspots of this genus [2-3]. Populations of four *Nepeta* species, including *N. cataria* L., *N. crassifolia* Boiss. & Buhse, *N. menthoides* Boiss. & Buhse, and *N. kotschy* Boiss. were established in the field (western Tehran) to form the main germplasm that would be used for various studies. Earlier studies proved that these Iranian *Nepeta* species are rich in essential oils and targeted phenolic compounds [4]. This study was conducted to evaluate the *in vitro* antimicrobial activity of methanol extracts of selected endemic and native Iranian *Nepeta* species as mentioned above against some of the most important pathogenic bacteria and fungi. The results indicated that *N. kotschy* leaf extract was the most efficient against the tested bacteria, with *Pseudomonas aeruginosa* being the most sensitive and fungal species were more susceptible to the extracts than bacterial strains. *Nepeta* spp. extracts showed a strong antifungal activity against micromycetes, except for quite resistant *Aspergillus niger*. Antibacterial MIC values (mg.mL<sup>-1</sup>) ranged from 0.01 (*N. kotschy*) to 0.20 (*N. crassifolia*), while antifungal MIC values ranged from 0.02 (*N. crassifolia*, *N. kotschy*, *N. menthoides*, and *N. cataria*) to 0.13 (*N. crassifolia* and *N. menthoides*). When comparing to positive controls, in most cases the extracts performed much better. The recorded antimicrobial activity candidates the selected four endemic and native Iranian *Nepeta* spp. as prospective and promising antimicrobial agents to be used in both pharmacology and biotechnology.

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Poster Presentation ID: 101

### Changes in Elements Absorb Power, Essential Oil Content and Composition of *Rosmarinus officinalis* L. in Response to Organic and Chemical Fertilizers

**Bohloul Abbaszadeh<sup>1,\*</sup>, Fatemeh Sefidkon<sup>1</sup>, Masoumeh Layeghhaghighi<sup>1</sup>, Mehdi Rezaei Sarkhosh<sup>1</sup>**

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#### ARTICLE INFO

*Keywords:*

*Rosmarinus officinalis*

L.

Yield

Elemental Adsorption

Essential Oils

Organic and Chemical

Fertilizers

#### ABSTRACT

In order to the destructive effects of conventional farming due to the excessive use of chemical inputs, especially chemical fertilizers, the organic matter content of the land has been reduced and the soil composition has become hard and undesirable then using the combination of organic and chemical fertilizers to reduce environmental pollution, improve soil physical conditions, and increase the quantitative and qualitative yield of medicinal plants. Evaluation of elemental adsorption and changes of rosemary essential oil in response to organic and chemical fertilizers application. This study was carried out in the field of medicinal plants at Alborz Research Station, Karaj, in the year 2013-2014. The experiment was conducted on a randomized complete block design with 16 treatments and three replications. Treatments included vermicompost per ton / ha, manure per ton / ha and N.P.K (urea source, triple-superphosphate, potassium hydroxide per kg/ha, respectively). Analysis of variance showed that the effect of different organic and chemical fertilizer treatments except for essential oil percentage on all studied quantitative traits was significant at 1% level. Among treatments, combined usage of organic manure and chemical fertilizers showed the greater increasing in studied traits than individual consumption. The highest leaf, stem, shoot, root, biological and essential oil yield were obtained from combined usage of organic and chemical fertilizers (10 t.ha<sup>-1</sup> farm manure + NPK ratio of 50:25:25 + 5 t.ha<sup>-1</sup> Vermicompost) (T15). Combined use of organic and chemical fertilizers improves the quantitative and qualitative yield of rosemary and reduces the use of chemical inputs in agricultural ecosystems which is a step to minimize environmental pollution and sustainable agriculture.



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### The Effect of Macro Elements and Spraying of Micoe Enements on Quality and Quantity of *Rosa damascena* Mill.

Masoumeh Layeghhaghi<sup>1,\*</sup>, Bohloul Abbaszadeh<sup>1</sup>, Fatemeh Sefidkon<sup>1</sup>, Fatemeh Zakerian<sup>1</sup>, Maryam Jebelly<sup>1</sup>

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#### ARTICLE INFO

##### Keywords:

Essential oil

Nutrition

Damask Rose

#### ABSTRACT

*Rosa damascena* Mill. is the one of the oldest and most valuable medicinal herbs wicth widely used in pharmaceutical, food, cosmetic and health. In order to investigate effect of macro- and micronutrients uptake and their effects on quantity and quality of damask rose (*Rosa damasena* Mill.) this research was conducted at Alborz research station under field conditions in 2008-2012. It was performed as split plot based on randomized complete block design with 3 replications. Main factor was including chemical fertilizers, manure, combine fertilizor at 14 levels and sub factor was foliar spraying of micronutrients to Fe chelate at 4 levels (0, 1, 2 and 3 time). The results of analysis variance of macro and micro nutrients at two years indicated that between years was significantly different for the number of flower in bush, yield of fresh flower, essential oil percent and essential oil yield ( $\alpha \leq 0.01$ ). The results of analysis variance indicated that between macro nutrients and nano chelate of iron was significantly different for the number of flower in bush, yield of fresh flower, essential oil percent and essential oil yield ( $\alpha \leq 0.01$ ). The results of analysis variance indicated that interaction of year\* macro-nutrients\* micro-nutrients, was significantly different in yield of fresh flower, essential oil percent and essential oil yield ( $\alpha \leq 0.01$ ). The results of mean comparison in two years showed that essential oil percentage essential oil yield at first year with 0.62% and 2675 g/ha was the highest. The results of mean comparison of yield of fresh flower showed that the use of 15 ton/ha manure with 4656 kg/ha had the highest yield. The results showed that nutrition of plants was effective on increasing the flower yield.





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### Combined Analysis of Morphological and Physiological Data from Different Ecotypes of *Camphorosma monspeliaca* L. in Different Habitats from Iran

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#### ARTICLE INFO

*Keywords:*  
Ecotypes  
Elements  
Salinity  
Camphor

#### ABSTRACT

Soil salinity is a one of limitation in agricultur system. In this study, tree natural habitat of Camphor (*Camphorosma monspeliaca* L.) in Hamadan (a region with a moderate salinity), Shahr-e-kord (as a non-salinity region), and Arak (as sever salinity), was studied. Plants in the early stages of vegetative growth, full flowering and complete seed investigation was sampled and In full flowering stage, the some morphological characters such as plant height, number of tillers, small and large canopy diameter, root length and weight and some physiological characters such as chlorophyll a, chlorophyll b, total chlorophyll, soluble sugars and the Proline was measured. Flowering shoot and total shoot of each plot was harvested separately. Sodium, potassium, magnesium, calcium and iron was measured by ICP device. The results of combine analysis between habitats showed that the effect of habitats on number of tillers, small canopy diameter, percentage of essential oil, soluble sugars, Proline, magnesium, calcium, iron at 1% level and on sodium and potassium were different at 5% level significantly. Comparison means showed that the salinity were caused plants height reduction, in low salinity level, increased the number of tillers and then with increasing the salinity levels, reduced the number of tillers. The highest yield of the flowering shoot was obtained from Shahr-e-kord habitat that its non-salty region. The essential oil percentage in non-saline habitat were increased. Uptake of sodium, magnesium, calcium, chlorine and iron in Arak habitat (saline habitat) were higher than other habitats.



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### Physico-chemical Properties and Fatty Acid Profile of Seed Oil from *Citrus aurantium* Comparison Extraction Methods

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#### ARTICLE INFO

##### Keywords:

*Citrus aurantium* L. oil  
*Citrus aurantium* L.  
seed  
Pressurized extraction

#### ABSTRACT

*Citrus aurantium* L. seeds are normally waste products from fruit processing but they are a valuable source of certain pharmaceutical and nutraceutical compounds. Fatty acids, tocopherols, phytosterols are the source of bioactive compounds in *Citrus aurantium* L. seed oil that have promising applications such as biodiesel, high nutritional value food and natural antioxidants. This study was performed to determine and compare the physico-chemical properties of *Citrus aurantium* L. seeds oil extracted by cold pressing and n-hexane. The *C. aurantium* L. seed fatty acids profile was analyzed by GC-MASS, <sup>1</sup>HNMR and <sup>13</sup>CNMR. In this study the effectiveness of ultrasonic-assisted and influence of air pressure on extraction *Citrus aurantium* L. seeds oil by n-hexane was evaluated. The highest oil yields were obtained using ultrasound-assisted extraction (25%) compared to other methods. The five fatty acids, 9-oleic (18.07%), Linoleic (36.69%), palmitic (21.90%), stearic acid (6.6%) and 10-oleic acids (1.1%) were identified in this study.



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### Chemical Composition of Essential Oil in *Eryngium planum* L. from Different Phenological Growth Stages

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Volatile oil Blue eryngo GC-MS Sesquiterpene</p>	<p><i>Eryngium planum</i> L. known as “Blue Eryngo or Flat Sea Holly”, a non-native and perennial plant with vertical stems 40-100 cm, from Apiaceae family, distributed in west, center and east of Europe and some parts of North America. This plant is known in European folk medicine as “Eryngii plani herba or Eryngii plani radix”, the aerial parts of this plant, including the stems and flowers, have been used since ancient times to treat whooping cough and irritating coughs. In addition, anti-diabetic, anti-inflammatory and diuretic properties have been reported for this genus. In this study, the seedlings were produced from seeds and then transferred to the farm, to determine the influence of different phenological stages including Early flowering (EF), Full flowering (FF) and Pre-mature seeding (PS), on content and compositions of essential oil of this plant. The experiment was designed as randomized complete block with three replications at two years. The shade dried plant materials were hydrodistilled by Clevenger for 3 h. Essential oils analysis were carried out by gas chromatography-mass spectrometry (GC-MS) and quantified by GC-FID. The essential oil content in first year (Y1) were 0.14%, 0.12% and 0.12% and in second year (Y2) 0.18%, 0.13% and 0.14% for EF, FF and PS, respectively. The main components were <math>\beta</math>-Elemene (Y1: 24.6%, 11.6% and 6.6%, and Y2: 44.6%, 24.3% and 22.6%), <i>cis</i>-Chrysanthenyl acetate (Y1: 1.8%, 16.1% and 28.5%, and Y2: 0.3%, 9.0% and 21.5%), <math>\alpha</math>-Selinene (Y1: 15.8%, 9.2% and 11.9%, and Y2: 7.4%, 7.4% and 4.4%), <math>\beta</math>-Selinene (Y1: 15.0%, 9.6% and 4.8%, and Y2: 7.0%, 5.7% and 3.3%) and Germacrene A (Y1: 7.4%, 3.8% and 2.2%, and Y2: 17.5%, 8.9% and 7.6%), for EF, FF and PS, respectively. According to the results, the essential oil content and compositions of the <i>E. planum</i> L. significantly affected by different phenological stages. These results confirmed the reports based on affecting of different phenological growth stages effects on the quantity and quality of active substances in the medicinal plants [1- 4].</p>

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15 & 16 June 2022  
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Poster Presentation ID: 106

### Prediction of Mechanism of Fruticulin-A by Reverse Molecular Docking

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#### ARTICLE INFO

*Keywords:*

Fruticulin-A  
Reverse docking  
Anticancer activity

#### ABSTRACT

The reverse docking method is developed to evaluate the ability of a query molecule to bind multiple of probable target proteins for the identification of potential interactions between small molecules and pharmacological targets. This methodology helps us to predict of mode of action of bioactive compounds and finding their adverse effects. Herein, fruticulin-A, a diterpen with proven anticancer activity was docked with four selected target proteins that regulate cell proliferation and apoptosis including cyclin-dependent protein kinase 2 (CDK-2), CDK-6, DNA topoisomerases I (topo I) and topo II using autodock 4.2 simulation software for the identification of potential targets. Due to our results, fruticulin-A exhibited better binding affinity to CDK-2 than the known CDK-2 inhibitor (-8.17 and -7.79 kcal/mol, respectively). Further *in silico* analysis demonstrated that fruticulin-A formed a key H-bond in active site of CDK-2 with residues Leu 83 at a distance of 2.93 Å.



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Poster Presentation ID: 107

### ***In silico* Target Fishing for 7-(2-Oxoheptyl)-Taxodione Compound by Similarity Search Methodology**

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#### ARTICLE INFO

##### Keywords:

*In silico* target fishing  
7-(2-Oxoheptyl)-  
Taxodione  
Similarity search  
Molecular docking

#### ABSTRACT

Identification of target protein plays a pivotal role in the process of drug discovery. This approach helps us for prediction of bioactivity of compounds and recognition of their action mechanism. Recently, several *in silico* protocols have been developed for computational target fishing such as: chemical similarity searching, data mining/machine learning, bioactivity spectra, protein-structure-based and panel docking. In present study, we used similarity search methodology to predict target protein for 7-(2-Oxoheptyl)-taxodione compound which isolated from the hairy roots of *Salvia austriaca*. For this purpose, molecular docking simulation was applied for validation of databases output. The similarity searches were done in various online data bank including: binding DB and drug bank. According to query results, apoptosis cytochrome P450 suggested as potent target. Meanwhile, 7-(2-Oxoheptyl)-taxodione showed the best inhibition activity on cytochrome P450 in comparison with the positive controls with the docking scores of -10.37 and -9.87 kcal/mol, respectively.



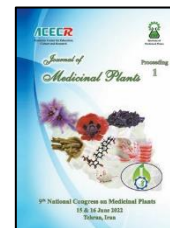
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Poster Presentation ID: 108

### Reduce Cadmium and Nickel from Soil with Phytoremediation

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#### ARTICLE INFO

*Keywords:*

Phytoremediation

Soil

Mine

Cadmium

Nickel

#### ABSTRACT

Today, attention to the environment and society has received a lot of attention in all industries and societies. Mining is one of the industries that should pay more attention to the environment and society. Paying attention to reducing soil pollution to improve the environment and improve the health of the community due to mining activities has become one of the serious issues in this field. In this article, due to the importance of this issue, we have tried to reduce soil pollution caused by cadmium and nickel metals. In this regard, several plants were introduced for these two metals, which reduces the amount of these two metals in the soil. One of the most important results showed that, due to the increase of mining activities to provide the demand and the existence of metal mines in Iran, attention to reducing pollution of cadmium and nickel in Iran should be given more attention. Then, the results obtained in line with this research work were discussed, and suggestions were made to reduce the negative factors and improve the positive factors.



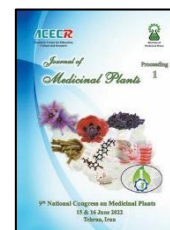
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Poster Presentation ID: 109

### Evaluation of Chemical Composition (HPLC and GC-Mass) from Afghan *Prangos pabularia* Roots

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#### ARTICLE INFO

##### Keywords:

Microencapsulation  
Anthocyanin  
Spray drying  
Saffron petal

#### ABSTRACT

One of Afghanistan's plant species is *Prangos pabularia*, which is also found in some parts of Afghanistan, Iran, India, Kashmir, Pakistan and Tajikistan(1). This plant is used in traditional medicine and pharmaceutical industry. Numerous studies have been performed on coumarins in this plant, which can strengthen the hypothesis of anti-cancer properties of this plant (2). In this study, *Prangos pabularia* roots were collected from Jaghori region in Afghanistan and then the components of ethanolic extract of *Prangos pabularia* roots were analyzed and identified by HPLC and GC- mass techniques. The results of this study showed that the roots of *Prangos pabularia* contain higher amounts of tert- butylhydroquinone, butylated hydroxytoluene, butylate hydroxyl anisole, quercetin and less amounts of vitamin C, beta carotene and hesperidin. The roots extract of *Prangos pabularia* contain 15.7% carbohydrate including glucose, fructose and sucrose, 1.8% protein, 6.3% water and 23.1% fiber and around 11.9% of lipids. The extract contains ions of S, Zn, Na, Fe, Mn, Al, Si, B and Ba. The results of this study suggest that anti-cancer and anti-inflammatory properties of *Prangos pabularia* roots extract may be due to their composition.

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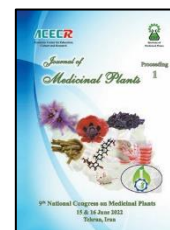
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Poster Presentation ID: 110

### Propolis Add-on Therapy Alleviates Depressive Symptoms; A Randomized Placebo Controlled Clinical Trial

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#### ARTICLE INFO

##### Keywords:

Depression

Propolis

Clinical trial

#### ABSTRACT

Almost half of the treatments with common antidepressants are failed or resulted in a relapse of symptoms after cessation. Moreover, the antidepressants side effects rationalize the use of complementary medicine as an adjunctive therapy. This study aimed to evaluate the efficacy and safety of propolis in complementary therapy of depressive disorder [1, 2]. Chromatography techniques were used to detect propolis components. A double-blind, randomized, placebo-controlled trial was designed, and 54 participants were randomly assigned to receive either propolis or placebo for six weeks. Treatment was defined as a decrease in 17-item Hamilton Depression Scale (HAMD-17) and Beck depression inventory (BDI). On D42, there was a significant reduction in HAMD score in the propolis group compared with the placebo group ( $p < .0001$ ). HAMD score significantly decreased in the propolis group from  $20.92 \pm 3.77$  on D0 to  $10.03 \pm 5.55$  on D42, and BDI score was improved from  $29.25 \pm 3.06$  on D0 to  $14.17 \pm 4.86$  on D42. Our findings confirmed that complementary treatment of propolis with SSRIs could safely attenuate symptoms of moderate-severe MDD. These antidepressant effects might result from the rich phenolic acids and flavonoids content of Azerbaijan propolis.

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Poster Presentation ID: 111

### The Effect of NaCl and Salicylic Acid on Total Flavonoid Contents in Suspension Culture of *Nitraria schoberi*

Nasim Zarinpanjeh<sup>1,\*</sup>, Dana Rafieei<sup>2</sup>, Mohammad Ali Ebrahimi<sup>2</sup>, Nassrin Qavami<sup>1</sup>, Sara Ghezlbash<sup>1</sup>

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#### ARTICLE INFO

##### Keywords:

Elicitor  
Medicinal plants  
Secondary metabolites  
Suspension culture

#### ABSTRACT

*Nitraria schoberi* is a medicinal plant with antioxidant, antifungal, antimicrobial, anti-inflammatory and, anti-viral properties. This plant is also tolerant to salinity and drought. The main aim of this study was to perform elicitation in cell suspension culture of *N. schoberi* to detect the production of total flavonoid contents. In order to accomplish this study, hypocotyls and cotyledonary leaves of *N. schoberi* were cultured in different callus induction treatments. At the next step, the calli from the best callus induction treatment were transferred to cell suspension cultures containing sodium chloride (NaCl) and salicylic acid (SA) alone or in combination with each other. Total flavonoid contents in treatments were measured using a spectrophotometer (absorbance at 765 nm and 430 nm, respectively). According to the results, although callus induction was observed in all treatments, the maximum fresh weight (FW) (7.6 g) and dry weight (DW) (3.7 g) were obtained by culturing hypocotyl explants in MS medium supplemented with 2, 4-dichlorophenoxyacetic acid (2, 4-D) at 0.5 mg/L. The highest total flavonoid content (48.24 mg/g) was detected in suspension culture containing 100 millimolar (mM) NaCl and 50 micromolar (M $\mu$ ) SA.



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Poster Presentation ID: 112

### Evaluation of Wound Healing and Anti-inflammatory Activities of a Herbal Ointment Consisting of *Althaea officinalis*, *Lavandula angustifolia*, and *Rosa x damascena* in Animal Excision Wound Model

Saeideh Momtaz<sup>1</sup>, Eghbal Jasemi<sup>1</sup>, Reza Ghaffarzadegan<sup>1</sup>, Bahman Yaghoobvand<sup>1</sup>

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#### ARTICLE INFO

Keywords:

*Althaea officinalis*

*Lavandula angustifolia*

*Rosa x damascene*

Excision wound healing

Inflammation

#### ABSTRACT

Abstract: *Althaea officinalis* L., *Lavandula angustifolia* Mill. and *Rosa x damascena* Herrm. are used to treat excision or burn lesions in traditional medicine. Objective: To evaluate the healing effect of a polyherbal ointment containing *L. angustifolia*, *R. x damascena*, and *A. officinalis* combination on wounds caused by third grade skin cut. Methods: To evaluate the wound healing effect of this polyherbal formulation, an ointment containing the extract of *A. officinalis*, the essential oil of *R. x damascena* (2 % essence) and the essential oil of *L. officinalis* (2 % essence) in an eucerin base (20:20:10:50) was prepared. The formulation was examined using excision wound test for 14 days and the percentage of healing effect in each group was calculated. Formalin induced rat hind paw edema method was used for determination of anti-inflammatory activities of the same formulation. Results: The percentage of recovery in the polyherbal formulation group was significantly higher than the other groups. Histological studies also confirmed these results. Herbal formulation treated group showed significant improvement in terms of re-epithelialization, angiogenesis, collagen deposition, and reducing inflammation. The percentage of wound healing was  $99.07 \pm 0.34$ ,  $99.22 \pm 0.35$ ,  $98.45 \pm 0.733$ ,  $98.75 \pm 0.88$  and  $63.72 \pm 5.64$ , for the polyherbal formulation, *L. angustifolia*, *R. damascena*, *A. officinalis* extracts, and the placebo group, respectively. Conclusion: This polyherbal formulation could act as a wound healing agent, possibly due to the suppression of inflammatory mediators. The presence of phenolic compounds might be a reason behind the therapeutic effect of these plants. [1].

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Poster Presentation ID: 113

### Fabrication of Nanoliposomes Containing *Vitis vinifera* L. Leaves Extract and Evaluation of their Characteristics

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#### ARTICLE INFO

##### Keywords:

*Vitis vinifera* L. leaves  
extract  
Red vine  
Nanoliposome  
Chronic venous  
insufficiency (CVI)

#### ABSTRACT

Red vine (*Vitis vinifera* L.) is a plant belonging to the genus of Vitaceae, originating in the Mediterranean area. Its leaves, shoots, stem, and seeds are traditionally used in several countries as a source of bioactive compounds. This plant produces many secondary metabolites belonging to a chemically heterogeneous class of phenolic compounds. Dried red leaves contain a variety of phytoconstituents showing high anti-inflammatory and antioxidant activity; among them, quercetin-3-*O*-glucuronide and quercetin-3-*O*-glucoside are the most abundant phenols in the extract [1]. Chronic venous insufficiency (CVI) is a common disease in adults associated with increased venous hypertension and can affect both the deep and superficial venous systems. Initial causes of CVI can include obstruction from deep vein thrombosis, acquired or genetic valvular defects, and ineffective action of the calf muscle pump [2]. In traditional medicine, red vine leaves extract has been used to cure CVI symptoms in legs for decades. There are some products containing red vine leaves extract in Health & Pharmaceutical market, such as Antistax® (Pharmaton, Germany), which contains pure 360 or 720 mg of red vine extract in the form of tablets or hydrogels which has been used in most trials, or VenoVine tablets or topical cream from Vasha Herbals Pharmaceutical Company in the domestic market of Iran for Varicose and CVI treatment. This study aimed to prepare some nanoliposomes containing *V. vinifera* leaves extract and evaluate their biological characteristics to reach a proper formulation to alleviate Varicose and CVI symptoms. First of all, we prepared the hydroalcoholic extract using ground dried leaves. Then, using LXA-10 resin, we enriched the polyphenolic content about two times higher, proved by HPLC-UV results. Due to special features of nanoliposomes, such as increased stability and controlled release of encapsulated extract, we prepared nanoliposomes via two different methods, Thin film hydration and the Mozafari method, then evaluated their biological characteristics as a potential treatment for Varicose vein insufficiency.

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Poster Presentation ID: 115

### The Role of Drought Stress and Humic Acid on The Elements Uptake in Rosemary (*Rosmarinus officinalis* L.)

**Masoumeh Layeghhaghi<sup>1,\*</sup>, Bohloul Abbaszadeh<sup>1</sup>, Samaneh Asadi Sanam<sup>1</sup>, Saedeh Meshkizadeh<sup>1</sup>, Behrouz Naderi<sup>1</sup>**

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#### ARTICLE INFO

##### Keywords:

Rosemary  
Biological fertilizers  
Drought  
Macro elements  
Zinc

#### ABSTRACT

Rosemary (*Rosmarinus officinalis* L.), belonging to Lamiaceae family, is a perennial, medicinal and aromatic plant. The plant and its secondary metabolites are widely used in landscape designing and pharmaceutical, cosmetic and food industries. Nevertheless the water deficiency in soil can be effective on the quality and quantity of plant growth. Biological fertilizers are one of the most important supply source of nutrients in sustainable agriculture. In order to investigate the effect of drought stress and humic acid on some macro and micro elements of Rosemary, an experiment was conducted under field conditions in 2014-15, at Alborz research station, Research Institute of forests and Rangelands, Karaj, Iran. The experiment was conducted in split plot in the form of a randomized complete block design with three replications. The main factor was drought stress in three levels (including 30%, 60% and 90% field capacity) and the sub factor was foliar application of humic acid in five levels (including 0, 100, 200, 300 and 400 mg/L). The results of analysis variance indicated that drought stress, humic acid and interaction of drought stress and humic acid on total nitrogen, potassium, phosphorus, iron, manganese, zinc and copper ( $P < 0.01$ ). The maximum amount of iron (639 ppm), was related to 90% of the FC and non-foliar application of humic acid. 60% of FC combined with the application of 400 mg/l of humic acid, had the highest percentage of phosphorus (0.15%). Rosemary is one of the resistant plants that can tolerate the conditions of reduced water availability in the root environment that the field capacity of 30% and 60% increased some elements of rosemary in this experiment.



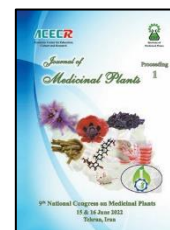
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Poster Presentation ID: 116

### Evaluation of Antioxidant, Anticancer, Antimicrobial Activities and Separation and Identification of Antioxidant Components of *Corchorus olitorius* L. Using High Performance Liquid Chromatography

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#### ARTICLE INFO

##### Keywords:

*Corchorus olitorius* L.  
Antioxidant activity  
Anticancer activity  
Antimicrobial activity  
High performance  
liquid chromatography

#### ABSTRACT

The history of using plants as medicines is as ancient as the mankind existence itself. Today, the application of modern sciences and technologies has led to the production of novel plant origin therapeutic materials. In this study the plant Nalta Jute (scientific name: *Corchorus olitorius* L) from Tiliaceae family was collected from Golestan province (Gorgan) and its antimicrobial, antioxidant and anticancer activities were evaluated [1, 2]. Phenolic compounds of the plant ethyl acetate extract were determined qualitatively and quantitatively by injecting it to a HPLC apparatus equipped with a diode array detector. The presence and amount of catechin, rutin, chlorogenic acid and quercetin in the ethyl acetate extract were investigated. Then, preparative high performance liquid chromatography was applied for the separation of phenolic compounds from the ethyl acetate extract. Identity and quantity of each phenolic compound in the ethyl acetate fractions were determined using analytical HPLC. Antioxidant activities were evaluated by 2, 2-diphenyl-1-picryl hydrazil (DPPH) radical and methanol extract of the leaf showed the best result compared to synthetic standard antioxidant (BHT). Total phenols and flavonoids of the plant were also measured (64.75 and 54.28 µg / ml respectively) were in accordance with DPPH test results [3]. The antimicrobial activities of the plant extracts were evaluated using disk diffusion method and no significant antimicrobial activity was recorded. The methanol extract showed the most antimicrobial activity against *E. coli* standard strain [4]. Nalta Jute showed a weak anti-cancer activity in the brine shrimp lethality test (LC<sub>50</sub> = 987 µg / ml) [5].

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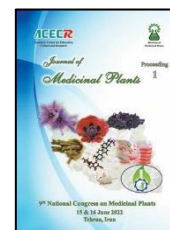
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## 9<sup>th</sup> National Congress on Medicinal Plants

15 & 16 June 2022  
Tehran, Iran



Poster Presentation ID: 117

### Standardized Extract of *Tamarix stricta* Boiss. Targets Nitregic Pathways in Acetic Acid-Induced Colitis

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#### ARTICLE INFO

*Keywords:*

*Tamarix stricta* Boiss  
Inflammatory bowel diseases (IBD)  
Inflammatory mediators  
Nitric oxide synthase (NOS)

#### ABSTRACT

Inflammatory bowel disease (IBD) is a chronic recurrent disease with no certain treatment. Tamarisk is a medicinal plant mentioned in Persian medicine as an effective treatment for gastrointestinal bleeding. Current study aimed to investigate the ameliorative effect of *Tamarix stricta* Boiss. on acetic acid-induced colitis in rats and the role of nitregic system. The hydro-ethanolic extract was analyzed via liquid chromatography–mass spectrometry. Gallic acid and quercetin were quantified with high-performance liquid chromatography. Following induction of colitis with acetic acid, *T. stricta* extract (50, 100, 150, and 200 mg/kg) was orally administered for two successive days. The involvement of nitregic system was examined, using L-NG-Nitro Arginine Methyl Ester (L-NAME) and aminoguanidine as nitric oxide synthase (NOS) inhibitors. Finally, macroscopic and microscopic analyses were performed. Tissue concentrations of inflammatory mediators including interleukin (IL)-1 $\beta$ , tumor necrosis factor (TNF)- $\alpha$ , and myeloperoxidase (MPO) were assessed. *T. stricta*, especially at 200 mg/kg dose, could significantly improve colitis and downregulate the inflammatory factors including TNF- $\alpha$ , IL-1 $\beta$ , and MPO (P <0.001). Concomitant use of NOS inhibitors with 200 mg/kg of the plant extract reversed the observed positive effects, which demonstrates the protective role of NO in IBD pathogenesis as a probable mechanism for *T. stricta* in healing process of colitis. The positive effect of *T. stricta* on colitis might be attributed to anti-inflammatory properties of its polyphenolic components, mainly through modulation of the nitregic system.



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### Cinnamaldehyde Mediates Inflammatory Cytokines in Acetic-Acid Induced Ulcerative Colitis Model

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#### ARTICLE INFO

##### Keywords:

Cinnamaldehyde (CA)  
Inflammatoryboweldisease  
(IBD)  
Tumor necrosisfactor-  
alpha (TNF- $\alpha$ )  
Myeloperoxidase (MPO)  
Toll like receptor 4 (TLR-  
4)

#### ABSTRACT

Cinnamon and its bioactive ingredients such as cinnamaldehyde (CA), with broad pharmacological profiles, are important parts of daily diet in many cultures. Moreover, there are plenty motivating patents on efficacy of nutritional phytochemicals as novel anti-inflammatory drugs in patients with inflammatory bowel disease (IBD). This study intended to evaluate the effects of CA on inflammatory biomarkers in acetic acid-induced colitis rats. Colitis was induced in all animals, except in sham group, using acetic acid (4%). Following colitis induction, in 3 groups, CA was administrated orally at 2, 4 and 8 mg/kg/day for 2 days (once a day). Other groups were defined as the control (only treated with acetic acid), sham group (normal saline), and a standard group (Dexamethasone). To evaluate the inflammation sites, macroscopic and microscopic markers were assessed. Tissue concentrations of interleukin (IL)-6 and tumor necrosis factor-alpha (TNF)- $\alpha$ , were assessed by ELISA assay kits, while myeloperoxidase (MPO) was measured spectrophotometrically. The mRNA expression of toll like receptor (TLR)-4 in colon tissue was assessed by Real time-PCR. CA at 4 mg/kg/day and 8 mg/kg/day significantly improved microscopic and macroscopic manifestations of colitis tissues. TNF- $\alpha$ , MPO, and IL-6 levels were significantly lower in CA treated groups at all the concentrations tested ( $P < 0.001$ ). CA at 4 and 8 mg/kg/day significantly downregulated the mucosal gene expression of TLR-4. CA attenuated experimental colitis by means of colitis symptoms, reduction in inflammation cytokines, decline of neutrophil infiltration, and suppression of TLR-4 expression in acetic acid-induced colitis. CA improved colitis in animal model through suppression of inflammatory parameters and downregulation of TLR-4 mRNA expression.



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### Evaluation of Suitable Time and Conditions for Cultivation of *Mentha Mozaffarianii* Jamzad

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#### ARTICLE INFO

*Keywords:*

Planting time

Puden Koochi

Rhizome propagation

Rhizome germination

#### ABSTRACT

*Mentha Mozaffarianii* Jamzad, locally known as Puden Koochi, is an aromatic, medicinal and endemic plant in southern Iran [1]. It was first collected and introduced in 1987 in the Bokhoun region from north of Hormozgan province, at 1750 meters altitude [2]. This study was in the greenhouse of Hormozgan University. The germination and growth of Rhizomes, selective from nine main habitats, were evaluated in different months and pots. In this study, rhizome cultivation in pots with larger diameters showed better development. It is justified given that this plant has shallow roots and needs space to expand its roots to grow foliage. In the study of rhizomes cultivated at different times, rhizomes are selective from Zakin, Geno, Damtang (Hormozgan), Komarj (Fars), and Khaiz (Bushehr) regions showed the highest germination, respectively, and none of the rhizomes sprouted from Homag region. The best season for this plant propagation and planting in Bandar Abbas is autumn, from the end of October to the end of November, and in winter and spring, from February terminal to the middle of April. Also, the germination rate of rhizomes, and climatic conditions of Bandar Abbas, in the canopy greenhouse were more favourable than in the plastic greenhouse. Cultivation of rhizomes collected from Komarj habitat in Fars province in canopy greenhouse showed that the plants of this region were flowering in sync with other areas. This flowering variety in habitat areas, since this was under drought and extinction conditions in the Fars region, can be due to climatic and environmental conditions. In this study, we tried to study different habitats to identify the best natural habitats to propagate this plant. However, to improve the plants, various cases will be considered depending on the purpose of the breeder. The study of suitable conditions for plant propagation is one of the main stages of plant breeding.

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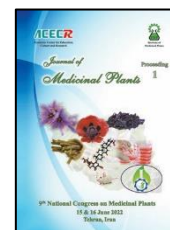
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Poster Presentation ID: 120

### *Salvia abrotanoides* (Kar.) Sytsma: An Ethnobotanical Study among the Border Resident Ethnicities of Northeast Iran

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#### ARTICLE INFO

##### Keywords:

Medicinal plants  
Ethnobotany  
Indigenous people  
Pharmacology

#### ABSTRACT

As one of the traditional medicinal species of the family Lamiaceae, *Salvia abrotanoides* (Kar.) Sytsma (previously named as *Perovskia abrotanoides* Kar.) has a wide distribution range in Iran. The common name of the plant is "Barazambal"[1]. The present study aims to document the ethnobotanical features of *S. abrotanoides* among border residents of northeast Iran. Field studies were carried out from September 2018 to October 2021 in the eight border cities of Khorasan-e Razavi province using semi-structured interviews. A total of 42 informants, aged between 33 to 87, were chosen based on a snowball sampling in 34 villages. The local names, as well as ethnobotanical uses of *S. abrotanoides*, were documented and voucher specimens deposited at the Herbarium of Ferdowsi University of Mashhad. Local names of the plant among the Turk, Lak, and Kurd ethnicities (living in the villages of Quchan, Dargaz, and Kalat) are Pallek, Gol-e Kabood, and Housh, respectively. They use *S. abrotanoides* to treat fever, colds, digestive problems, kidney stones, vaginal infections, bleeding, and wound disinfection. It is also used for dyeing yarn. The Fars and Baluch border residents of Saleh Abad, Torbat-e Jam and Sarakhs locally name the plant as Gol-e Manzar and use it for treating digestive problems. The local name of the plant among the Fars ethnicities of Khaf and Taybad is Ostokhodos. They use it to treat backache. Aerial parts are the only plant part used in the whole study area, and decoction is the most common preparation method, followed by raw (fresh or dried). This study documents indigenous knowledge about the local names and ethnobotanical uses of *S. abrotanoides* among the border resident ethnicities of Khorasan-e Razavi. Five local names, eight medicinal uses and one industrial usage are registered for this plant. Considering high usage and different applications of *S. abrotanoides*, this species is suggested as a proper candidate for further phytochemical, pharmacological and clinical studies.

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Poster Presentation ID: 121

### Physico-chemical Properties and Fatty Acid Profile of Seed Oil from *Citrus aurantium* Comparison Extraction Methods

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#### ARTICLE INFO

Keywords:

*Citrus aurantium* L.

Seed oil

Pressurized extraction

#### ABSTRACT

*Citrus aurantium* L. seeds are usually waste products from fruit processing, but they are valuable for certain pharmaceutical and nutraceutical compounds. Fatty acids, tocopherols, phytosterols are the source of bioactive compounds in citrus seed oil. They are used for different applications such as biodiesel, high nutritional value food and natural antioxidants. This study was performed to determine and compare the physicochemical properties of *C. aurantium* seeds oil extracted by cold pressing and n-hexane. The *C. aurantium* seed fatty acids profile was analyzed by GC-MS, <sup>1</sup>HNMR, and <sup>13</sup>CNMR. This study evaluated the effects of ultrasonic-assisted and the influence of air pressure on the extraction of *C. aurantium* seeds oil by n-hexane. The highest oil yields were obtained using ultrasound-assisted extraction (25%) compared to other methods. The five fatty acids, 9-oleic (18.07%), Linoleic (36.69%), palmitic (21.90%), stearic acid (6.6%) and 10-oleic acids (1.1%) were identified in this study.



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### Optimization of Isolation, Purification and Quantification of *Anabasis setifera* Moq. Saponins from Different Iranian Regions using HPTLC and LC-MS

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#### ARTICLE INFO

##### Keywords:

*Anabasis setifera*  
Triterpene saponin  
Spectrophotometry  
HPTLC  
LC-MS

#### ABSTRACT

*Anabasis setifera* Moq. is a herbal plant, perennial and diploid ( $2n=2x=18$ ), from Chenopodiaceae family which in traditional medicine is known as an anti-inflammatory, anti-ulcer, disinfectants and is used in treatment of itching, blisters and pimples and some skin diseases such as psoriasis and Vitiligo [1,3]. One of the main phytochemical compounds in *Anabasis setifera* Moq., is saponin, which are bipolar glycosides with a complex structure and have a non-polar and lipophilic moiety called aglycone or sapogenin and a polar (hydrophilic) moiety called glycone [2]. The aim of this study was to isolate, purify and determine the saponins of *Anabasis setifera* Moq extract from different origin. For this, the hydro-alcoholic extract of Aerial parts of plant material was used to determination of its total saponins by UV-vis spectrophotometry method. The obtained result showed that the sample Qom with  $104.195 \text{ mgg}^{-1}$  and sample Sistan and Baluchestan with  $50.928 \text{ mgg}^{-1}$  total saponin content, were found as the highest and lowest saponin sources depending on their growth condition. In the following, a solid-phase extraction (Macroporous adsorption resin) technique was developed and optimized for isolation and concentration of saponin content of crude extracts. Based on UV-vis spect. Result, 70 % ethanol was chosen as the optimum elution solvent for clean-up saponin fraction in resin. Then the separation of saponin composition was performed on High Performance Thin Layer Chromatography (HPTLC) aluminum plates pre-coated with silica gel 60 F<sub>254</sub>. Good separation was achieved in mobile phase using a mixture of water/acetic acid/1-Butanol (4:1:14 v/v/v) and modified anisaldehyde as a spraying reagent. Determination and quantitation were performed by scanning at 544 nm. Also LC-MS technique was used to identify saponins in the extract of this plant.

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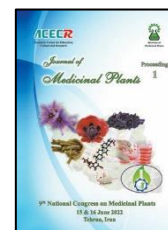
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Poster Presentation ID: 123

### Study of some Phytochemical Traits and Antibacterial Effects in the Extract of Iranian Cultivars of *Chrysanthemum*

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#### ARTICLE INFO

Keywords:

Antioxidant activity

Chrysanthemum

Essential oil

Flavonoids

Phenol

#### ABSTRACT

**Abstract:** Due to their pleasant and soothing taste and odor, attractive colors, and medicinal purposes, *Chrysanthemum morifolium* flowers have been widely used as food, tea, ornamentation, and medicine. It has been reported that *C. morifolium* can reduce hyperactivity of the liver, improve eyesight and regulate cellular immunity. Pharmacological investigations have shown that Flo's chrysanthemum exhibits antibacterial, antioxidant, anti-inflammatory, and heart-protective characteristics. Previous phytochemical studies on caffeic acid derivatives, flavonoids, triterpenoids, glycosides and alkaloids have been isolated from Flo's chrysanthemum. In this study, chrysanthemum cultivars were evaluated in terms of having secondary compounds and desirable medicinal properties, as well as antibacterial effects to introduce superior cultivars and purposeful planning for breeding research. The purpose of the present study, 25 cultivars of *C. morifolium* were compared in terms of essential oil content, leaves total phenolic, flavonoid and antioxidant activity. In this experiment, 25 chrysanthemum cultivars were studied in terms of essential oil percentage, antioxidant index, total phenol and flavonoid content and antibacterial effects in a randomized complete block design in Lorestan University research farm in the year 2016. Essential oil was extracted from dried flowers in the shade using a Clevenger apparatus for 3 hours. Evaluation of antioxidant activity of the extract was measured by DPPH method based on the method of Kulisic et al. (2004). The amount of flavonoids was measured by aluminum chloride and total phenol by Folin - Ciocalteu reagent colorimetric. Ward analysis was done to classify the cultivars. The results of analysis of variance showed that the studied chrysanthemum cultivars had significant differences in terms of all studied phytochemical traits. According to the obtained results, among different cultivars, the total amount of phenolic compounds is between 14.52-47.90 mg.g<sup>-1</sup> dry weight, the total flavonoid content is between 11.59-55.62 mg.g<sup>-1</sup> DW and IC<sub>50</sub> index varied between 83.92 and 257.43 µg/ml. The highest amount of total phenol was present in Avadis and Dila cultivars (45.86-47.90 mg.g<sup>-1</sup> dry weight), while Yasamin cultivar (14.52 mg.g<sup>-1</sup> DW) had the lowest amount. Also, in terms of total flavonoid content, Golnar and Farahnaz cultivars had the highest total flavonoid content with 55.62 and 53.01 mg quercetin/g DW, respectively. Cluster analysis divided all studied cultivars into five groups. The percentage of essential oil among different cultivars varied between 0.41 to 0.62% and a high variability was observed in terms of the amount of essential oil in the studied cultivars. The highest percentage of essential oil was related to Farhnaz and Elmira2 cultivars. In general, the results showed high antioxidant activity of most cultivars. Therefore, chrysanthemum extract can be introduced as a suitable source of natural antioxidants. Also in this study, Paridokht, Sana and Ashraf cultivars were studied in terms of antioxidant and antibacterial index and Farahnaz and Elmira 2 cultivars appeared superior to other cultivars in terms of essential oil production. Hedaei *et al.* (2018) studied evaluation of some bioactive compounds and antioxidant activity of leaf methanolic extract and flower essential oil content from different cultivars of *Chrysanthemum morifolium*, in this review, total phenol and flavonoid contents and IC<sub>50</sub> values in different cultivars were ranged from 17.63-33.20 mg.g<sup>-1</sup> DW, 12.62-53.17 mg quercetin.g<sup>-1</sup>, and 54-228 µg/ml respectively. The highest phenolic content was in cultivar "Poya3" (33.20 mg.g<sup>-1</sup> DW), whereas the cultivar "Sahand2" (17.63 mg.g<sup>-1</sup> DW) contained the lowest value. Also, in terms of total flavonoid content, cultivars "Marmar" and "Sahand 2" had the highest and the lowest flavonoids with 53.17 and 12.62 mg quercetin per gram, respectively. The results of the present study indicate a significant difference between different cultivars in terms of the total amount of phenolic, flavonoid and antioxidant compounds that the existence of such diversity can be the role of cultivar and genetics in the production of these compounds. According to the results of this study, chrysanthemum cultivars with desirable levels of phenolic and flavonoid compounds can be used as a source of natural antioxidants as an alternative to synthetic antioxidants. In this study, Sana, Paridokht and Ashraf cultivars appeared superior to the existing genotypes in terms of phytochemical and antibacterial traits. The results of this study can be used to select the correct parents for purposeful crosses in subsequent chrysanthemum breeding programs in order to improve the phytochemical traits of existing cultivars.



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Poster Presentation ID: 124

### How Ecological Factor of Elevation Can Effect on Essential Oil Composition of *Echinophora platyloba*?

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#### ARTICLE INFO

##### Keywords:

Essential oils  
Ecological effects  
*Echinophora platyloba*  
Elevation  
Iran

#### ABSTRACT

*Echinophora platyloba* DC. with different medical and dietary application, belongs to Apiaceae family and is growing in different regions of Iran. Due to intensive aroma, the plant is well known in traditional medicine and local dairy industries as a natural preservative. Habitat elevation as an important ecological factor is directly affects in essential oil composition and therefore on medical properties of plants. Some researches were carried out previously on the EOs of plant in various parts of Iran [1, 2]. There is no previous report about the effect of ecological factors on EOs composition of plant. So identifying the EOs components of *E. platyloba* in different elevations was subjected in this study for the first time. The aerial parts of plants were collected from natural habitats and dried in room temperature. Plant samples were identified carefully using valuable Floras. They were deposited at the herbarium of Institute of medicinal plants (IMPH). EOs were extracted by water distillation method using Clevenger apparatus and finally the compounds were identified by GC/MS instrument. Results were demonstrated that the major effect of elevation observed in increasing amount of beta-Ocimene monoterpene component. It was calculated as 38.9 % in 1350 m, 71.2 % in 1900 m and 81.5 % in 2300 m elevation above the sea level. This component is important in pharmaceutical and industrial uses of plant. Anticonvulsant, antifungal and antitumor activity and also usage in food industries as flavor are mentionable here. It is obvious that ecological changes have a great role in EOs production of plant. It was also demonstrated that increasing in habitat elevation is in direct correlation with production of main compound of EOs and therefore it can be useful for agricultural, food and pharmaceutical industries.

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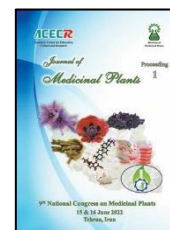
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Poster Presentation ID: 125

### Application of Medicinal Plants in Remedy of Cardio-Vascular Diseases in Larijan District of Amol

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#### ARTICLE INFO

##### Keywords:

Ethnobotany  
Traditional medicine  
Iran

#### ABSTRACT

Medicinal plants are important elements in medical system [1]. Larijan County is a traditional and historical region situated in Amol District of Mazandaran province in North of Iran. Larijan area is an important region located in this county and the traditional usage of plant species is commonly observed in the region. Nowadays Cardiovascular diseases are regarded as one of the most killer agents in the world [2]. An Ethnobotanical study of plant used for the treatment of these diseases was carried out in the studied area. The study revealed 18 plant species that are used for the treatment of heart disease, Regulation (increase or decrease) in blood pressure, Strengthen of heart, Regulation of heart beat and blood purifier. These plants belong to 17 genera and 8 families. Rosaceae with 6 species, Lamiaceae with 4 species and Boraginaceae with 2 species are the most abundant and important families respectively. 50% of the plants were used for the management of regulation of blood pressure, 28% as blood purifier and 17% for the Strengthen of heart. The most commonly utilized portions of plants for healing purposes include the leaves and fruits. Other part used are roots, stems and seed. The methods of preparation often employed are infusions and decoctions. According to our research the significance reduction of ethnobotanical information have been observed in the area studied. Therefore the comprehensive research surveys in the area are necessary to finding and documenting more useful species.

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Poster Presentation ID:

### Metabolic Profiling of Two Potential Sources of Galbanum: An NMR-based Metabolomics Study

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#### ARTICLE INFO

Keywords:

<sup>1</sup>H-NMR metabolomics

Barijeh

Chemotaxonomy

*Ferula galbaniflua*

*Ferula gummosa*

#### ABSTRACT

*Ferula gummosa* Boiss. and *Ferula galbaniflua* Boiss. & Buhse (Apiaceae) are two important Iranian source of Galbanum (barijeh). According to a phylogenetic analysis of the nrDNA ITS sequence and the Flora Iranica, *F. gummosa* has been considered as a synonym of *F. galbaniflua*. However, *F. galbaniflua* and *F. gummosa* have different metabolic patterns. So to discriminate these species metabolic profiles of these species samples were study with <sup>1</sup>H-NMR-based metabolomics. The result showed a clear separation between the two species (Ligupersin A and conferdione and high level of mogoltacin were significantly detected *gummosa*, and high level of feselol and sterol compounds were significantly detected in *F. galbaniflua*) that related to the quantity and diversity of their metabolites. Our findings indicate that clear metabolomics discrimination of *F. gummosa* and *F. galbaniflua* makes their chemotaxonomic classification possible.

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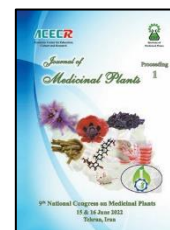
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## 9<sup>th</sup> National Congress on Medicinal Plants

15 & 16 June 2022  
Tehran, Iran



Poster Presentation ID: 128

### Fatty Acid Compositions of Two Walnut (*Juglans regia* L.) Cultivars Grown in Iran

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#### ARTICLE INFO

Keywords:

Walnut

*Juglans regia* L

*Carya illinoensis*

Fatty acids

Fixed oil

#### ABSTRACT

Walnuts are good sources of unsaturated fatty acids (USFAs) which have beneficial effects such as proper growth, decreasing coronary heart disease, prevention of several kinds of cancer, and anti-inflammatory [1]. The objective of this study was to compare the fatty acid and oil content of Jamal walnut cultivar and Pecan walnut (*Carya illinoensis* (Wangenh.) K. Koch). The fixed oil content was measured by soxhlet extraction. The fatty acid compositions in two walnuts were derivatization and determined using a GC-FID coupled with a flame ionization detector. According to the results, the total oil content of Pecan walnut (61%) was about twice of Persian walnut (31%) (Table 1). Although the amount of saturated fatty acids in the two walnuts are almost equal, unsaturated fatty acids in Pecan walnut are 19% higher than in Persian walnut which is mainly due to the linoleic acid (42%) in Pecan walnut. Due to the higher oil content of Pecan walnut and its enrichment of unsaturated fatty acids and the compatibility of this species with hot weather conditions, this species is a good candidate for cultivation in Iran.

No	Fatty acid	FA Type	C No.	Persian walnut (%)	Pecan walnut (%)
1	Pentadecanoic acid	SFA	C15:0	0.15	0
2	Palmitic acid	SFA	C16:0	11.52	12.29
3	Palmitoleic acid	UFA	C16:1ω7	0.78	0.25
4	Margaric acid	SFA	C17:0	0	0.21
5	Stearic acid	SFA	C18:0	31.26	29.20
6	Oleic acid	UFA	C18:1	6.47	6.76
7	Linoleic acid	UFA	C18:2ω6	24.04	42.31
8	Gondoic acid	UFA	C20:1ω9	1.12	2.18
<b>Total Saturated Fatty Acid</b>				42.93	41.70
<b>Total Unsaturated Fatty Acid</b>				32.41	51.5
<b>Fixed Oil</b>				31.5	61.1

Table 1. The total oil contents of Pecan walnut and Persian walnut

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### Biopesticide Formulation Based on Neem Oil and Cinnamon Oil

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#### ARTICLE INFO

##### Keywords:

Neem oil  
Cinnamon oil  
Biopesticide  
Mite

#### ABSTRACT

Due to the fact that chemical pesticides are very dangerous for human health and the environment, plant pesticides can be a suitable alternative to them. Among the numerous ingredients of plants studied, compounds from the neem tree, *Azadirachta indica* [1], and Cinnamon oil [2], *Cinnamomum verum J.*, have attracted the special interest of entomologists and phytochemists all over the world. *Azadirachta indica* is a tree belonging to the Meliaceae family and its centers of origin lie in southeastern Asia. Cinnamon essential oil consists of a higher concentration of beneficial chemical compounds and is one of the best-known materials with bioactivity against insects. Biopesticides are a form of pesticides that has gained considerable traction over the past few decades as the movement towards sustainable agriculture has intensified. Their main benefit, as compared to conventional synthetic pesticides, is that they control the proliferation of pests on a crop or in an agricultural field through non-toxic mechanisms. As a result, they do not harm the crop and even if they remain on the crop surface, they can be easily metabolized by the body, since they do not contain any chemicals. Biopesticides formulation is a mixture of bioactive ingredients which effectively controls a pest. Formulating a pesticide involves processing it to improve its storage, handling, safety, application, or effectiveness. Since one of the most common farms and greenhouses pests is two-spotted mite, we prepared an 10% emulsifiable concentrate (EC) based on the neem oil and cinnamon essential oil biopesticide called NC-BP. Stability tests were performed on this formula according to the CIPAC reference. The amount of active substance, pH value and emulsion were stable before and after thermal condition tests. The NC-BP efficiency was about 70%, at a concentration of 3%, it caused 67.3 mortality in mites. According to the toxicology tests results, the LD<sub>50</sub> of the NC-BP in the acute oral toxicity test was determined as 1760 mg/kg, and acute dermal toxicity was more than 2000 mg/kg. The herbal formulation was extremely effective in controlling adult two-spotted spider mites. The outcomes of this study offer that a plant-based pesticide with less toxic than chemical pesticides and more compatible with the environment.

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Poster Presentation ID: 130

### Optimization of Ultrasonic Bath Pre-treatment to Essential Oil Isolation of Spearmint

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Spearmint Ultrasonic Optimization RSM</p>	<p>Essential oils, produced by the secondary metabolic pathways are one of the main drivers of the medicinal properties of plants [1]. This study aimed to optimize the temperature and time duration of ultrasonic bath (UB) pre-treatment using central composite design (CCD) followed by conventional hydro-distillation. The CCD of the response surface method included a full or fractional factorial design with center points that are improved with a group of star points [2]. The two numeric factors were temperature (30-80) and time duration (1-30 minutes) of UB. The results showed that the temperature had an inverse effect on spearmint essential oil (SEO) extraction yield. More time in the UB process resulted in a more SEO yield. The results also revealed that the optimized conditions were as follows: UB temperature: 37.3 °C and UB time: 5.2 minutes. A 2FI model was also fitted for the dependent and independent variables. The following equation was obtained for the SEO yield, predicted <math>R^2 = 0.7773</math> and adjusted <math>R^2 = 0.9002</math>: <math>Y = + 0.5708 - 0.0891A + 0.0256B + 0.0483AB</math> (Y: SEO percentage, A: UB temperature, and B: UB time). The SEO yield increased about 19.7% in one of the experiment runs in comparison to the control. The content of oxygenated monoterpenes was higher in the SEO of the treated samples in comparison with the untreated sample. Carvone, as a main component of SEO, was also increased by 2% (36.95% in control and 38.93% in UB treated sample), while limonene (the second major component) was lowered by about 2% too using UB pre-treatment.</p>

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Poster Presentation ID: 131

### Encapsulation of Enriched Olive Leaves Extract (عنوان با عنوان اکسل، متفاوت است)

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#### ARTICLE INFO

##### Keywords:

Olive leaf  
Encapsulation  
Nano spray dryer  
Natural polymers  
Polymer coatings

#### ABSTRACT

Olive leaves have had many therapeutic applications in traditional medicine since ancient times. Scientific studies confirm the existence of therapeutic properties including cardiovascular protective properties, antioxidant, anti-inflammatory and antifungal properties, attributing these properties to existing compounds such as oleuropein, tyrosyl, hydroxytyrosol, luteolin-7-glucoside, apigenin-7. Glucoside. Among them, oleuropein is the most abundant compound in olive leaf extract. Due to the structural properties of oleuropein, which falls in the class of Secoiridoids, it is unstable in acidic environment. The use of nanocarriers to maintain the structure of this compound in the gastrointestinal tract and improve its effectiveness is one of the methods available in scientific sources and pharmaceutical industry. The purpose of this project was to select a suitable method for encapsulating olive leaf extract and increase its stability and effectiveness. For this purpose, whole olive leaf extract was concentrated using HP-20 macroporous resins to double its effective compounds. The enriched extract was then encapsulated using liposomal carriers. For this purpose, liposomes were prepared using phospholipids and thin layer hydration method and converted to nano-liposomes with a size of 98 nm by sonic probe device. Given that liposomes are essentially unstable systems, polymer coating method was employed to stabilize them. The natural polymer of chitosan was used as the coating layer on the nano-liposomes. Due to the susceptibility of natural polymers to ambient pH, they are suitable for targeted release in the gastrointestinal tract. Therefore, alginate polymer, which is hydrolyzed in the alkaline environment and is suitable for release in the intestinal environment, was selected as the second polymer layer. Using a nano spray dryer, the nanoparticles were coated with alginate polymer. To evaluate the effect of polymers on the rate of release, alginate with different concentration (0.1, 0.2, 0.5 and 1%) were used. In terms of release, the behavior of the formulations in the gastric environment was investigated at pH = 1.2 for 2 hours and in the intestinal environment at pH = 6.8 for 6 hours. In vitro tests were also performed on the formulations. Finally, one of the formulation, which had a release in the intestinal environment, was selected as the most optimized formulation.



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Poster Presentation ID: 132

### Optimization of Water/Material Ratio and Ultrasonic Bath Pre-treatments of Spearmint Essential Oil Isolation

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#### ARTICLE INFO

##### Keywords:

Spearmint  
Carvone  
Ultrasonic  
RSM  
Water/material

#### ABSTRACT

Spearmint (*Mentha spicata* L.) is an annual plant from the Lamiaceae family, widely distributed in many parts of the world [1]. The essential oil of spearmint (SEO) has anti-aflatoxigenic, antifungal, and insecticidal properties. Because of its useful properties, it has great value in the food industry [2]. Carvone, limonene, linalool, 1,8-cineole, and dihydrocarveol are the main constituents of SEO [3]. In the current study, the pre-treatments of water/material ratio (w/m) and ultrasonic bath (UB) were subjected to the design of an optimization experiment including both of them, followed by hydro-distillation. The central composite design of the response surface method was used for the design of the experiments. The independent variables included w/m (10-40), UB temperature (30-80°C), and UB processing time (1-30 min.). The linear model was fitted and the following equation was obtained for the treated EOs yield, predicted  $R^2 = 0.8263$  and adjusted  $R^2 = 0.8754$ :  $Y = + 0.6980 + 0.0619A + 0.2603B - 0.1663C$  (Y: SEO percentage, A: w/m ratio, B: UB temperature and C: UB time). The results also showed that the optimized conditions were as follows: 33.9 w/m, 69.9 °C of UB temperature, and 6.9 minutes of UB time. *Iso*-Menthone content was raised using the pre-treatments but the amount of carvone, as the major component of SEO was decreased.

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Poster Presentation ID: 134

### The First Report of Key Pests and Diseases of Artichoke in Iran

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#### ARTICLE INFO

#### ABSTRACT

Artichoke, *Cynara scolymus* L. is a plant of the Asteraceae family with special advantages such as wide adaptation to Iran's climatic conditions, significant yield potential, low production cost, low expectations in terms of agricultural needs and environmental factors (1). This plant is used to control diabetes and hyperlipidemia. The most important known pests of artichokes in the world are as follows. 1- Sucking pests: including aphids (*Aphis fabae*, *Myzus persicae* and *Capitophorus elaeagni*), bugs (*Proba californica*), and spider mites (*Tetranychus urticae*); 2. Leaf- and bud- borer pests: including moths (*Platyptilia carduidactyla*, *Stigmene acrea*), weevil (*Otiorthychus cribricollis*), and leaf miner (*Phytomyzus syngenesiae*); 3- Crown and root pests: armyworms (*Peridroma saucia*) (2). The most important known diseases of artichoke in the world are: 1- Soil-borne diseases: fungi (*Verticillium dahlia*); 2- Fungal diseases of the aerial parts: including powdery mildew (*Leveillula taurica*), fungi (*Ramularia cynaragi*, *Botrytis cinerae*); 3- Bacterial diseases: crown rot (*Erwinia chrysanthemi*); 4- Viral diseases: curly dwarf; 5- Physiological disorder: black tip. (2). In Isfahan province, Iran the cultivation of this plant was done in two research stations of Kabutarabad and Golpayegan during 2019- 2020 and during the growth period, its key pests and diseases were studied and identified as follows: 1- Aphids: Two species of aphids named Black bean aphid (*Aphis fabae*) and artichoke aphid (*Capitophorus elaeagni*) were collected. The highest population density belonged to the second species, which is a specific pest of artichoke. This pest produces a lot of honey and causes general weakness of the plant, deformity and eventually wilting of the plant. 2- Crown rot: during surveys rotted and wilted plants were inspected and cultured on nutrient media. *Dickeya chrysanthemi* (formerly *Erwinia chrysanthemi*) has been identified as the pathogen. The bacterium is a serious pathogen on artichoke in the world, causing plant stunting and crown rot, and eventually plant death. This is the first report of pests and diseases of artichoke in Iran.

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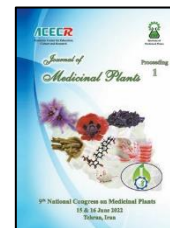
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Poster Presentation ID: 136

### Extraction, Characterization and Biological Activity Study of *Viola spathulata* Cyclotides

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#### ARTICLE INFO

*Keywords:*

Cyclotides

*Viola spathulata*

Anticancer effects

Purification

#### ABSTRACT

Cyclotides are a group of plant polypeptides that often contain 28 to 37 amino acids. These compounds are an appropriate choice for drug design as well as a mold for drug delivery due to their cyclic structure and unique stability against chemical, thermal and biological agents [1]. All species of the violet family have been shown to contain cyclotides [2, 3]. *Viola spathulata*, an Iranian violet species, is geographically unique to Iran and grows wild in the foothills of the Alborz and the forests of Gilan. Therefore, this study aimed to extract and identify natural cyclotides in *Viola spathulata* and investigate their biological activity. To fulfil this goal, firstly, the *Viola spathulata* plants were collected during the flowering stage and extracted using methanol-dichloromethane solvent (1:1 v/v) with maceration method. For initial purification, liquid-liquid extraction was performed to collect polar partition using H<sub>2</sub>O (1:1 v/v). Then, the aqueous partition was applied on C<sub>18</sub> solid-phase and fractionated using 50% and 80% ethanol. Preparative liquid chromatography (HPLC) was also used for the final purification of cyclotides of each fraction. Finally, the biological effects of the obtained fractions were evaluated against carcinogenic cell lines. According to mass spectrometry results, 2800 to 3500 molecular weights were observed which proved the presence of cyclotides. 15 different fractions were purified using the preparative HPLC method from 50% and 80% fractions. In addition, the cytotoxic assay showed the cyclo-peptides have considerable anticancer properties against three cancer cell lines including PC-3, A549 and MCF-7.

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### Study of Seaweed, Lignin, and Tea Compost Effect on Crocin, Picrocrocin, and Safranal Contents and Some Phytochemical Traits in Saffron Petals and Stigmas (*Crocus sativus* L.)

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Crocin Organic fertilizer Safranal Seaweed</p>	<p>Saffron (<i>Crocus sativus</i> L.) is a perennial plant belonging to the Iridaceae family and is one of the world's most valuable agricultural and medicinal species. This study aimed to investigate the effect of organic compounds on total phenols and anthocyanins in stigma and petal tissues and total safranal, total crocin, and total picrocrocin in stigma tissue based on a randomized complete block design with four replications in Kashmar city and Gorgan University of Agricultural sciences and natural resources. Treatments include: Kelp seaweed extract (0, 1, 2, 3 mg.l<sup>-1</sup>), tea compost (0, 200, 300, 400 mg.l<sup>-1</sup>) and lignin (0, 500, 1000, 1500 mg.l<sup>-1</sup>). The analysis of variance showed that the effect of seaweed, lignin, and tea compost on the measured traits was significant at the level of one percent except picrocrocin. Based on the comparison results, the highest average of total safranal (10.21%) was observed in 200 mg.l<sup>-1</sup> of tea compost treatment. Consumption of 200 mg.l<sup>-1</sup> of tea compost, either single or in combination with two other treatments, had a positive effect on increasing total safranal. In the case of crocin, no difference was observed between most treatments, and the treatment of 1500 mg.l<sup>-1</sup> of lignin (24.47%) increased crocin with a little difference. The highest amount of total stigma phenol (6.75 mg.g<sup>-1</sup>) was observed in 3 mg.l<sup>-1</sup> of seaweed. The highest amount of total petal phenol (21.1 mg.g<sup>-1</sup>) was recorded in the interaction of 150 mg.l<sup>-1</sup> of lignin, 3 mg.l<sup>-1</sup> of seaweed, and 400 mg.l<sup>-1</sup> of tea compost. Also, the highest level of stigma anthocyanin (0.07 mg.g<sup>-1</sup>) was in the control treatment. The highest amount of petal anthocyanin (0.42 mg.g<sup>-1</sup>) was seen in 2 mg.l<sup>-1</sup> of seaweed treatment. The effect of treatments on petal anthocyanin content was much greater than stigma anthocyanin. In general, seaweed, lignin, and tea compost fertilizers, either individually or in combination, positively affected the saffron plant. Due to the economic importance of this plant, the use of more than Biological and organic fertilizers and replacing them with chemical fertilizers will have better effects on our agriculture. [1, 2].</p>

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Poster Presentation ID: 138

### Enrichment of Comfrey Extract using Macro-Porous Resins and Optimization of Resin Parameters

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#### ARTICLE INFO

##### Keywords:

Macroporous Resins  
Rosmarinic Acid  
Pyrrolizidine Alkaloids  
Optimization  
HPLC-UV

#### ABSTRACT

In this study, the performance of macroporous resins (DM-130, LXA-880, LSD-001, LXA-10, HP-20, LXA-17) was evaluated for the enrichment of rosmarinic acid and removal of pyrrolizidine alkaloids in comfrey plant. According to performed analyzes with mentioned resins, LSD-001 was selected in line with the purpose of this project and then the adsorption and desorption processes were optimized to achieve maximum enrichment efficiency. Accordingly, by using the LSD-001 resin, the amount of rosmarinic acid was enhanced from 11.44 ppm in the initial extract to 75.79 ppm in the desorbed extract, representing a 7-fold increase. In addition, the selected resin has revealed a high capability in phenolic compounds separation from  $46.26 \pm 2.72$  ppm of the primary extract to  $150.95 \pm 0.7$  ppm in the desorbed extract. The obtained results of the total alkaloid test showed that the alkaloid amounts of desorbed extracts from all resins are reduced, but this reduction was more noticeable in LSD-001 resin (0.018 ppm). According to the obtained results, LSD-001 resin was chosen as the selected resin to enrich the phenolic compound of rosmarinic acid and remove alkaloid compounds. And the contact time of 30 min and 30 ml of resin content in 50 ml comfrey aqueous extract and for achieving the maximum percentage of desorption the contact time of 10 min and solvent to resin volume ration of 6 was determined as optimal conditions. Isotherm studies showed that the Langmuir model with  $R^2 = 0.98$  highly fits with the experimental data and proves the multilayering of the adsorption process. Moreover, based on kinetic studies, the adsorption data of rosmarinic acid were correctly adjusted by the pseudo - second-order kinetic model with  $R^2 = 0.98$ . Rosmarinic acid-enriched by HPLC-UV was qualitatively and quantitatively analyzed according to the rosmarinic acid standard. The antioxidant activity was assessed by using the DPPH test and the total phenolic content was determined by using Folin-Ciocalteu method. The total alkaloid and adsorption content were investigated by extracting the alkaloid using chloroform solvent and using a spectrophotometer, respectively.





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## 9<sup>th</sup> National Congress on Medicinal Plants

15 & 16 June 2022  
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Poster Presentation ID: 140

### A Comparative Study of the Effects of Soybean Oil (*Glycine Max*) and Animal Fat on the Stimulation of the Immune Response Caused by Avian Influenza Infection in Broilers

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#### ARTICLE INFO

Keywords:

*Glycine max*

Animal Fat

Immune Response

H9N2

#### ABSTRACT

Soybean (*Glycine max*) extracted fatty acids are precursors of lipid mediators that play an important role in regulating immune response processes. It also acts as an emulsifier and improves fat digestion and absorption, controls fatty liver syndrome, improves health, increases the production of liver lipoproteins, and acts as a natural antioxidant [1]. In current study, five groups of one-day-old broilers (first group: feed with normal diet, second group: feed with diet containing 6% soybean oil, third group: feed with diet containing 6% animal fat, fourth group: feed with diet containing 2% soybean oil and the fifth group: feed with diet containing 2% animal fat) were studied. The H9N2 influenza virus was injected intraocular into all birds twice at 7 and 9 days of age. Serum samples were isolated on the 7th, 10th, and 18th days after virus inoculation before the virus inoculation to check for changes in the virus titer, and were sent to the laboratory for testing for hemagglutination inhibition (HI) [2]. The results showed that in groups where oils were added to the diet at a rate of 6%, the HI test titer of both groups was higher than the control group (Normal diet- Without oil). Meanwhile, the titer of this test in the soybean oil group was higher than the animal fat group. Also, in groups where oils were added to the diet at a rate of 2%, the HI test titer of the group fed soybean oil, was higher than the control group and in the group consuming animal fat was slightly lower than the control group. The performed statistical analysis indicated a significant difference between the groups in determining the HI titer ( $P < 0.05$ ). Finally, the results of this study indicated that the use of vegetable oils, including soybean oil, can increase the activity of the body's inflammatory reactions through high levels of unsaturated fatty acids, compared to animal fats that contain high amounts of saturated fatty acids, and provide stronger immunity to avian influenza in broilers.

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### Therapeutic Effect of Brewed *Hyssopus officinalis* on the Process of Experimental Avian Influenza Infection in Broilers

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#### ARTICLE INFO

Keywords:

Avian Influenza

*Hyssopus officinalis*

Brewed

#### ABSTRACT

*Hyssopus officinalis*, from the Greek word *azob* (sacred plant), is one of the most important medicinal plants which were used in ancient times to flavor soft drinks. Vegetative body of *Hyssopus officinalis* is mentioned as a medicine in most reputable pharmacopoeias. Therapeutic properties of this plant include expectorant in bronchitis and asthma and severe cough. It is also used as an anti-flatulence, anti-colic and antiperspirant in colds and other respiratory illnesses [1]. In this study, two groups of one-day-old broilers were studied with the same diet and breeding conditions (first group: control group, second group: treatment with brewed *Hyssopus officinalis*). The H9N2 influenza virus was injected intraocular into all birds twice daily at 7 and 9 days of age. 3 days after inoculation of influenza virus until the end of the breeding period, the required samples were taken from the air sacs, lungs, heart, kidneys, liver, intestines, proventriculus, trachea and brain after examining the autopsies of birds and were sent to the the laboratory for histopathological examinations[2]. The results of current study indicated that the use of brewed *Hyssopus officinalis* can significantly reduce fatty liver, hypertension, necrosis and inflammation in the liver, reduce inflammation, necrosis and hyperemia in the kidneys, and reduce pathological lesions of hyperemia, bleeding, hemorrhage and Inflammation in the lungs, reduce hyperemia in the trachea, and reduce bleeding, hyperemia, necrosis and inflammation in the heart and reduce inflammation in the brain, intestines and proventriculus compared to the control group. Furthermore, the transparency and health of the airsacs in the group that consumed the brewed *Hyssopus officinalis* were higher than in the control group. Finally, the results of current study indicated that the use of the brewed *Hyssopus officinalis* can reduce the histopathological lesions caused by experimental influenza in broilers.

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Poster Presentation ID: 142

### Antioxidant Activity in Different Extracts of Endemic Species of *Clematis iranica*- a Comparative Study

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#### ARTICLE INFO

Keywords:

*Clematis iranica*  
Endemic Species  
Phytochemical  
investigation  
Iran

#### ABSTRACT

*Clematis iranica* Habibi, Ghorbani & Azizian is an endemic plant of Iran which is recently reported as a new species for the first time in the world. This species is distributed in mountainous parts of Alborz in Iran plateau [1]. The genus *Clematis* is a well-known plant in traditional medicine of other countries, but the Iranian species of the genus are not commonly used until now. Due to some local usages of the species which confronted during in our Ethnobotanical studies we decide to evaluate the phenolic and flavonoid content of the species. Evaluation and comparison of antioxidant activity in five different extracts (Methanol, Hexane, Ethyl-acetate, Butanol and water) of *C. iranica* using two different methods of DPPH radical scavenging activity and FRAP (Ferric-Reducing-Antioxidant power) was subjected as the aim of study. The potential of the extracts for both methods was determined by Gulcin et al. [2] and Crozier et al. [3] methods. The result showed that the DPPH (IC<sub>50</sub> µg/ml) values for plant extracts were 37.00 for Butanol, 52.36 for Ethyl-acetate, 54.14 for Methanol, 230.73 for water and 228.49 for Water and 307.91 for Hexane extracts. Also the reductive potential *C. iranica* in FRAP method (mmol FeSO<sub>4</sub>/g Extract) was found to be in the ascending order of 2.37 Hexane, 2.81 in Water, 4.42 in Methanol, 5.05 in Ethyl-acetate and 8.20 in Butanol. The results showed that the Butanol and Ethyl-acetate extracts of *C. iranica* had the highest antioxidant activity in both evaluated methods and so it is concluded that the major effective phytochemical agents of activity are extracted using these solvents. Therefore, further investigation is required for determination of phytochemical properties of species and its phytochemical strategy in resistance of industrial pollution.

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### Protective Effect of *Hyssopus officinalis* L. Extract on Histopathological Lesions During Infection with Avian Influenza Virus H9N2

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#### ARTICLE INFO

Keywords:

Avian Influenza

Haemagglutination

Inhibition

*Hyssopus officinalis*

#### ABSTRACT

*Hyssopus officinalis* L. (Zoofa) has a long history in tradition medicine of Iran. The purpose of this study was to determine the protective effect of Zoofa extract on histopathological lesions of chickens infected with avian influenza virus H9N2 [1]. Sixty day-old Ross breed broiler chicks were randomly divided into two groups of 30 birds. Group I and II were experimentally challenged with avian influenza virus (H9N2) on day 21. Group I was treated with Zoofa extract in drinking water from day 27 for 6 consecutive days. Group II received no treatment and was positive control. At the end of the study, multiple organs were sampled for histopathological evaluation. Blood sample was taken for haemagglutination inhibition (HI) test [2]. Mean HI titer for group I and II was 4.3 and 4.4 respectively. There was no difference among HI titer between two groups ( $P < 0.05$ ). Major clinical manifestations were coughing, eye dropping, nasal discharge, sinusitis, depression, fluffy hair, in appetite, facial edema and paralysis. No mortality was observed in group I. In group II 10% mortality was recorded. Histopathological lesions in lungs, air sacs, brain, trachea, liver, kidney and spleen were significantly decreased in group I compared to group II. These results suggested the positive impact of Zoofa extract against infection with H9N2 avian influenza virus in broiler chickens. These findings can have beneficial field application in control and treatment of avian influenza.

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Poster Presentation ID: 144

### Improvement of Germination and Seedling Indices of *Lallemantia iberica* L. Under Drought Stress by Hydro-priming Treatments

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#### ARTICLE INFO

##### Keywords:

Germination indices  
Hydro-priming  
*Lallemantia*  
Osmotic Potential

#### ABSTRACT

*Lallemantia* is a medicinal plant of the Lamiaceae family that is used in the textile and pharmaceutical industries, as well as in the treatment of liver, kidney, and neurological diseases [1]. One of the most common and cheapest methods of priming is hydropriming, which the seeds are treated without the use of chemicals and by absorbing water at a specified time, can increase the percentage and speed of seed germination [2]. In order to assess the effect of seed hydro-priming on germination and seedling indices of *Lallemantia iberica* L. under osmotic potential, an experiment was conducted as a factorial using a randomized completely design with four replications. Experimental factors included hydro-priming (H) in four levels (0, 2h, 4h, and 6h) and three levels of drought stress. (0, -0.6 and -1.2 MPa imposed by PEG 6000). The results showed that the influence of hydro-priming, drought stress, and their interaction were significant on germination percentage, germination rate, seedling length, and seedling vigor index. The highest germination percentage (91.11%), germination rate (12.13 seeds.d<sup>-1</sup>), and seedling vigor index (2.27) were obtained from the interaction treatment of 6h-H at 0 MPa. The maximum seedling length (2.53cm) was related to 4h-H at 0 MPa. The lowest germination percentage (16.66%) and germination rate (2.15 seed.d<sup>-1</sup>) were allocated to the 2h-H at -1.2 MPa and 0-H at -1.2 MPa treatments, respectively. Also, the minimum seedling length (1.80 cm) and seedling vigor index (0.30) were related to 0h-H at -0.6 MPa and 2h-H at -1.2 MPa treatments, respectively. In this experiment, the best treatment was 6h-hydropriming, which was able to increase germination indices of *L. iberica* under stress and optimal conditions.

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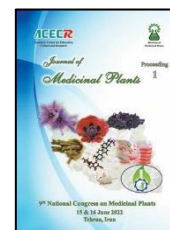
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Poster Presentation ID: 145

### The Effect of Different Forms of the Hyssop Medicinal Plant (*Hyssopus officinalis*) in Improving Respiratory Symptoms Caused by Experimental Avian Influenza (H9N2) Infection in Broilers

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Microencapsulation Anthocyanin Spray drying Saffron petal</p>	<p>Hyssop with the scientific name of <i>Hyssopus officinalis</i>, is a woody and perennial plant with various medical properties such as: Expectorant discharge in bronchitis and asthma, anti-flatulence and anti-colic and stimulants for colds and flu, breast ointment in bronchitis and coughs Intense which has been used for a long time. Also, the active ingredients of Zoofa plant reduce inflammation in various organs [1]. In present study, 4 groups of one-day-old broilers with the same diet and breeding conditions (first group: control group, second group: treatment with drinking brewed Zoofa plant, third group: spray treatment with Zoofa plant, fourth group: treatment with drinking extract of Zoofa plant) were studied. The H9N2 influenza virus was injected Intraocular into all birds twice at 7 and 9 days of age. After inoculation of the virus and daily examination and recording of clinical symptoms of influenza, on the 18th day of breeding in most broilers, clinical signs of respiratory system including cough, hoarseness, sneezing and lethargy were observed. Treatment with various forms of Zoofa plant (sprayed, brewed and drink extract) started on the 18th and lasted for 6 days and in 3 times a day [2], all the clinical symptoms of the respiratory system were recorded and the significance of all data was examined by SPSS software at a significantly lower level than 0.05. The data from present study indicated that all clinical symptoms in groups that used different forms of the plant as a treatment were less than the control group. In the study of different forms of Zoofa plant, the therapeutic form of the plant as a spray had more significant effects than the reduction of respiratory clinical symptoms caused by influenza. Finally, the results of current study indicated that the use of the spray form of Zoofa plant can significantly reduce the clinical symptoms of experimental influenza in broilers.</p>

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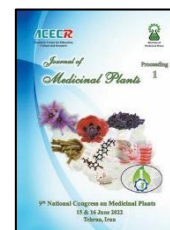
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Poster Presentation ID: 146

### Therapeutic Effect of Soybean Oil (*Glycine max*) and Animal Fat on the Process of Experimental Avian Influenza (H9N2) in Broilers

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#### ARTICLE INFO

Keywords:

Soybean  
Animal Fat  
Influenza

#### ABSTRACT

Soybean (*Glycine max*) is originally from the legume family, and because of its partial resemblance to cereals, it is assigned in the cereal family in some Western countries. Soybean oil has several benefits compared to other oils. The extracted oil has a high unsaturated surface. The fatty acids extracted from soy are precursors to lipid mediators which play an important role in regulating inflammatory processes [1]. In current study, 3 groups of one-day-old broilers (first group: normal diet, second group: diet containing 6% soybean oil and third group: diet with 6% animal fat) were studied. The H9N2 influenza virus was injected Intraocular into all birds twice daily at 7 and 9 days of age. 3 days after inoculation of influenza virus until the end of the breeding period, the required samples were taken from the air sacs, lungs, heart, kidneys, liver and intestines. After examining the autopsies of birds and were sent to the laboratory for histopathological examinations. The results of current study indicated that the use of soybean oil in the diet can reduce inflammation and bleeding in the liver, reduce hyperemia in the kidneys, reduce hyperemia and bleeding in the lungs, reduce edema and hyperemia in heart tissue and reduce damage to intestine tissue compared to the control group and the diet group containing animal fat. Furthermore, the transparency and health of air sacs in both diets groups containing soybean oils were higher than in the control group. Finally, the results of this study indicated that the use of soybean oil can reduce the histopathological lesions caused by experimental influenza in broilers.

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### Enhancing Oxidation Stability and Anti-cancer Activity of Essential Oil Nanoemulsion: A Study to Decipher the DNA Binding Affinity of EO Components Via In vitro and in Silico Investigations

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#### ARTICLE INFO

##### Keywords:

Apple pectin  
ZEO  
Nanoemulsion  
Breast cancer  
Apoptosis;  
DNA  
damage

#### ABSTRACT

ZEO (*Zataria multiflora* Essential Oil) is a natural complex of compounds with a high apoptotic potential against breast cancer cells and minor toxicity to normal cells, however, similar to many EOs, ZEO utilization in pharmaceutical industries has limitations due to its labile and sensitive ingredients. Nanoemulsification using natural polymers is one approach to overcome this issue. In this study, extracted ZEO by hydrodistillation were first characterized by GC/MS analysis and then an Apple Pectin-ZEO nanoemulsion (AP-ZEONE) was prepared and its FTIR spectra and physical properties were characterized. Furthermore, it was shown that AP-ZEONE substantially suppresses the viability of MDA-MB-231, T47D, and MCF-7 breast cancer cells. AP-ZEONE significantly triggers apoptotic morphological variations and DNA fragmentation confirmed by fluorescent staining and Tunnel assay. Moreover, AP-ZEONE induced apoptosis in MDA-MB-231 cells by loss of the mitochondrial membrane potential ( $\Delta\Psi_m$ ), associated with the accumulation of Reactive Oxygen Species (ROS), G2/M cell cycle arrest and DNA strand breakage as flow cytometry, DNA oxidation and comet assay analysis revealed. Spectroscopic and computational studies also confirmed that AP-ZEONE interacts with genomic DNA in a minor groove/partial intercalation binding mode. This study demonstrated the successful inhibitory effect of AP-ZEONE on metastatic breast cancer cells, which may be beneficial in the therapy process.





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### Metabolite Profiling of Propolis and Pollen Grain from Various Regions of Iran

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#### ARTICLE INFO

##### Keywords:

Propolis  
Pollen-Grain  
Authenticity

#### ABSTRACT

Propolis is a resinous substance that has some biological properties such as anti-tumor, antioxidant, antimicrobial, anti-inflammatory, and immune-boosting effects. Pollen grain, called the only complete food, contains all the essential amino acids as a dietary supplement and some bioactive compounds to strengthen the immune system. It seems that determining of authenticity and health of honey by-products and their metabolite profile is important [1-2]. In this study, 15 samples of propolis and 15 samples of pollen grains were collected from different regions of Iran. The content of secondary metabolites, such as phenolic compounds of propolis and pollen grains, was identified using HPLC. Antioxidant assay (DPPH) was also used to differentiate between propolis and pollen grains of different regions. In addition, due to the high protein content of pollen grains, the Bradford test was used. According to HPLC analysis and anti-oxidant assay of propolis and pollen grain samples with the same origins, it can be concluded that propolis samples have contained more phenolic constituents than pollen grain ones. Also, among the propolis samples with different origins, west Azarbayejan and Shahreza showed the lowest IC<sub>50</sub> (range 50-60 ppm) in the antioxidant test. In addition, the dendrogram of hierarchical clustering analysis (HCA) of phenolic compounds profiles, revealed the closest cluster of these two cities' propolis samples. Also, the results of the pollen grain dendrogram showed that the samples of 15 areas are divided into 2 clusters and the effect of vegetation on the diversity of compounds in pollen grains is clear. In conclusion, more differences between samples metabolite with various origins could be the best marker for choice and introduces the proper sample for industrial and medicinal applications.

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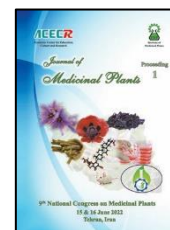
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### Calcium and Melatonin Synergistically Modulate the Production of Phenolic Compounds in *Dracocephalum kotschy* under Salinity Stress

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#### ARTICLE INFO

Keywords:

*Dracocephalum*

*kotschy*

Melatonin

Calcium

Salt stress

Rosmarinic acid

#### ABSTRACT

Calcium (Ca<sup>2+</sup>) and melatonin (Mel) as multifunctional molecules have regulatory roles in the induction and production of secondary metabolites. Also, crosstalk between Ca<sup>2+</sup> and Mel triggers defensive responses against stresses in plants [1, 2]. In this study, the interplay between Mel and Ca<sup>2+</sup> in four genotypes of *Dracocephalum kotschy* Boiss. (Bojnord, Urmia, Fereydun Shahr, and Semirom) under both control and salinity stress conditions in a pot experiment was investigated. After the exogenous application of 5 mM Ca<sup>2+</sup> and 100 μM Mel, the salinity stress (75 mM NaCl) was implemented on 60-day-old seedlings for 4-weeks in the greenhouse. Exogenous application of Ca<sup>2+</sup> and Mel on seedlings improved biomass, total phenolic content, gallic acid, caffeic acid, and rosmarinic acid content, and DPPH scavenging capacity in the leaves of four genotypes of *D. kotschy* under both normal and salinity conditions. However, a combined application of Mel and Ca<sup>2+</sup> was more efficient than single applications under both normal and salinity conditions. The results also showed that pre-treatment with Mel and Ca<sup>2+</sup> increased biomass, total phenolic content and DPPH scavenging capacity but the degree of enhancement of biomass, total phenolic content and DPPH scavenging capacity in Fereydun Shahr genotype was higher than the other genotypes. Under both normal and salinity stress conditions, the highest rosmarinic acid content was produced by the application of 100 μM Mel and 5 mM Ca<sup>2+</sup> in Bojnord genotype and the highest gallic acid and caffeic acid content was observed in Semirom genotype.

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15 & 16 June 2022  
Tehran, Iran



Poster Presentation ID: 150

### Antibacterial Activity of Three Species of *Fumaria* L. in Iran

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#### ARTICLE INFO

Keywords:

*Fumaria*

Antibacterial Activity

Ethnopharmacology

Plant extracts

#### ABSTRACT

Fumitory plant is one of the native medicinal plants and weeds of Iran that has many medicinal effects. *Fumaria* L. species have often been known in traditional medicine as antihypertensive, liver protector, blood purifier, and effective in the treatment of some skin diseases. The genus *Fumaria* has been identified in Iran with 8 species. Although this medicinal plant has significant applications in Iranian traditional medicine, so far limited research has been done to investigate the therapeutic properties of the species available in Iran. This study aims to investigate antimicrobial effects of three species of *Fumaria* in Iran. To prepare the extracts, branches obtained from different species of the genus *Fumaria* were stored in a dry shade after identification and kept in a dry place. Samples were turned into small pieces and powdered by a grinder. Next 100 g of dried plant powder is mixed in 1 liter of hydroalcoholic solvent and extracted by maceration method. The extract was filtered and concentrated using a rotary evaporator. Antibacterial activity of hydroalcoholic extracts of three *Fumaria* species was verified by the agar well diffusion method and by determining the MIC (Minimum Inhibitory Concentration) and MBC (Minimum Bactericidal Concentration). To do so, the extracts were prepared. Inoculum including each bacterial culture to be tested spread on nutrient agar plates with a sterile cotton swab. Next, wells were pierced to the agar medium and filled with different concentrations of extracts, and negative control was allowed to diffuse at room temperature. Then plates for each bacterial culture were incubated and the diameter of the growth inhibition zone around each well was calculated by marking with an accuracy of 1 mm and all results were noted. The results show that, the highest amount of MIC was calculated for *F. asepala* against *Klebsiella pneumoniae*, while the lowest MIC was found for *F. Vaillantii*. And *F. asepala* on *Escherichia coli*. These results are consistent with the findings obtained from the test on these bacteria under the effects of the desired hydroalcoholic extracts. As MIC is defined as the lowest concentration of the antimicrobial agent that inhibits visible growth and the MBC is the minimum concentration of the extract that kills the bacteria. Therefore, it can be concluded that *F. Vaillantii* has the highest antibacterial effect and *F. parviflora* has the lowest antibacterial effect in this study. [1,2,3].

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Poster Presentation ID: 151

### Synthesis and Characterization of Electrosprayed Silymarin Loaded Polymeric Micro/Nano Particles for Application in Poultry Industry

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#### ARTICLE INFO

##### Keywords:

Herbal drug  
Silymarin  
Electrospray

#### ABSTRACT

Application of chemical drugs and presence of high level of aflatoxin in poultry nutrition, have posed a potential threat on human health due to accumulation of toxic entities in poultry meat and egg. In addition, due to the deficiencies of immune and digestive system of these poultry, feed conversion ratio also declined obviously. To overcome this challenge, researchers have developed herbal based products which has shown a promising results. Regardless of limited side effect of herbal based drugs, their formulation is much more complicated and because of fast biodegradation and low bioavailability, increased dose of administration is needed. So as to overcome this issue, preparation of micro/nano formulation of herbal APA's would be a promising technique in herbal products development. Milk thistle (*Silybum marianum*) is a medicinal herb which has an arrays of phytochemicals with proven detoxifying activity both in human and animal. Low solubility and bioavailability of Silymarin has limited its usage and it is used mostly in solid formulations. In this research, silymarin was concentrated in crude extract by liquid-liquid extraction method and was separated with 98% purity. Then, electrospray method was used to prepare PVP/silymarin micro/nano particles. Electrospray was conducted by working parameters as following; voltage 16 kv, flow rate 0.5 ml/h, distance 15 cm. Prepared sample was collected on Aluminum foil and evaluated. Particles morphology was analyzed with scanning electron microscopy (SEM), the mean particle diameter was 235+65 nm for optimum solution. Water solubility of electro sprayed powder was analyzed with UV-Visible spectrometer. Results showed, silymarin containing micro/nanoparticles are 4 time soluble than pure extract. Finally, prepared sample was used to make an oral formulation as detoxifying feed additive for poultry nutrition.

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Poster Presentation ID: 152

### Extraction, Purification and Identification of Alkaloids of two Medicinal Plants, *Hyoscyamus niger* and *Datura stramonium*

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#### ARTICLE INFO

Keywords:

Alkaloid

*Datura stramonium*

*Hyoscyamus niger*

Scopolamine

Atropine

#### ABSTRACT

Alkaloids are a major group of basic compounds which exist in herbal medicines. Many of them have attracted major interest due to variety of pharmacological and medicinal activities. Some alkaloids have been used for the various diseases such as: bronchial asthma, infection of pulmonary regions and tumors, diarrhea, gastrointestinal colic, antitumor, mydriatic, antispasmodic, anticholinergic, neuralgia and manic psychosis, etc. [1]. The Solanaceae family are abundant in alkaloids and contains 90 genera and more than 2000 species that found in all continents. Some typical genera are *Hyoscyamus* and *Datura*. Iran with a wide range of habitats and rich flora is one of the best places for the growth of medicinal plants [2]. In this study, we collected two plants *Hyoscyamus niger* and *Datura stramonium* from two regions of Iran (Zanjan and Mazandaran). We are reporting here the amount of scopolamine and atropine tropane alkaloids in *D. stramonium* and *H. niger* in different parts of the plants from different regions. The atropine and scopolamine were extracted from both plants and contents of them quantified HPLC. These tropane alkaloids were highest in the leaves of *D. stramonium*. In leaves of *D. stramonium*, atropine content was higher than scopolamine (Atropine 50%, Scopolamine 35%). The obtained results explained that atropine and scopolamine contents depend on the different parts of the plant, and plant growth region.

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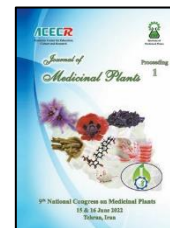
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Poster Presentation ID: 153

### Docking Studies of Natural Compounds from Plant Extracts as Treatment for COVID-19

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Covid-19 <i>Hyoscyamus niger</i> <i>Datura stramonium</i> Main protease AutoDock Vina</p>	<p>The Corona virus disease (Covid-19) is a major threat to public health. In March 2020 World Health Organization (WHO) has expressed SARS-CoV-2 as a pandemic [1]. According to the widespread nature of infection, no well effective antiviral treatment has proven for coronavirus-2 and supportive cares have been the most current treatment. Therefore, the present study is molecular docking of compounds identified in <i>Hyoscyamus niger</i> and <i>Datura stramonium</i>. These plants are rich in alkaloids. Sufficient evidence has shown that these alkaloids have anti-inflammatory, anti-spasmodic, anti-cholinergic, anti-oxidant, anti-microbial, anti-bacterial and hypoglycemic activities. Our targets were main proteases CLpro and PLpro of SARS-CoV-2 [2]. In this study, the AutoDock Vina was used to study the efficiency of 63 chemical components of the <i>Hyoscyamus niger</i> and <i>Datura stramonium</i> in binding to the COVID-19 main proteases. Then, 10 ligands with the lowest binding affinity were selected for flexible docking step. These compounds, block the main amino acids active site, (His41 and Cys145) of CLpro and (Cys111, His272, and Asp286) of PLpro. Also these compounds can block major residues in the binding site. After this step, we selected the best structures and used them for molecular dynamic (MD) simulation.</p>

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Poster Presentation ID: 154

### The Effect of Simple Drying and Combined Drying Methods on the Content and Components of Essential Oil and Biochemical Properties of *Mentha × piperita* L.

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#### ARTICLE INFO

##### Keywords:

Essential oil  
Polyphenol Compound  
*Mentha × piperita*  
Drying  
Microwave

#### ABSTRACT

To investigate the effect of different drying methods on the content and components of essential oil and biochemical properties of *Mentha × piperita*, including polyphenolic content, total flavonoids and flavone and flavonols, two separate experiments based on a completely randomized design with three replications was conducted. In the simple drying method, treatments consist of natural shade dryind, artificial shade drying, oven drying (50 and 70°C), and microwave dryind with different powers (100, 180, 300, 450, 600 and 900 W) and fresh samples, while in the combined drying methods of shade + 100 W microwave, shade + 180 W microwave, shade + 300 W microwave, shade + 450 W microwave, 100 W microwave + shade, 180 W microwave + shade, 300 W microwave + shade, 450 W microwave + shade, shade and fresh samples as as treatment were compared. The end time of each treatment determined on the basis of moisture content equal to 10% on the basis of fresh weight. The results showed a significant effect of different drying methods on the studied traits. In simple drying, The maximum essential oil content obtained from natural shade dried samples, while in combined drying in the shade method and microwave combination treatment of 100 W+ shade dried samples. The maximum amount of Menthol in the simple drying method reach at microwae dried samples, while the in this way a significant decrease was found Menthone, also, in the combined drying treatments, the maximum amount of Menthol in the combined shade + 300 W microwave method, but in this method, the amount of Menthol was significantly reduced. In addition, the maximum amount of polyphenole compound related to fresh samples and then microwave (900 w), while in combined drying methods the maximum amount was observed shade + 450 W microwave method.

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Poster Presentation ID: 156

### The Effect of Different Amounts of Calcium Chloride and Calcium Nitrate on Morphological Characteristics and the Content Essential Oil of *Satureja hortensis*

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#### ARTICLE INFO

##### Keywords:

Essential oil  
Calcium chloride  
Calcium nitrate  
*Satureja hortensis*  
Chlorophyll

#### ABSTRACT

In medicinal plants, the production of secondary metabolites is influenced by various factors such as genetics and cultivation conditions such as climate, plant density and the use of fertilizers. In this study, in order to investigate the effect of calcium chloride and calcium nitrate fertilizers, a factorial experiment was conducted based on a completely randomized design with two factors and three replications. The first factor of fertilizer type had two levels (calcium chloride and calcium nitrate) and the second factor of concentration had four levels (0.25, 0.5, 1% and zero as a control). The results showed that different levels of calcium chloride and calcium nitrate have a significant effect on the growth and essential oil content of *Satureja hortensis*, so that the maximum fresh weight and dry weight was obtained in 1% calcium chloride treatment. The essential oil content also decreased with increasing calcium content. The maximum content of chlorophyll a and total chlorophyll related in 0.5% calcium chloride treatment.

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### Fabrication of Nanocomposite Hydrogels Based on Polyvinyl Alcohol, Chitosan, and Savory Essential Oil; Wound Healing Potential and Antimicrobial Properties

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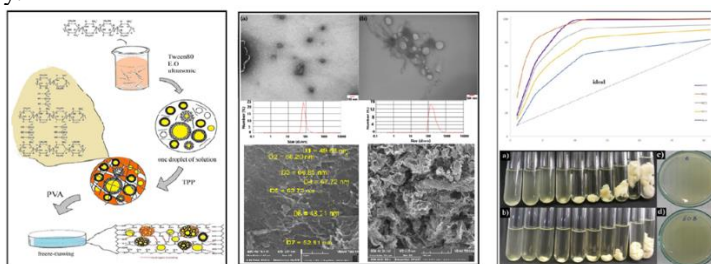
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#### ARTICLE INFO

#### ABSTRACT

Savory essential oil is a natural and edible compound with antiseptic and antioxidant properties. Hydrogel-base encapsulation of essential oils by biodegradable polymers is prevalent because of its wide application in the pharmaceutical, food, and cosmetic industries. Nanocomposites have multiple advantages for the ingredients used in them and reduce the functional defects of the prepared composition by balancing the amounts of the main effective materials [1]. The essential oil nanocapsulated by an ionic method in chitosan and a polyvinyl alcohol-based hydrogel film in this research work. The essential oil nanoemulsions are obtained by adding a tween 80 and stabilized by ultrasonication. Crosslinking of chitosan performs by adding sodium tripolyphosphate (TPP) to generate nanocapsules. The nanocapsules were placed in a solution of polyvinyl alcohol and kept at -20°C and then frozen at room temperature and then melted. This cycle was repeated five times to form a three-dimensional grid. The percentage of essential oils encapsulated and release rate was investigated. Extending the polymer ratio of hydrogel to 50/50 w/w makes it even more homogeneous and stable and causes the release rate to be continuous. After drying the samples by freezing/drying method, SEM, TEM, and FT-IR techniques were used to identify the nanocomposite structure and optical spectroscopy was used to investigate the essential oil release. The release profile and antibacterial properties of essential oil nanocapsules have been investigated. [1] The essential oil release in acidic and neutral media has been measured and analyzed for one month. The antimicrobial activity on the most suitable nanocomposite has been performed on *Escherichia coli* and *Staphylococcus aureus* and the minimum inhibitory concentration (MIC) for both bacteria is 1.3 mg/mL. While the minimum bactericidal concentrations (MBC) for *E. coli* and *S. aureus* are 1.3 mg/mL and 10.3 mg/mL, respectively.



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Poster Presentation ID: 158

### Growth Inhibition Mechanisms of MDA-MB-231 Breast Cancer Cells Induced by ZEO in Comparison with Etoposide: In vitro and in Silico Investigations

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#### ARTICLE INFO

*Keywords:*

Etoposide  
Nanoemulsion  
Apoptosis  
DNA damage/groove  
binding  
ROS  
Topoisomerase II $\alpha$   
inhibitors

#### ABSTRACT

Etoposide (ETO), as a Topoisomerase II poison, induces apoptosis in many tumor cells mainly via mitochondrial pathway. However, due to its side effects it has limited use. Essential oil of *Zataria Multiflora* (ZEO) on the other hand is a secondary metabolite with some biological properties. In this study, ZEO physical properties and GC/MS analysis were characterized. To evaluate the anti-breast cancer efficacy and apoptotic mechanism it was compared with Etoposide. ZEO and ETO substantially suppress the viability of breast cancer cells. ETO significantly triggers apoptosis-related morphological variations and DNA fragmentation confirmed by fluorescent staining and Tunnel assay. Moreover, ZEO exposure causes apoptosis in MDA-MB-231 cells by loss of the mitochondrial membrane potential ( $\Delta\Psi_m$ ), associated with the accumulation of Reactive Oxygen Species (ROS) in the mitochondria, G2/M phase arrest and DNA strand breakage. Notably, docking molecular modeling also revealed that the major ingredient of the ZEO interact with topoisomerase II alpha in the same manner as ETO. This study demonstrated the successful inhibitory effect of ZEO on metastatic breast cancer cells, which may be beneficial in the therapy process.



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### Study on Essential Oil of some Iranian Wild Chamomile (*Matricaria chamomilla* L.) Populations

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#### ARTICLE INFO

##### Keywords:

Chamomile  
Wild population  
 $\alpha$ -bisabolone oxide A  
Chamazulene  
 $\alpha$ -bisabolol oxide A

#### ABSTRACT

Chamomile (*Matricaria chamomilla* L.) has many applications in various food, pharmaceutical, and cosmetic industries and has a special place among medicinal plants [1]. The biological and pharmacological properties of chamomile are attributed to its secondary metabolites, especially its essential oil components such as chamazulene and bisabolol oxide and its flavonoids. In the present study, to assay the chamomile germplasm of the country and its future comparison with similar cultivated samples, the essential oil variety of flowering tops in 15 Iranian wild chamomile populations collected in the growing season of 2021 (February-May) from some natural habitats of Khuzistan (12 Samples), Fars (two samples), and Bushehr (one sample) provinces were studied. The essential oils of shade-dried samples were extracted using Clevenger apparatus (hydrodistillation) and analyzed using GC and GC/MS. In all populations,  $\alpha$ -bisabolone oxide A (from 31.3% in *Fars1* to 64.5% in *Khuzistan3*) was identified as the main essential oil component. The amount of chamazulene (from 1.6% in *Fars1* and *Khuzistan6* to 5.3% in *Khuzistan8*) was low in all the populations and the amount of  $\alpha$ -bisabolol oxide A was obtained from 5.8% (*Khuzistan5*) to 21.5% (*Khuzistan4*). The results of the present study showed that the amount of two important compounds of chamazulene and  $\alpha$ -bisabolol oxide A in the essential oils of wild chamomile populations is low and this proved the importance of plant cultivation to increase and fix the amount of these compounds in the essential oils. In breeding programs, the use of diverse plant populations from different geographical areas is one of the basic necessities of producing superior cultivars and the first step in any breeding program is to cultivate the species. Cultivation of wild populations and study on essential oil compounds over several years and in several different geographical areas under agricultural conditions is recommended.

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Poster Presentation ID: 160

### Preliminary Phytochemical Screening and *In vitro* Antibacterial Activity of *Juniperus communis* from Guilan – Iran

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#### ARTICLE INFO

Keywords:

*Juniperus communis*

MIC

MBC

DPPH<sup>0</sup>

Phytochemicals  
compounds

#### ABSTRACT

The importance of medicinal plant in drug development is known to us and humans have used them for different diseases from the beginning of human history. Traditional folk treatment from wild plants has always guided researchers to search for novel medications to develop healthy life for humans and animals [1-2]. The purpose of the current study is to identify the phytochemicals as well as to determine the level of evaluation phytochemical compounds and antibacterial activity of leaves of ethanolic extract of *Juniperus communis* (Cupressaceae) from Guilan - Iran. In this study, the leaves were collected and extract prepared from ethanol by microwave assisted extraction (MAE) method. The present study revealed that the phytochemicals analysis of seven different chemical compounds terpenoids (Salkowski Test), flavonoids (Alkaline Reagent Test), phenols (Ferric Chloride Test), coumarins (sodium hydroxide Test), tannins (Ferric Chloride Test), cardiac glycosides (Keller-Killani test) and saponins (Foam Test) were tested in ethanolic extracts. Later, the antibacterial activity of ethanolic extract of leaves of *Juniperus communis* was tested against microorganisms *Escherichia coli* (ATCC 25922), *Pseudomonas aeruginosa* (ATCC 25619), (Gram Negative) and *Staphylococcus aureus* (ATCC 25923), *Bacillus subtilis* (ATCC 12711) (Gram Positive) by Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) methods. The results of the phytochemical screening of ethanolic extract of leaves of *Juniperus communis* were (Terpenoids, Flavonoids, Phenols, Coumarins, Tannins, Cardiac glycosides and saponins) presented. The ethanolic extract of leaves of *Juniperus communis* showed significant antibacterial activity against both (Gram positive) and (Gram negative) bacteria. The findings of the present study demonstrated the potential of phytochemicals from *Juniperus communis* leaves, a natural source, in the pathway of developing a novel antibacterial agent able of treating bacterial infections.

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Poster Presentation ID: 161

### Distribution Pattern and Conservation Status of some *Allium* Species from Iran

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#### ARTICLE INFO

Keywords:

*Allium* sp.

Conservation

Distribution pattern

Iran

#### ABSTRACT

Iran is an important center of origin for *Allium* genus so that more than 80 species are reported from this country, which are valuable for food and pharmaceutical applications. Unfortunately, some of these species are endangered due to overgrazing by animals, drought and other environmental perturbations, overharvesting, etc. Assessment of distribution pattern and conservation status of important species is widely used in their conservation planning. In this study, the distribution pattern and conservation status of valuable species namely *Allium akaka* S.G.Gmel. ex Schult. & Schult. f., *A. amploprasum* L., *A. jesdianum* Boiss. & Buhse, *A. longiscapus* Regel., *A. stipitatum* Regel., were determined and their conservation value was specified using GIS and GeoCat software based on the IUCN classification system. Also, conservation plans were proposed by overlapping the current range of these species with protected areas. Results shown that among the studied species, *A. amploprasum* had the maximum range and *A. longiscapus* had the lowest range (Fig 1). In terms of conservation status, *A. longiscapus* is in critical condition and other species are in the least concern situation. Also, this species had the highest conservation value (1.98) compared to the others (Table 1). As presented in Fig. 1 species *A. amploprasum*, *A. stipitatum*, *A. jesdianum*, *Allium akaka* and *A. longiscapus* had 6, 5, 5, 4 and 3 populations in protected area, respectively. According to the results of this study, it could be proposed that *A. longiscapus* protected Ex-situ and other species should be given more attention in protected areas and some new protected areas be introduced to them.

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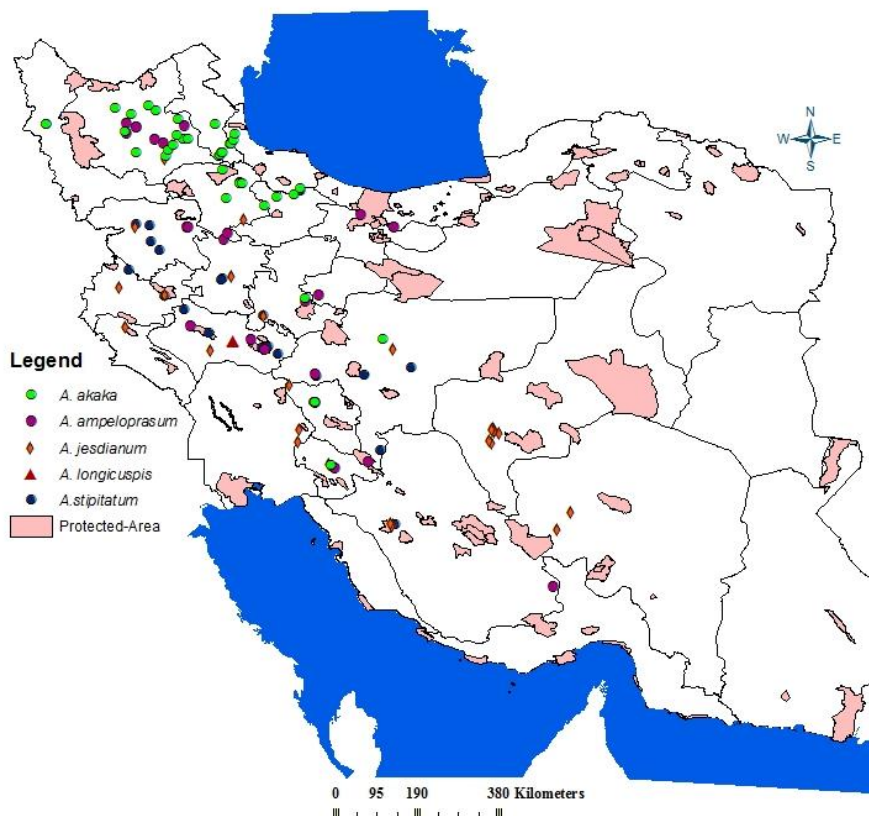
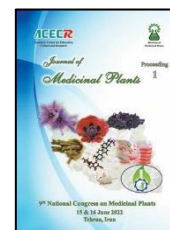
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**Figure 1.** Map of distribution of *Allium* species in Iran.

**Table 1.** The importance and conservation information of the *Allium* species in Iran.

Species	Common name	gene pool	Conservation status	Conservation value
<i>Allium akaka</i>	Valak	GP1: <i>A.akaka</i>	Least concern	1.068408
<i>Allium ampeloprasum</i>	Great-head garlic	GP1: <i>A.purpureum</i> , GP3: <i>A.schoenoprasum</i>	Least concern	1.054016
<i>Allium Jesdianum</i>	Bon sorkh	GP1: <i>A.jesdianum</i>	Least concern	1.018091
<i>Allium longicuspis</i>	Seer	GP1: <i>A.sativum</i> , GP3: <i>A.ampeloprasum</i> , <i>A.porrum</i>	Critical	1.998756
<i>Allium stipitatum</i>	Moo sir	GP2: <i>A.cepa</i>	LC	1.018091



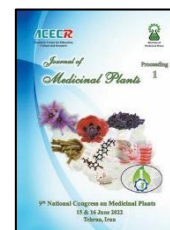
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Poster Presentation ID: 162

### Investigation of Antibacterial and Antioxidant Activity of Extract of Leaves of *Sambucus ebulus* L. from Guilan - Iran

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#### ARTICLE INFO

##### Keywords:

*Sambucus ebulus* L.  
*Escherichia coli*  
DPPH<sup>0</sup>  
TFC  
Pathogenic microbes

#### ABSTRACT

Medicinal plants and herbs have been used worldwide in the management of different diseases. The search for new antibacterial, antiviral, anticancer agents from natural sources has been intensified due to the reduction of currently available therapy in subjects who do not qualify for conventional pharmacological therapy and the emergence of drug-resistant strains [1-3]. The aim of this project was to investigate the antibacterial and antioxidant effect of methanolic extract of leaves of *Sambucus ebulus* L. (Adoxaceae) from Guilan - Iran. In this project, the leaves were collected and extract prepared from methanol by microwave assisted extraction (MAE) method. Then, total phenolic contents (TPC) and total flavonoid contents (TFC) of the extracts were then measured using Folin Ciocalteu Reagent (FCR) and aluminum chloride colorimetric methods, respectively. And total antioxidant activity was assayed by DPPH<sup>0</sup> free radical scavenging assay method. Later, the antibacterial activity of the leaves of *Sambucus ebulus* L. was tested using both gram positive as well as gram negative bacteria i.e. *Staphylococcus aureus* (ATCC 25923) and *Escherichia coli* (ATCC 25922), respectively. Methanolic extract of leaves of *Sambucus ebulus* L. showed total phenolic contents of (58.61±0.13) mg GAE/g dry plant material respectively. Total flavonoid contents of methanolic extract of leaves of *Sambucus ebulus* L. was (25.28±0.04) mg QE/g dry plant material, respectively. The antioxidant activity of the investigated methanolic extract of leaves of *Sambucus ebulus* L. was scavenging ability of DPPH<sup>0</sup> radical scavenging activity (78.45%). Whereas, the IC<sub>50</sub> of methanolic extract of leaves of *Sambucus ebulus* L. for DPPH<sup>0</sup> assay was (1.23±0.12) mg/ml respectively. The methanolic extract of leaves of *Sambucus ebulus* L. showed significant antibacterial activity against both (Gram positive) and (Gram negative) bacteria. Thus, the methanolic extract of leaves of *Sambucus ebulus* L. would be helpful for the preparation of pharmaceutically useful drugs to destroy pathogenic microbes. Furthermore, in the present study the phytochemical evaluation of *Sambucus ebulus* L. were found to be a powerful antioxidant, antibacterial agent and this study can be continued for their structural elucidation and pharmacological activity.

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Poster Presentation ID: 163

### The Protective Effect of Rosemary and Main Ingredient Against Cancer by Modulating Nrf2 Signaling

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#### ARTICLE INFO

Keywords:

NRF-2

Rosemary

Cancer

Nuclear factor erythroid

2

Rosmanic acid

#### ABSTRACT

NRF2 is a critical protein in expressing antioxidant and anti-inflammatory proteins that plays a significant role in cancer prevention and treatment. Various promising drug candidates have been evaluated to regulate the production and effects of this protein [1]. One of the most important treatment options in this regard has been rosemary [2]. Rosemary as a medicinal plant with several effects, including anticancer effects. Studies have shown that this herb contains valuable compounds such as rosmanic acid, rosmanol, carsonic acid, and carnosol [3]. The main mechanisms of these herb lead compounds includes enhancing luciferin activity and promoting Nrf2 translocation to the nucleus, activating NRF2/HO-1 pathway that can decrease the susceptibility of mitochondria to prooxidant stressors, inducing apoptosis and increase the downstream of antioxidant enzyme activity in favor of the cancerous cell line death, inducing the NRF2 activity via activating protein kinase RNA-like endoplasmic reticulum kinase that results in increasing the phosphorylation at site threonine, increasing the NO level downregulating iNOS by a mechanism of HO-1, enhancing nerve growth factor, activating transcription factor 4 through the integrated stress response, cytoprotective effect, protecting cells against carcinogenesis, phase II detoxifying enzymes, increasing NRF2 localization, inhibiting KEAP1-mediated ubiquitination and inhibiting the initiation of tumor growth. So, we can conclude that rosemary lead compounds are a novel and promising agent in activating NRF-2 and managing cancer [4].

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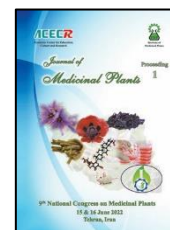
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Poster Presentation ID: 164

### Efficacy of Medium-Chain Triglyceride (MCT) on Prognosis and Outcome of Outpatients Suspected COVID-19

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#### ARTICLE INFO

Keywords:

MCT oil

Covid-19

Pneumonia

Dyspnea

#### ABSTRACT

Considering the advantages of the ketogenic diet on immune system and infections, besides the mTOR signaling pathway correlation with MCT and the human being's inflammatory system, we conducted this study to assess the effect of oral MCT on COVID-19 disease and its clinical significance manifestations[1,2,3]. This was a randomized clinical trial on 185 patients clinically suspected of COVID-19 referred to infectious disease clinics of Kerman. Patients were randomly assigned to two groups. The Control group received either standard supportive treatment, the recommendation for carbohydrate avoiding - and diet modification. Patients in the intervention group received all mentioned recommendations plus MCT oil. Patients' clinical symptoms, including body temperature, respiratory rate, body pain and dyspnea, were recorded in a checklist. The mean age of patients was  $37.78 \pm 12.42$  in the intervention group and  $40.81 \pm 13.23$  in controls ( $P=0.231$ ). The patients in MCT group had lower duration of weakness ( $P=0.004$ ), body pain ( $P=0.004$ ), dyspnea ( $P=0.004$ ), gastrointestinal manifestations ( $P<0.001$ ), sore throat ( $P<0.001$ ), increased respiratory rate ( $P<0.001$ ), high intensity of cough ( $P=0.002$ ). Indeed, weakness, frequency of cough, sore throat, and gastrointestinal complications were significantly lower in study group females ( $P=0.006$ ,  $P=0.030$ ,  $P=0.005$ , and  $P=0.001$ , respectively). In contrast, in males of the intervention group, manifestations such as respiratory rates, dyspnea, intensity of cough, and sore throat were significantly lower than those in the control group. Administration of MCT alleviated clinical symptoms of outpatients suspected of COVID 19 such as respiratory rate, the intensity of cough, dyspnea, body pain and gastrointestinal symptoms and maintains them from probable disease morbidity.[4,5]

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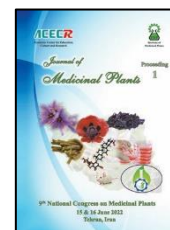
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Poster Presentation ID: 165

### Lavender Improves Fatigue Symptoms in Multiple Sclerosis Patients: A Double-blind, Randomized Controlled Trial

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Nervous System Disease Persian Medicine Fatigue Multiple Sclerosis <i>Lavandula angustifolia</i></p>	<p>Fatigue is one of the most common complications of Multiple Sclerosis (MS) patients. Several pharmacological and non-pharmacological interventions have been recommended to control this complication. Lavender is one of the plants considered by Persian Medicine (PM) and recommended by scholars of past centuries in the treatment of neurological diseases. This study aimed to investigate the efficacy of lavender capsule on improving fatigue symptoms in MS patients. In a double-blind, controlled trial, using a computer block randomization approach, 48 confirmed MS patients with eligibility criteria of being 18 years or older, Modified Fatigue Impact Scale (MFIS) <math>\geq 25</math>, relapsing-remitting MS patients, EDSS <math>\leq 6</math>, not pregnant, not breastfeeding, and not suffering from other diseases that cause fatigue, were randomized to receive capsules containing 600mg of lavender flowers as the intervention group or capsules containing 600mg cornstarch as the control group. Patients were randomized after completing the MFIS and were asked to take one capsule three times daily for 60 days. The MFIS again checked to</p>



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assess the impact of two interventions. Analysis of Covariance (ANCOVA) was used to assess the impact of two interventions. 24 patients included in each group. The mean (standard deviation) of MFIS was 40.56 (7.63) in the intervention and 41.43 (7.89) in the control groups ( $P=0.706$ ) before the intervention. However, there was a significant reduction ( $P<0.001$ ) in the intervention group, 7.04 (4.91) compared to the control group, 38.17 (9.78) after the intervention. In comparison to cornstarch capsules, consuming the capsules of lavender flowers decreased the MFIS in MS patients.

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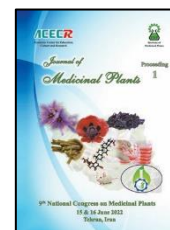
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Poster Presentation ID: 166

### The Phytochemical Diversity of some Species of Pagoda Tree (*Sophora alopecuroides*)

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> <i>Sophora alopecuroides</i> Total alkaloids The Phytochemical diversity Pharmaceutical industry</p>	<p>The genus <i>Sophora</i>, (Family Fabaceae) is a perennial plant that has been reported to have 187 species worldwide. <i>Sophora alopecuroides</i> which is existed in Iran contains active ingredients that have anti-cancer, anti-viral, anti-inflammatory, anti-microbial, analgesic, and neuroprotective activities, as well as protective properties against pulmonary fibrosis and proliferation of cardiac fibroblasts. So, this plant can be considered a prospect for the development of novel medicines used for the treatment of cancer and some chronic diseases [2, 3]. In the present study, the phytochemical diversity of 10 populations of <i>Sophora alopecuroides</i> from different ecotypes in Iran was investigated. In order to perform phytochemical experiments, the seed samples of the collected populations were used and the total alkaloids were extracted according to Kamada et al. using the UV-Spectrophotometer method [1]. The results showed that different populations of <i>S. alopecuroides</i> had significant differences in the phytochemical properties. The highest and the lowest amounts of total alkaloids were related to the samples obtained from Alborz (5.7%) and Fars (0.2%) provinces, respectively. In conclusion, various <i>S. alopecuroides</i> populations can be used to select suitable genotypes for medicinal purposes in the Iranian pharmaceutical industry.</p>

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### Evaluation of the Effect of Biofertilizers on Growth Characteristics and Yield of Summer Savory (*Satureja hortensis* L.)

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#### ARTICLE INFO

##### Keywords:

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Vermicompost

Mycorrhiza

Yield

#### ABSTRACT

In order to evaluate the growth characteristics and yield of summer savory with vermicompost and inoculation with mycorrhiza, an experiment was conducted in 1399 in research lands located in Damavand, Chenar Shargh village, in the form of a factorial design. Factors studied in this experiment include different levels of vermicompost as the main factor at three levels (0, 2.5 and 5 tons per hectare) and the sub-factor including mycorrhizal fungi at four levels (non-consumption, *G.mosea*, fungi). *G.intradices* and the combination of *G.intradices* + *G.mosea*). The results of this experiment showed that different levels of vermicompost and mycorrhiza fungi had a significant effect on the studied traits. At vermicompost levels, consumption of 5 tons per hectare of vermicompost had the highest plant height, number of sub-branches, plant dry weight, flowering branch yield and biological yield. Also, by combining *G.intradices* and *G.mosea*, the highest plant height, number of sub-branches, plant dry weight, flowering branch yield and biological yield were obtained. The results of this study show that inoculation of seeds with mycorrhizal fungi and consumption of 5 tons per hectare of vermicompost had the greatest effect on the yield of safflower.



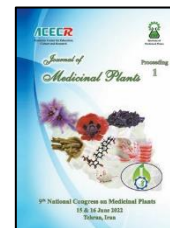
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## 9<sup>th</sup> National Congress on Medicinal Plants

15 & 16 June 2022  
Tehran, Iran



Poster Presentation ID: 168

### Efficiency of Different Solvent Polarities in Total Phenolic and Flavonoid Content of *Clematis flammula*

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#### ARTICLE INFO

Keywords:

*Clematis flammula*

Phytochemical  
investigation

Iran

#### ABSTRACT

*Clematis flammula* L. is one of the Iranian species of the genus with limited distribution in Iran. This was grown in the polluted industrial soils and so it seems to be resistant species. Antioxidant activity of two other species of Iranian *Clematis* species were investigated previously [1]. Therefore this one was subjected to study for investigation on the assessment of its Antioxidant potentials. So the aim of this study was defined as description on effect of various solvent extracts of *C. flammula*. This study is the first to compare total phenolic and total flavonoid content of aerial parts of plant. The extracts were obtained by hydrolyses extraction method using different solvent polarities consist of Chloroform, Hexane, Ethyl-Acetate, Butanol and Water. The total phenolic compounds (TPC) of the extracts were determined as described earlier [1]. The extract was measured at absorbance 765 nm and the result expressed as milligrams of gallic acid equivalents (GAE) per gram of dry matter. The total flavonoid compounds (TFC) was determined according to Hendra et al. [2] and the extract was measured using absorbance at 510 nm and the result was expressed as milligrams of rutin equivalents per gram of dry matter. The highest amount of phenolic content was found in the Butanol extract ( $3.15 \pm 0.19$  mg gallic acid equivalent/g DW) followed by Chloroform (1.64), Ethyl-Acetate, (1.08) Hexane (0.93) and Water (0.85) extracts respectively. While total flavonoid contents of Hexan solvent ( $7.58 \pm 0.31$  mg rutin equivalent/g DW) was found significantly higher than other solvents consist of 4.41, 4.00, 2.31 and 1.26 for Ethyl-Acetate, Butanol, Water and Chloroform extracts respectively. So the data from present study revealed that *Clematis flammula* is a rich natural source of phenolic and flavonoid compounds. But the extraction solvent is more affective on the extracted compound amounts.

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Poster Presentation ID: 169

### Assessment of Antioxidant Activity of Silymarin/Lemon Oil Nanoemulsion in Comparison with Its Bulk Form

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#### ARTICLE INFO

##### Keywords:

*Silybum marianum*

Silymarin

Nanoemulsion

Antioxidant activity

Lemon oil

#### ABSTRACT

Silymarin is natural antioxidant compound extracted from the seeds of Milk thistle. Silymarin's antioxidant function is at least ten times more powerful than of the tocopherol. It is used in the treatment of liver diseases [1]. Silymarin absorption is very poor, owing to its low solubility in water. Oil phase of nanoemulsion-based delivery system play a carrier role for hydrophobic medicines [2]. In this study we applied low-energy method to preparation of new formulation of silymarin nanoemulsion using lemon essential oil as the oil phase, Tween 80 as a surfactant, ethanol as co-surfactant, and distilled water as aqueous phase for enhancing solubility and antioxidant activity. Prepared nanoemulsion was characterized by dynamic light scattering and FTIR spectroscopy. Antioxidant activity of nanoemulsions and mixed silymarin with lemon oil as bulk form was investigated by DPPH assay. The half-maximal (50%) inhibitory concentration (IC<sub>50</sub>) of antioxidant activity of nanoemulsion and bulk formula were 87.70±0.11 and 146.96 ± 0.11 µg/mL, respectively. The results showed that decreasing the particle size from micro to nano-scale increases antioxidant activity.

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Poster Presentation ID: 170

### Evaluation of Factors Controlling the Loading of *Silybum marianum* Extract on Chitosan Particles Using Artificial Neural Networks

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> <i>Silybum marianum</i> Silymarin Loading Drug delivery Artificial neural networks</p>	<p><i>Silybum marianum</i> is an annual or biennial plant of the Asteraceae family. Its extract (Silymarin) made from the seeds and used for the treatment of numerous liver disorders. Because silymarin is poorly water-soluble and its bioavailability is low, various drug delivery techniques were employed to improve silymarin bioavailability [1]. Loading efficiency is a key property in drug delivery systems [2]. In this study we used Artificial Neural Networks (ANNs) software to investigate the interactions between the variables inputs and their effects on silymarin loading into chitosan particles. There were four inputs including: pH, weight ratio of chitosan to silymarin, weight ratio of chitosan to tripolyphosphate and stirring time (min). Results of ANNs indicated that pH and weight ratio of chitosan to silymarin are potentially the dominant factors that influence the loading of silymarin into chitosan. Also, the stirring time showed a reverse effect on silymarin loading, while the weight ratio of chitosan to tripolyphosphate showed no important effect on the loading capacity.</p>

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Poster Presentation ID: 173

### Genetic Diversity of some Tea Genotypes Collected from Lahijan District by using Morphological Markers

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#### ARTICLE INFO

##### Keywords:

Tea  
Genetic Diversity  
Morphological Markers  
Cluster

#### ABSTRACT

One of the basic and strategic products in the north of Iran is tea plant (*Camellia sinensis* (L.) O. Kuntze) from Theaceace family. The brewed of this plant is the cheapest non-alcoholic drink after water. Today's, for many different reasons, many of these plants are at risk of disappearing therefore having information about genetic of them can help in saving this germplasm and designing of breeding programs in futures. On the other hand, investigating and studying of genetic diversity in existing genotypes is a fundamental step for selecting superior genotypes and cultivating of them for increasing the production and quality of tea. In this study by used of 20 morphological characters genetic diversity of 25 tea samples under cultivation in north of Iran was investigated. Similarity and cluster analyses were done by PAST 4.03 software with Euclidean coefficient and UPGMA algorithim. These coefficient and the algorithm had the highest copenetic coefficient (76%). Calculated maximum and minimum similarity were 60.64 and 4.36 respectively. Based on the data from this study, samples at level 26 are divided into three groups. The third group was the largest group and have 15 members (60% of all investigated samples). Based on the results, clustering showed that grouping of samples was not match with the geographic distribution and we were not found high level of morphological diversity in tea plants [1,2].

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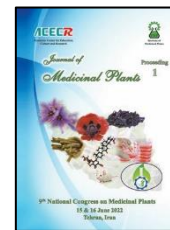
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Poster Presentation ID: 174

### Synthesis, Characterization, and Anti-cancer Activity of Novel PEGylated Derivatives of Noscapine as a Potential Nanocarrier System

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#### ARTICLE INFO

##### Keywords:

Natural product,  
Solubility, PEGylation,  
Micelle, Cancer

#### ABSTRACT

Poor water solubility of many natural products as drug candidate limited their therapeutic potential for clinical use<sup>1</sup>. An effective strategy for improving the solubility, specific delivery, and reducing the first-pass metabolism at low bioavailability of drugs, is PEGylation<sup>2</sup>. In this work, regarding the poor water solubility of noscapine that limits its therapeutic effect, novel PEGylated derivatives of noscapine were synthesized via covalent crosslinking through a succinate linker. The chemical structure of the synthesized compounds was characterized by <sup>1</sup>HNMR, FT-IR, and UV-vis techniques. The micelle formation properties of the PEGylated compounds (CMC) were determined via the iodine UV-absorption method. The results exhibited that by increasing the PEG chain length, the CMC value was increased accordingly. The morphological analysis of the polymeric micelles via TEM showed spherical shapes with a mean particle size of 300-400 nm, confirming the results obtained by dynamic light scattering. *In vitro* cytotoxicity assay of the PEGylated derivatives of noscapine on MCF-7 breast cancer cells using MTT assay revealed that by increasing the water solubility of the PEGylated noscapine derivatives, the cytotoxicity effect enhanced dramatically from IC<sub>50</sub>= 242.0 ± 1.01 μM for noscapine to 66.0 ± 0.43, 22.0 ± 0.23, and 15.0 ± 0.81 μM for PEGylated derivatives of 1000, 4000 and 6000 g/mol, respectively. It can be concluded that new PEGylated derivatives of noscapine with enhanced solubility may have the potential to be developed as a class of novel anticancer medicines.

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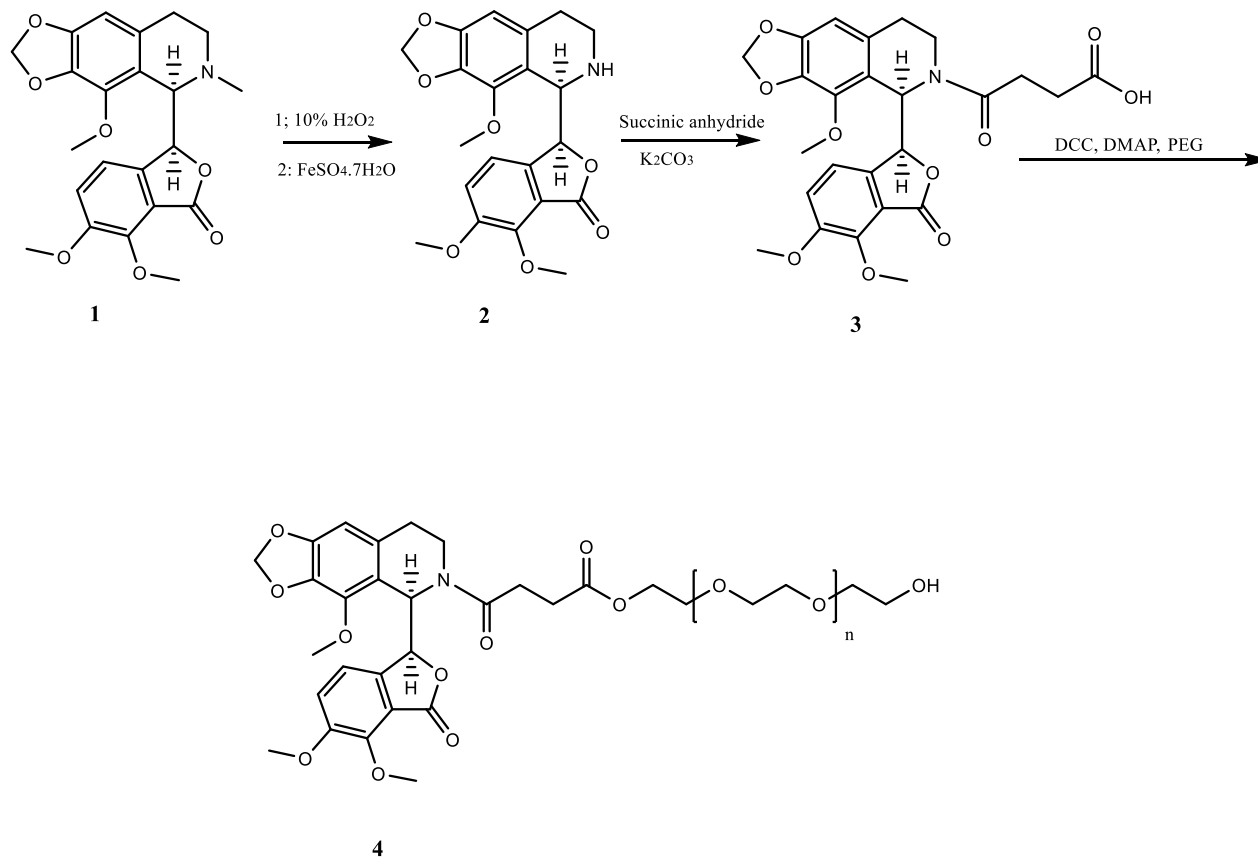
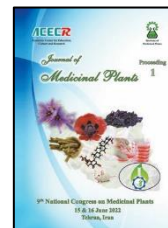
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Scheme 1. Synthesis pathway of PEGylated derivatives of noscapine



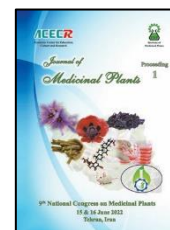
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Poster Presentation ID: 179

### Designing a Database of Natural Habitats of Native Iranian Medicinal Plants

Ebrahim Sharifi Ashourabadi<sup>1,\*</sup>, Maryam Mackizadeh Tafti<sup>2</sup>, Hamid Reza Sharifi<sup>3</sup>, Somayeh Fekri Qomi<sup>3</sup>

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#### ARTICLE INFO

##### Keywords:

Natural ecosystems  
Biodiversity  
Climatic and soil  
factors

#### ABSTRACT

In order to study and record information about the natural habitats of medicinal plants, a study was conducted for 2 years in 2017-2017. A comprehensive database was designed for this purpose. Using various sources such as the flora of Iran, the plan to identify ecological areas and other sources, data were entered. Information fields included a number of ecological characteristics such as climate type, altitude, rainfall, slope percentage, land type, soil type, associated species and so on. Accordingly, climatic characteristics of 1806 native medicinal and aromatic species from 592 genera and 127 families were recorded. After completing the database information, the browser software was designed. In this software, information is stored in SQL format and programmed using an object-oriented programming language (C #). Using this database, search was provided, and data retrieval was changed from manual to automated. Thus, fast data retrieval and various reports were provided. This database can be useful for managing the cultivation of medicinal plants in the target areas.



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Poster Presentation ID: 180

### Changes in Enzymatic Activity of Lemon verbena (*Lippia citriodora* H.B.K.) Leaves under Application of Anti-Chilling Agents and Adjuvants

**Hanieh Rafiee<sup>1,\*</sup>, Ali Mehrafarin<sup>2</sup>, Hassanali Naghdi Badi<sup>2</sup>, Farahnaz Khalighi- Sigaroodi<sup>2</sup>, Agnieszka Sękara<sup>3</sup>, Esmail Jabbari<sup>4</sup>**

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#### ARTICLE INFO

##### Keywords:

Glycerol

Proline

Glycine-betaine

$\alpha$ -Tocopherol

Abcsic acid

#### ABSTRACT

The objective of this study was to investigate the effect of anti-chilling formulations and adjuvants on lemon verbena (*Lippia citriodora* H.B.K) leaves under low temperature. The combined analysis was done on the basis of randomized complete blocks design (RCBD) with three factors included anti-chilling formulations (glycerol and glycerol + polyvinyl alcohol), adjuvants formulations ( $\alpha$ -tocopherol, amino acids of proline + glycine-betaine, and ABA), and two levels of low temperature (5 and 10 °C) with three replications. The maximum activity of the enzyme CAT, as well as APX, was related to plants foliar applied by treatment glycerol + ABA. The application of glycerol in combination with ABA resulted in the lowest activity of H<sub>2</sub>O<sub>2</sub>. The maximum activity of SOD was achieved by foliar application of the mentioned treatments. Polyphenols content attained the best results by glycerol + ABA application. In conclusion, the best formulation was glycerol + ABA from the viewpoint of qualitative protection against low temperature. The efficiency of the mentioned formulation was due to synergistic interaction of anti-chilling formulation and adjuvants.



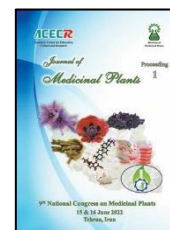
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Poster Presentation ID: 181

### Morphophysiological and Phytochemical Changes of Lemon verbena (*Lippia citriodora* H.B.K.) by Adjuvants and Anti-Stress Formulations

**Hanieh Rafiee<sup>1,\*</sup>, Ali Mehrafarin<sup>2</sup>, Hassanali Naghdi Badi<sup>2</sup>, Farahnaz Khalighi-Sigaroodi<sup>2</sup>, Agnieszka Sękara<sup>3</sup>, Esmail Jabbari<sup>4</sup>**

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#### ARTICLE INFO

##### Keywords:

Glycerol

Proline

Glycine-betaine

$\alpha$ -Tocopherol

Abcsic acid

#### ABSTRACT

The aim of this research was to investigate the effect of adjuvants formulated in anti-chilling agents on lemon verbena (*Lippia citriodora* H.B.K) leaves under low temperature. The combined analysis was done on the basis of randomized complete blocks design (RCBD) with factors of anti-chilling formulations (glycerol and glycerol + polyvinyl alcohol), adjuvants formulations ( $\alpha$ -tocopherol, amino acids of proline + glycine-betaine, and ABA), and two levels of low temperature (5 and 10 °C) with three replications. The highest amount of leaves, stems, shoot, roots, and total dry weight was observed by G6 in combination with Pro, GB, and ABA. The relative water content was elevated by application of mentioned treatment. The treatment of glycerol + proline + glycine-betaine + ABA improved the essential oil content and osmoprotectants under low temperature. In conclusion, the best formulation was glycerol + proline + glycine-betaine + ABA from the viewpoint of economic yield and this allows economic production in areas with the possibility of low temperature. The efficiency of the mentioned formulation was due to its direct protective function and indirect influence of adjuvants in a synergistic interaction with other components of the formulation.



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Poster Presentation ID: 182

### Evaluation of Phytochemical Study and Free Radical Scavenging Activity of the *Lallemantia iberica*

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#### ARTICLE INFO

Keywords:

*Lallemantia iberica*

Antioxidant activity

GC-MS

Column

Chromatography

PTLC

#### ABSTRACT

**Introduction:** Plants of genus *Lallemantia* have been used in different cultures as traditional medicines [1]. **Scope:** Due to the importance of medicinal properties of genus *Lallemantia* and very limited studies on the phytochemistry of *Lallemantia iberica* seed, this plant was selected for phytochemical analysis along with evaluation of its antioxidant activity, total phenol and flavonoid content. **Methods and materials:** The seeds of *Lallemantia iberica* were extracted with n-hexane, chloroform, and methanol, respectively, and then dried by rotary evaporator. The methanolic extract was fractionated by various chromatographic methods (Decantation with non-miscible solvents, PTLC) and finally a pure substance was identified by NMR. Fatty acid content of N-hexan extract of aerial part was analyzed by GC-MS analysis as well. Furthermore, total phenolic content, total flavonoid content and antioxidant activity of N-butanol, ethyl acetate and aqueous fractions of methanolic extract were evaluated [2]. **Results:** A Phenolic glycoside compound was identified from the N-butanol fraction of the methanolic extract of this plant. Fatty acid content of n-Hexan extract identified 25 compounds. Linolenic acid methyl ester and Palmitic acid were the main compounds of Fatty acid content. Among the extracts, ethyl acetate extract showed high anti oxidant capacity ( $201.57 \pm 0.1 \mu\text{g/ml}$ ) along with total phenol ( $2,169 \pm 25,91652 \mu\text{g/mgr}$  extraction) and total flavonoid contents ( $0,237 \pm 12,670616 \mu\text{g/mgr}$  extraction). Nmr data lead us to identify Curcubitoside D as phenolic compound of N-butanol extract of this plant. **Conclusion:** Among the extracts, ethylacetate extract demonstrated high free radical scavenging activity. Linolenic acid methyl ester and Curcubitoside D were the main constituent of the fatty acid content and N-butanol extract of this plant.

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### Chemical Diversity of some *Thymus* Species

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#### ARTICLE INFO

##### Keywords:

*Thymus vulgaris* L.  
*Zataria multiflora* L.  
*Thymus daenensis*  
Celak  
*Thymus kotschyanus*  
Bioss. & Hohen  
Thymol

#### ABSTRACT

For evaluation of chemical relationships among some *Thymus* species, the essential-oil composition of four populations of *Thymus* including: *Thymus vulgaris* L., *Zataria multiflora* L., *Thymus daenensis* Celak, *Thymus kotschyanus* Bioss. & Hohen were analyzed by GC and GC/MS. The 7 components were identified, amounting to a total percentage of 82.99–94.52%. The monoterpene fraction was dominant in all the oils analyzed, especially the oxygenated monoterpenes (55.52–89.01%). The proportion of oxygenated monoterpenes in the essential oils of *Zataria multiflora* L. was higher, whereas for *T. vulgaris* L. was lower compared to others. Some components were found in only one essential oil, whereas other components occur in all the oils. For example, *p*-cymene, thymol and carvacrol were common to all essential oils, whereas  $\alpha$ -pinene, linalol, and carvacrol methyl ether were found in only one oil (especially *T. kotschyanus* oil). *Thymus vulgaris* L., *Thymus daenensis* Celak and *Thymus kotschyanus* Bioss. & Hohen were characterized by their high thymol content (46.09, 44.92 and 35.15%), compared with *Zataria multiflora* L. in which the highest percentage detected was 5.1%. *Zataria multiflora* L. yielded carvacrol-rich oils (81.2%), while *Thymus daenensis* Celak showed the lower content of that (9.43%).





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### Introduction of some Medicinal Plants used in Infectious Diseases Treatment in Traditional Medicine of North Khorasan Province (Case Study: Esfarayen)

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#### ARTICLE INFO

##### Keywords:

Ethnobotani  
Medicinal plants  
Esfarayen  
Infectious diseases

#### ABSTRACT

Access to unwritten traditional medicine from different regions, especially rural and inaccessible areas in each country can be a very valuable resource for the production of herbal medicines. Iran, with its diverse vegetation, different ethnic groups as well as its historical background in the field of traditional medicine and medicinal plants, can have a lot of information about traditional medicine and how to use medicinal plants, which has been passed down from generation to generation. Our goal in this research is to attain this ancient knowledge that is still used by the natives of the region for many years. Because they have to use the plants around them for their medical care. In this study, upon arrival in the city of Esfarayen, we questioned all 165 villages and found 38 species belonging to 18 families that were used to treat infectious diseases. These medicinal products are either used alone as a single plant, in combination with several plants or with animal or mineral products.

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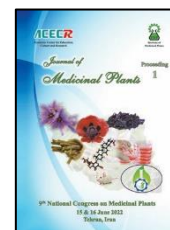
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### The Molecular Investigations on *Artemisia* L. (Asteraceae) in North of Iran

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#### ARTICLE INFO

##### Keywords:

Golestan Province

ITS

Maximum parsimony

Rpl32-trnL<sub>(UAG)</sub>

#### ABSTRACT

*Artemisia* L. is one of the largest genera in the family Asteraceae and the largest genus in the tribe Anthemideae comprises from 200 to more than 500 taxa at the specific or infraspecific level. The genus *Artemisia* is systematically very complex. The aim of this study was to evaluate taxonomic positions of taxa of the genus *Artemisia* in Golestan Province using some molecular techniques. In this molecular study, 12 individuals belong to 4 species of *Artemisia* were examined. Analyses were performed on the combined dataset using maximum parsimony, maximum likelihood and Bayesian inference and Molecular parameters obtained from co-evaluations of sequences of the rpl32-trnL<sub>(UAG)</sub> and ITS regions of examined individuals were used in the phylogenetic tree drawing. According to the results of this study, two molecular groups have been formed based on the DNA sequence similarity of the species, but there are no obvious morphological characters corresponding to two molecular groups. It was found that there were no gene flow and hybridization between the 4 species of the *Artemisia* and these 4 species were found completed their speciation. This study is important as it is the first molecular based study relating with belong to *Artemisia* species growing naturally in North of Iran.

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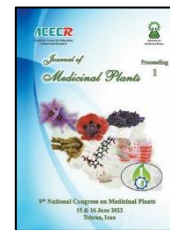
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### HPLC Determination of Bioactive Flavonoids in *Onobrychis cornuta* (Fabaceae-Hedysareae)

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#### ARTICLE INFO

##### Keywords:

*Onobrychis cornuta*  
Flavonoids  
Antioxidative property  
Phenolic compounds

#### ABSTRACT

*Onobrychis cornuta* (L.) Desv. is a multi-flowered dense spiny cushion-forming shrub with imparipinnate leaves. Its distributional range stretches from Turkey to C Asia including major parts of highlands of Iran. *O. cornuta* is both an important forage herb and also a great melliferous plant. It plays crucial ecological roles including preventing soil erosion and harboring other plant or animal species. In the present study presence and amount of some individual phenolic compounds were determined using HPLC using the aerial parts. Flavonoids are well-known phenolic compounds showing a wide range of biological properties such as significant antioxidative activities. The most abundant flavonoids were Vitexin, Diadzein, Kaempferol, Diosmin, Narengenin, Catechin, Myricetin, and Apigenin, of which, Catechin and Vitexin were respectively determined in the highest and lowest amounts. This is the first report on the phenolic components in the species and indicates that this widely spread plant contains important biologically active phytochemicals.

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### The Use of Macroporous Synthetic Adsorbents in the Extraction and Purification of Anthocyanins from Iranian Saffron Petal (*Crocus sativus* L.)

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#### ARTICLE INFO

##### Keywords:

Anthocyanin  
Adsorption  
Desorption  
Synthetic adsorbents  
Saffron petal

#### ABSTRACT

Today, the need to use natural extractable pigments, including anthocyanin pigments, in various industries such as food and medicine, has led researchers to look for a new source of dye. The biological properties of anthocyanins have doubled the importance of its study, so that among all the properties, strengthening the cardiovascular system and its function as a free radical scavenger makes anthocyanins a valuable source to control cancer, thus designing a method of increasing the percentage purity of anthocyanin pigments can be valuable. Saffron petals, the discarded part of saffron flowers, is considered as one of the extractable sources of anthocyanin pigment. In the research below, the amount of total monomeric anthocyanin equivalent to dried petals was calculated to be 0/82 g / 100g. Then the adsorption of anthocyanin on synthetic porous adsorbent based on Di-Vinyl-Benzene, resin LXA-860 was investigated by static experiments in laboratory scale. Which show a good behavior in the adsorption and desorption of anthocyanin compounds, these amounts were also measured by high performance liquid chromatography analysis. LXA-860 resin showed good ability in the adsorption of the anthocyanin compound of delphinidin 3,5-O-diglucoside as the predominant anthocyanin in the plant according to the specific properties of the adsorbent. Because of the importance of the compound mentioned, optimization on the parameters of the initial concentration of loaded extract, kinetic of adsorption and desorption and the appropriate amount of adsorbent was optimized. Then dynamic experiments were performed on the glass column and the parameter of loading extract amount and washing volume was optimized. Finally, The use of synthetic adsorbents for the extraction of anthocyanin pigment compounds from saffron petals, as an acceptable source for economic efficiency and reduction of environmental pollution, will be a suitable method.

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### Introduction of some Compound Drugs Used in Gastrointestinal Diseases Treatment in Traditional Medicine of North Khorasan Province (Case study: Esfarayen)

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#### ARTICLE INFO

##### Keywords:

Ethnobotani  
Medicinal plants  
Esfarayen  
Gastrointestinal  
diseases

#### ABSTRACT

According to the reports, medicinal use of plants dates back to at least 60,000 years. During this time, traditional systems of medicines have employed medicinal plants and their derivatives as valuable sources of new biologically active compounds and have been clinically practiced all over the world. Iran has an ancient history of medicine and pharmacy. In the meantime, various books have been written by scientists of that time, which introduce medicinal plants and how to prepare drugs of plant origin. In these written works, a number of medicines were used in the form of teas, but a number of herbal medicines were prepared as a product with special rules by the pharmacists of that time. What was interesting in this research and less seen in previous research [1] was that most of the medicinal forms made by the natives of the region are prepared and processed from a combination of several plants. Our goal in this article is to mention several medication instructions that are used to treat gastrointestinal diseases. Out of 165 villages that belong to Esfarayen city, after collecting and identifying plants [2], 24 species (about 21 Genus: *Alcea*, *Alhagi*, *Camellia*, *Carum*, *Cassia*, *Cuminum*, *Cydonia*, *Dianthus*, *Ferula*, *Fumaria*, *Glycyrrhiza*, *Mentha*, *Papaver*, *Plantago*, *Prunus*, *Rosa*, *Sisymbrium*, *Stachys*, *Teucrium*, *Zingiber*, *Ziziphus*) belonging to 13 families (Apiaceae, Asteraceae, Brassicaceae, Fabaceae, Fumariaceae, Caryophyllaceae, Lamiaceae, Rosaceae, Papaveraceae, Theaceae, Plantaginaceae, Malvaceae, Zingiberaceae) were registered during ethnobotanical studies in this area.

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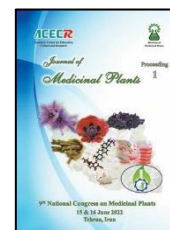
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### Antimicrobial Properties of Ethanol Extracts of *Rosa canina*. L Collected from Different Habitats in Lorestan

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#### ARTICLE INFO

Keywords:

Extraction

*Rosa canina*

Antimicrobial activity

Lorestan

#### ABSTRACT

Dog rose (*Rosa canina* L.) is a wild native species in Iran belongs to the Rosaceae family. The fruits of the plant are known as valuable source of nutrients and metabolites for their application in food and pharmaceutical industry. They contain a wide range of biologically and physiologically active ingredients from vitamins (C, B, E, and K), flavonoids, carotenes, carbohydrates, to organic acids [1]. In the present study, antimicrobial activity of ethanolic extracts of *R. canina* samples collected from different habitats (Nurabad, KhorramAbad, Aleshtar, Dorud and Aligudarz) in Lorestan province was investigated using disc diffusion technique (DDT) and minimum inhibition concentration (MIC) against some Gram-positive and Gram-negative bacteria such as *Bacillus subtilis* ATCC 605, *Escherichia coli* ATCC 11775, *Streptococcus pneumoniae* ATCC 6305, *Staphylococcus aureus* ATCC 25923, *Salmonella typhimurium* ATCC 14028, and *Klebsiella pneumonia* ATCC 13883. The results showed that the extracts of collected plants from both Nurabad and Dorud habitats had the greatest effect on *B. subtilis* and the least effect on both *S. typhimurium* and *K. pneumonia* in the DDT method. The extracts of Nurabad and Dorud showed the highest efficiency on *B. subtilis* with minimum inhibitory concentration equal to 100 µg/ml. The extracts of these two habitats exhibited the minimum inhibition on bacteria *K. pneumonia* and *S. typhimurium*. The results of this study showed that some extracts of this plant can be considered as antibacterial in food industry.

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### A Comprehensive HPTLC Metabolite Profiling of Iranian Safflower Genotypes

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#### ARTICLE INFO

**Keywords:**

High-performance thin-layer chromatography (HPTLC)  
Carthamidine  
Carthamin  
Safflower

#### ABSTRACT

Safflower (*Carthamus tinctorius*) is one of the world's oldest crops. Safflower petals contains two pigments red (0.83 w/w %) and yellow (30 w/w%). The structures of safflower red and yellow pigments are reported as C-glucosyl quinochalcone moieties that present only in *C. tinctorius*. The yellow pigment include Hydroxy safflower A and hydroxy safflower B. Precarthamin is the minor yellow pigment. Traditionally, safflower was grown for its seeds and coloring, and flavoring food, as medicines and for making red and yellow dyes. Safflower pigments are safe for food and have curative effects on diseases such as lack of oxygen coronary heart diseases, myocardial infarction, cerebral thrombosis and renal thrombosis etc. In addition, Its petals are used for healing diseases such as hypertension, coronary heart ailments, rheumatism. The purpose of this research is to purify the pigmentation of safflower on an industrial scale as well as to investigate the different species collected from this plant. the silica gel column followed by HPLC semi-Prep used as purify the yellow and red color of the plant and then to measure the three main safflower metabolites from different species, HPTLC technique was developed, which is a fast and inexpensive system. solvent for extraction was optimized as water: acetone (1:1) for quantification of safflower yellow and red. silica TLC plates were used with the solvent system containing n-butanol, acetic acid, water, methanol. analysis of color was performed at the absorbance mode of 400 nm for yellow and 520 nm for red. The highest amount of Hydroxy safflower yellow A, hydroxy safflower B and carthamin was 32.87%±0.1(Padideh) 13.78%±0.2 (Padideh) ,9 % (TN79604) and the lowest amount of hydroxy safflower A, hydroxy safflower B and carthamin was 4.72%±0.13(TN79815), 4.07±0.01 (TN79815), 0.02% (S-541) respectability. HPTLC method is a user-friendly method that can be successfully used for the qualitative and quantitative analysis of herbal materials with different species of safflower.

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### Analysis of Polyphenolic Compounds in Extracts from Leaves of Some *Catharanthus roseus* Cultivars by High-Performance Liquid Chromatography (HPLC)

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#### ARTICLE INFO

##### Keywords:

*Catharanthus roseus*  
HPLC  
Polyphenol compound  
Rosmarinic acid

#### ABSTRACT

*Catharanthus roseus* (Madagascar periwinkle) is a medicinal plant producing about more than 150 different terpenoid indole alkaloids (TIAs). Among the many pharmaceutically important TIAs are vinblastine and vincristine, the well-known anticancer agents that have been long in clinical use. Nevertheless, report has also suggested that *C. roseus* contains a wide spectrum of phenolic compounds besides TIAs, such as caffeic acid, rosmarinic acid, chlorogenic acid, gallic acid, and cinnamic acid derivatives. These natural products contribute to human health by exerting various biological activities including antioxidant, antibacterial and anticancer [1,2]. The aim of this study was to evaluate the content of polyphenolic compounds in seven cultivars of *C. roseus* (*C. roseus*, var Blush (CR1), *C. roseus*, var Apricot (CR2), *C. roseus*, var Red Really (CR3), *C. roseus*, var Polka Dot (CR4), *C. roseus*, var Burgundy Halo (CR5), *C. roseus*, var Burgundy (CR6) and *C. roseus*, var Orange (CR7)). For this purpose, the methanolic extract of the leaves of these cultivars was prepared and the content of polyphenolic compounds (rosmarinic acid, gallic acid, caffeic acid, chlorogenic acid, coumaric acid, cinnamic acid, apigenin, quercetin and rutin) were evaluated by HPLC. The results show that the highest rosmarinic acid, cinnamic acid and quercetin content were observed in *C. roseus*, var: Polka Dot (CR4). In terms of coumaric acid, rutin and apigenin, the highest amount was obtained in *C. roseus*, var Blush (CR1). The highest production of caffeic acid and chlorogenic acid rate was observed in *C. roseus*, var Red Really (CR3). Finally, maximum production of gallic acid polyphenols was achieved in *C. roseus*, var Burgundy Halo (CR5). The results of this study can be used in selecting superior cultivars to produce valuable polyphenolic compounds.

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### Study of Genetic Variation in some Hawthorn Species (*Crataegus* L.) Based on Antioxidant Activity and Biochemical Traits from West Azerbaijan Province

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#### ARTICLE INFO

##### Keywords:

Antioxidant activity  
Anthocyanin  
Hawthorn  
Phenolics  
Phytochemicals

#### ABSTRACT

The different *Crataegus* species recently have been noticed due to their notable phytochemical compound and biological activities. Polyphenols, bioflavonoids, flavonoid glycosides, antioxidants, vitamins, tannins, organic acids, and some phenolic acids are the main active constituents of the *Crataegus* species. West Azerbaijan is one of the biodiversity centers of medicinal *Crataegus* plant. In this study, total phenolic and flavonoid contents, tannin, anthocyanin, ascorbic acid, carotenoid and antioxidant activity by DPPH assay of four native *Crataegus* species (*C. azarolus*, *C. pseudoheterophylla*, *C. meyeri* and *C. atrosanguinea*) were assessed. The highest concentrations of total phenolic (59.20 mg GAE/g FW), total flavonoid (1.90 mg QUE/g FW), total tannin (67.31 mg/g FW), total anthocyanin (6.9 mg/g FW), total ascorbic acid (51.25 mg/100g FW), total carotenoid (61.1 mg/100g FW) and antioxidant activity (86.99 %) were obtained in *C. pseudoheterophylla*, *C. meyeri*, *C. meyeri*, *C. pseudoheterophylla*, *C. pseudoheterophylla*, *C. atrosanguinea*, and *C. meyeri* species, respectively. The considerable variations in the antioxidant activity and biochemical traits of *Crataegus* species were demonstrated by our results. Hence, the evaluation of *Crataegus* genetic resources could supply precious data for screening species with high bioactive contents for producing natural antioxidants and other phytochemical compounds valuable for food and pharma industries [1,2].

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### Optimization Extraction of Aloins from *Aloe vera* Skin Using Central Composite Design-Response Surface Methodology and Investigation of its Biological Properties

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#### ARTICLE INFO

#### ABSTRACT

Food waste contains precious bioactive compounds used in the food and pharmaceutical industries, such as *Aloe vera* waste. The aloe vera is a cactus-like perennial with dense, rosette-like, fleshy leaves. This plant has been used in cosmetics formulation, skin protection, wound healing, sunscreen, etc. [1]. It has also shown significant effects in treating asthma, gastric ulcers and diabetes. The leaf of this plant produces a bitter yellow liquid called the middle layer (latex) immediately after cutting. This latex contains anthraquinones, a subset of phenolic compounds such as aloe-emodin, aloin A and B. These compounds have been shown antiviral, anticancer, antibacterial, and laxative properties. The extraction of aloin A and B from aloe skin powder using ethanol solvent using probe ultra-sonic and optimization was studied by response surface methodology. The three independent variables were sonication time (A), solvent composition (B) and sonication power (C). Fit summary suggested quadratic correlation according to the model obtained using central composite design (CCD)-Response surface methodology (RSM). The analysis of variance (ANOVA) results show the accuracy of the model and significance of the A and B parameters and according to the diagrams, the C factor is effective but independent of other parameters. In other words, in this system, Sonic Power has a positive effect. The probability values less than 0.05 indicate that the model terms are significant. P-value < 0.0001 for the response in this report confirms that the model is highly significant. The optimization of extraction procedures resulted in the maximum amount of aloin A (4.327 mg/g) and B (4.461 mg/g) with 80 % ethanol in 29 min with 65% sonic power at 60 °C. MTT cell viability was assessed in A549 cells (a human lung cancer cell line), as the concentration of *A. vera* leaf skin extract increases, the percentage of the toxicity rate increases ( $p < 0.005$ ) and the morphology of *A. vera* leaf skin surface after the ultrasound treatment and conventional extraction was explicated via the Scanning Electron Microscopy (SEM).

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### Optimization of *In Vitro* Bulblet Induction by Different Concentrations of Benzylaminopurine, Naphthalene Acetic Acid and Sucrose in Six Persian Shallot (*Allium hirtifolium*) Ecotypes

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Bulblet Ecotype Persian Shallot Sucrose</p>	<p>Immature flowers of six Persian shallot ecotypes (Fariden, Khansar, Shahre kord, Kordestan, Mashhad and Hamedan) were cultured on BDS medium with two concentration of sucrose (50 and 100grl<sup>-1</sup>) and different concentration of NAA (0, 1 and 2 mg<sup>l</sup>-<sup>1</sup>) and BAP (0, 1 and 2 mg<sup>l</sup>-<sup>1</sup>). The results showed that different hormonal treatments, sucrose concentration and ecotypes affected the time and percent of bulblet regeneration as well as the number, length and weight of regenerated bulblets. Application of sucrose, NAA and BAP accelerated the bulblet regeneration of Persian shallot explants and the highest bulblet regeneration and maximum bulblets number were obtained by 2 mg<sup>l</sup>-<sup>1</sup> BAP with 2 mg<sup>l</sup>-<sup>1</sup>NAA in medium with 100grl<sup>-1</sup> sucrose. The explants of Mashhad and Hamedan ecotypes showed the highest percent of bulblet regeneration and bulblets number per each explant. The rooting of bulblet in all the studied ecotypes was obtained in hormone-free medium in the shortest time (25 days after culture) in comparison with other treatments that was also accompanied with the highest percent of rooting. According to the results the culture of Mashhad ecotype in BDS medium with 100grl<sup>-1</sup> sucrose and 2 mg<sup>l</sup>-<sup>1</sup> BAP with 2mg<sup>l</sup>-<sup>1</sup> NAA is advisable for <i>in vitro</i> bulblets production of Persian shallot [1, 2].</p>

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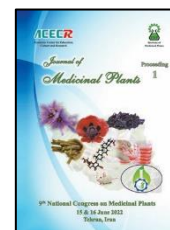
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Poster Presentation ID: 197

### Enrichment Polyphenol from Red Grape Leaves Extract Using with Macroporous Resin; Isotherm and Kinetic Studies and Investigation of Antioxidant Properties

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#### ARTICLE INFO

#### ABSTRACT

*Vitis vinifera* L., known as the vine, is the native Mediterranean region grown worldwide today. Grape leaves and seeds are byproducts and contain valuable secondary metabolites, Mainly phenolic compounds. Grape leaves and major components, anthocyanin, have been used to treat inflammatory disorders, stopping bleeding and pain.<sup>1</sup> In recent years, macroporous adsorption resins have been successfully used to isolate, enrich and purify herbal products in laboratory and industry-wide processes. This is due to high capacities, potential recovery of adsorbed molecules, relatively low costs, and easy regeneration.<sup>2</sup> In this research work, we study the process of adsorption/desorption of grape extract on the LXA10 macroporous resin. The extraction phytochemical from grape leaves was extracted using an ultra-sound assisted probe using water and ethanol (50:50). The extraction yield was performed 26.4%. All adsorption and desorption processes on the resin have been optimized for maximum separation efficiency. The optimal operating conditions are obtained: contact time 40 min, pH Value 3.26, resin dose 20 g to reach adsorption equilibrium, contact time of 8 min, and four-bed volume (BV) solvent consumption to get maximum desorption percentage. The Langmuir model was considered a better model for describing adsorption equilibrium due to higher correlation coefficients ( $R^2 = 0.9962$ ). The isotherm modeling is essential to elucidate the adsorption behavior and obtain information regarding the adsorption mechanism. The enrichment factor was monitored by quantification of major compounds such as quercetin-3-*O*-glucuronide and quercetin-3-*O*-glucoside by HPLC –UV. The results showed that the concentration of these two-quercetin increased 2.5 times after the enrichment process. The antioxidant activity of grape leaves extracts determined as ferric reducing-antioxidant power (FRAP) ranged from 252.37 to 408.03 mMolFe (II)/mg extract.

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Poster Presentation ID: 198

### Application of Solvent-antisolvent Crystallization Technique for Excellent Enrichment of Crocin from Saffron

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#### ARTICLE INFO

##### Keywords:

Saffron  
Crocin  
Solvent-antisolvent  
Recrystallization

#### ABSTRACT

Saffron (*Crocus sativus* L.) is a medicinal plant that is obtained from the stigmas dried of the plant [1]. This plant originally cultivated in the East, Middle East and later in some Mediterranean countries. Its main components consist crocin, picrocrocin and safranal [2]. Saffron is used as the spice to give color, taste and aroma to foods and beverages [3,4]. Purification of crocins as the most bioactive compounds inside saffron is one the main concern of pharmaceutical industry. Looking for a cost effective method, in this work, solvent-antisolvent recrystallization technique was used for extraction of crocins from saffron. We used ethanol and ethylacetoacetate as solvent and antisolvent, respectively. Some important experimental parameters such as solvent:antisolvent ratio, temperature, injection rate and extract concentration were examined and optimized. Under optimized conditions, crocin 1 was enriched up to 47% while the extraction of picrocrocin was excluded. However, the extraction of crocin 1 and picrocrocin in crude extract was 26%, 23%, respectively.

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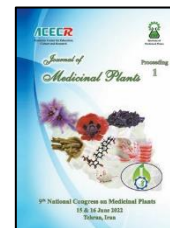
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Poster Presentation ID: 199

### Phytochemical Study of *Eryngium planum* L. (Iran and Poland) and *Eryngium alpinum* L. Species

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> <i>E. planum</i> <i>E. alpinum</i> Yield, chemical composition Essential oil</p>	<p><i>E. planum</i> and <i>E. alpinum</i> are endangered species belonging to the subfamily Saniculoideae of Apiaceae family. These species don't have much yield of essential oil but there are a wide range and more attractive compounds in their essential oils and sweat which has a direct effect on treating diabetes. In addition, anti-diabetic, anti-inflammatory and diuretic properties have been reported for this genus. In this research, seeds of three samples including two species, were prepared from Iran and Poland. At first the seeds were planted in a greenhouse, then the seedlings were transferred to the field. The experimental design was performed in the form of randomized complete blocks with three replicates. The plants were harvested at the full flowering stage, and after separation the different organs, samples were shade dried, then the essential oil was extracted by hydrodistillation. This study describes the yield and the chemical composition of the essential oil extracted from shoot, roots, stems, leaves and flowers of one-year Polish <i>E. planum</i>, <i>E. alpinum</i> and three-year Iranian <i>E. planum</i> species. Essential oils analysis were carried out by gas chromatography-mass spectrometry (GC-MS) and quantified by GC-FID. The yield of essential oil in different organs of the mentioned species showed different values. The highest percentage of essential oils were in the roots of Polish species (0.6%), then the stems and flowers of all three plants, which had the same yield (0.4%), and finally the leaves of Iranian <i>E. planum</i> (0.33%). It was observed that the lowest percentage of essential oil was obtained in the roots of Iranian <i>E. planum</i> (0.12%). In total, more than fifty compounds were identified in each essential oil. The main constituents belongs to the aerial parts were sesquiterpenes, which is consistent with previous reports. The main compounds of <i>E. planum</i> (Poland), <i>E. alpinum</i> (Poland), and <i>E. planum</i> (Iran), were (Z)-Falcarinol (59, 68.8 and 67.4%) and 2,3,6-Trimethyl benzaldehyde (13.7, 13.7 and 16.4 %) in roots, cis-Chrysanthenyl acetate (19.3%, 31.6% and 14.9%) in flowers, 14-hydroxy-(Z)-Caryophyllene (43%, 4.8% and 10.2%) respectively in leaves. Also, the range of <math>\beta</math>-Elemene (0.3-42.4%) and <math>\beta</math>-Selinene (0.4-22.6%) was obtained in different organs, which the highest amount of them was presented in the aerial parts [1- 5].</p>

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Poster Presentation ID: 200

### Optimization Turmerones Extraction from Essential Oil of *Curcuma longa* L.

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#### ARTICLE INFO

Keywords:

*Curcuma longa*

Response Surface

Method

Essential oil

Turmerons

#### ABSTRACT

*Curcuma longa* rhizome known as turmeric contains some bisabolene sesquiterpene structures called turmerones in its essential oil. Turmerones including ar-Turmerone,  $\alpha$ -Turmerone,  $\beta$ -Turmerone and (*E*)  $\alpha$ -Atlantone have been recently reported as an anticonvulsant agent for treatment of epilepsy. In this study, the response surface method was used to optimize the extraction of turmerones in hydrodistillation process. The variables were ratio of turmeric weight (20, 30, 40, 50 and 60 grams) to 500 ml water, water pH (2, 3.5, 5, 6.5, 8) and distillation time (1, 2, 3, 4, 5 h). Essential oil yield was reported based as V/W % and analyzed by GC and GC/MS. Results showed that the more weight ratio of the powder/water, the less yield of turmeric essential oil and the percentage of ar-Turmerone,  $\beta$ -Turmerone and (*E*)  $\alpha$ -Atlantone but had no significant effect on the amount of  $\alpha$ -Turmerone. The main active ingredients in the essential oil were four compounds of oxygenated sesquiterpene, which was extracted in different methods with values between 63/50 to 78.51% was extracted. Increased essential oil yields in the presence of a higher water-to-plant ratio are probably due to improved contact between plant particles and water, access to essential oils and effective compounds for further distillation. Also, the reason might be less energy availability per particle leading to less heating effect with increase in plant material loading. Also, the maximum absorption of heat will be at vessel surface compared to the core of the vessel, hence, there would be no proper heat penetration in the core of the flask. An increase in yield with increasing extraction time has been reported in various studies. At this study the highest amount of essential oil was extracted in 3 hours. From 4 hours onwards, increasing the extraction time did not increase the yield. However, the extraction time did not have a significant effect on the amount of turmerons. The pH of distilled water in the range of treatments specified in this work, as in the study conducted by Tavakolizadeh *et al.*, did not show a significant effect on the efficiency of essential oils and the concentration of turmerones compounds. Maximum yield (3.5% v / w) and maximum extraction of turmerons (78.5%) were obtained under optimal conditions including material to water ratio of 20 g per 500 ml, extraction time of 3 hours and pH of 5 [1-6].

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### Effects of Non-chemical Fertilizers on Black Cumin (*Nigella sativa* L.)

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#### ARTICLE INFO

*Keywords:*

*Nigella sativa*  
Vermicompost  
Amino acid  
Essential oil

#### ABSTRACT

The current study was conducted as a factorial experiment at the Forest and Rangeland Research Institute of Iran in 2019 as a randomized complete block design with three replications. The studied treatments included six vermicompost levels (0, 3, 6, 9, 12, and 15 tons/ha), and the second factor included the foliar application of amino acid at 3 levels (no foliar application, foliar application at the beginning of flowering stage and foliar application at the beginning of the encapsulation stage). The results of the study in 2019 showed that amino acids, vermicompost, and their interaction had a significant effect on leaf yield, oil content, sabinene percentage. Moreover, the interaction of amino acid × vermicompost had a significant effect on biological yield, essential oil yield, oil yield, α-thujone percentage, and thymoquinone percentage. Comparing the mean oil yield showed that the highest oil yield (vermicompost, 73.22 kg/ha) was related to the 6 tons of vermicompost × without foliar application of amino acids. The results showed that using organic and biofertilizers could increase the quantity and quality of *Nigella sativa*.

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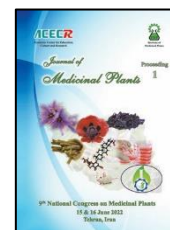
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Poster Presentation ID: 203

### Evaluation of the Amount and Composition of Active Ingredients of 12 Populations of *Tanacetum pinnatum* Boiss. in Agronomic Conditions

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#### ARTICLE INFO

##### Keywords:

Phytochemical  
Population  
Agronomic condition  
Composition of  
essential oil  
*Tanacetum pinnatum*

#### ABSTRACT

*Tanacetum pinnatum* Boiss. is a perennial plant native to Iran from the Asteraceae family. The *Tanacetum* genus is used to treat migraine, rheumatism, and anti-inflammatory diseases. In this study, first seeds of 12 populations from four provinces of Tehran, Alborz, Hamedan and Kermanshah were collected and were planted in planting trays in medium containing peat moss and placed in greenhouse. After five months, the seedlings were transferred to Alborz Research Station and planted in three replications on the main land in a completely randomized block design. In the first year, leaves without flowers and in the second year, flowers and leaves were collected. Essential oil was extracted by using water distillation with Clevenger device. The essential oil was dehydrated with anhydrous sodium sulfate. Gas chromatography-mass spectrometry (GC/MS) device was used to identify the essential oil compounds. The results of analysis of variance showed that the effect of population on leaf essential oil in the first year, leaves and flowers in the second year of cultivation was significant at the level of 1% ( $P < 0.01$ ). The results of mean comparison showed that there was a significant difference in the amount of essential oil between different populations. The highest amount of essential oil was observed in leaves of population 4 and the lowest amount of essential oil in population 5 was observed in the first crop year. The highest amount of essential oil per leaf of population 12 and the lowest amount of essential oil in population 6 was observed in the second crop year. The highest amount of essential oil was observed in flowers of population 12 and the lowest amount of essential oil was observed in populations 1, 3 and 8. In flowers, the most active ingredient was  $\beta$ -eudesmol in population 4 with 42.87%, in population 3 the active ingredient n-pentadecanol was 85.14 and in population 12 cubenol was 2.6%. In the second year leaves, the most active ingredient was  $\beta$ -eudesmol in population 4 with 54.36% and  $\alpha$ -chenopodiol in population 3 with 5.37%. In the first year leaves, the most active ingredient was  $\beta$ -eudesmol in population 4 with 24.78%,  $\alpha$ -chenopodiol in population 9 was 31.05%. Due to the high content of essential oil and the percentage of  $\beta$ -eudesmol in population 4, this population is recommended as the best population for cultivation of this plant [1,2].

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Poster Presentation ID: 204

### Variability of *Catharanthus Roseus* Medicinal Plant Cultivars Based on Morphological Characters

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ARTICLE INFO	ABSTRACT
<p><i>Keywords:</i> <i>Catharanthus roseus</i> Cultivar Diversity Medicinal plants Morphological traits</p>	<p><i>Catharanthus roseus</i>, from the Apocynaceae family, is among the most important medicinal plants used for treating diseases such as cancer, due to the presence of 120 terpenoids in the plant. It is one of the best sources of pharmaceutically active terpenoid indole alkaloids (TIAs), such as ajmaline, ajmalicine, serpentine, vincristine, vinblastine, vindoline, vinpocetine and reserpine. Herbal plants growing in nature contain proprietary phytochemicals and are valuable genetic resources that should be kept in support of community-based medicines in nature. Indeed, the study of morphological and phytochemical diversity among wild populations of medicinal and aromatic plants, is one of the essential stages of their domestication, cultivation, improvement, and commercial production in agricultural systems. In present study, some morphological traits of seven cultivars of <i>C. roseus</i> (<i>C. roseus</i>, var Blush (CR1), <i>C. roseus</i>, var Apricot (CR2), <i>C. roseus</i>, var Red Really (CR3), <i>C. roseus</i>, var Polka Dot (CR4), <i>C. roseus</i>, var Burgundy Halo (CR5), <i>C. roseus</i>, var Burgundy (CR6) and <i>C. roseus</i>, var Orange (CR7)) were measured for determining valuable characters for future breeding programs and medicinal purposes. The results of variance analysis on morphological data showed that the measured traits including leaf length and width, leaf area, stem height, leaf and stem fresh weight were significant at 5 % probability level among the studied <i>C. roseus</i> cultivars. The maximum leaf length (4.79 cm) and width (2.14 cm) and leaf area (5.02 cm<sup>2</sup>) were observed in <i>C. roseus</i>, var Blush (CR1). <i>C. roseus</i>, var Burgundy (CR6) had the maximum stem height (29cm), while the highest leaf (41.25g) and stem (14.83g) fresh weight was observed in <i>C. roseus</i>, var Orange (CR7).</p>

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### Biological Activities of *Phlomooides labiosa* Seed, Aerial part, and Rhizome Following Nanoencapsulation

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#### ARTICLE INFO

Keywords:

*Phlomooides labiosa*

Volatile Oils

Antioxidants

Biological Assay

Liposomes

#### ABSTRACT

*Phlomooides* species have been utilized traditionally to treat various ailments, including wound healing and gastrointestinal problems. The present study examined the phytochemical and biological characteristics of *Phlomooides labiosa* in liposomal and non-liposomal forms. Seeds, aerial portions, and rhizomes were air-dried and extracted using n-hexane, dichloromethane, ethyl acetate, and methanol solvents. The volatile oil and fatty acid compositions were evaluated by the GC/MS technique. Additionally, all extracts' antioxidant (DPPH technique), antibacterial, and cytotoxic (MTT assay) properties were assessed *in vitro*. Seeds are valuable sources of edible vegetable oils with a low saturated fatty acid content and cardiovascular disease risk, boosting their nutritional value. Findings demonstrated that oleic acid is the predominant fatty acid component of *P. labiosa* seed oil. Due to the great total yield of 37.62 (w/w %) and high oleic acid content, the seed oil of *P. labiosa* may be suitable for nutritional uses. The major constituent of the essential oil was biologically active caryophyllene (33.88%). Moreover, methanol and ethyl acetate extracts revealed radical scavenging activity congruence with the phenolic content. The ethyl acetate extracts of the seeds and aerial parts are possible candidates for food preservation investigations regarding their considerable antioxidant and antibacterial properties. Furthermore, the aerial part's dichloromethane extract exhibited the greatest cytotoxicity of any sample examined (IC<sub>50</sub>=40.8816.05 g/mL). The purpose of this study was to identify extracts with high biological activity in order to direct future studies toward purifying the active components of chosen samples using a variety of chromatographic methods. Subsequently, the formulation was optimized for maximum efficacy. Liposomal extracts were prepared by film hydration method. Some physicochemical features, including particle size, zeta potential, and transmission electron microscope (TEM) images, were assessed for the nanoparticles as well. Contrary to expectations, nanoliposomes had lower antibacterial and cytotoxic activity compared to non-liposomal extracts. While nanoliposomes increase the solubility of the extract, the membrane may postpone its release, hence reducing the activities mentioned above. As a result, confirmation of the outcomes of encapsulation requires more investigations on this subject [1].

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Tehran, Iran



Poster Presentation ID: 206

### Flavonoids from Aerial part of *Zeravschania aucheri*

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#### ARTICLE INFO

Keywords:

*Zeravschania Aucheri*

*Peucedanum aucheri*

Flavonoids

Kaempferol

Narcissin

#### ABSTRACT

The genus *Peucedanum* with more than 100 species in the world is one of the biggest genera in Apiaceae family, and the plants could be found in South, Western and Central Asia, Europe and Mediterranean region. *Peucedanum aucheri* Boiss or *Zeravschania aucheri* (Apiaceae) is an herbaceous wild plant native to Iran and is used in Iranian folk medicine as a diuretic and for the treatment of kidney disorders [1]. Previous investigations have been focused on different species of *Zeravschania* of Iranian origin recognize the presence of essential oils, antibacterial and antioxidative properties [2]. For this project, the plant was collected in the spring of 2019 from the heights of Semnan province. Phytochemical investigation of the Butanol Extracts obtained from the aerial parts of *Z. aucheri* on silica gel (normal and reversed phases) and Sephadex LH-20 columns resulted in the isolation of two Flavonoids. The structure of the compounds was identified as Kaempferol and Narcissin using <sup>1</sup>H-NMR, <sup>13</sup>C-NMR and EI-MS spectral analysis, as well as by comparison with those reported in literature.

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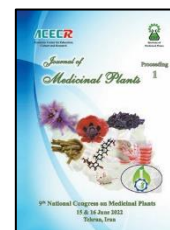
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### Diversity of Medicinal Plant Species in Gole-zard Region

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#### ARTICLE INFO

##### Keywords:

Medicinal plants

Biodiversity

*Thymus*

*Ziziphora*

*Allium*

#### ABSTRACT

Gole-zard (Markazi province) located at the eastern slopes of the Zagros Mountain Ranges showing striking ecological diversity is accordingly rich in plant species diversity. Medicinal plants have been using for treatment of different health problems since ancient times. Exploring and recording biodiversity and distribution of species are of great importance in phytogeography, conservation biology, and sustainable management of natural resources. In the present study, the Gole-zard region was explored and several hundreds of plant species were observed, collected and scientifically identified. The results showed the area has a remarkably diverse flora of medicinal plants, as nearly 80 edible and/or curative species were documented. The Lamiaceae family followed by Asteraceae and Apiaceae were found as the most medicinal plant containing families. Similarly, *Thymus*, *Ziziphora*, and *Allium* were represented by highest number of medicinal species. In accordance with the ecological conditions, perennial hemicryptophyte herbs constituted the majority of the species. *Thymus daenensis* Celak., *Ziziphora clinopodioides* Lam., *Stachys lavandulifolia* Vahl, *Rheum ribes* L., *Cichorium intybus* L., *Echinophora platyloba* DC., *Ferula assa-foetida* L., *Teucrium polium* L., *Allium akaka* S.G.Gmel. ex Schult. & Schult.f., *Malva sylvestris* L., and *Stachys inflata* Benth. are some of the well-known and widely consumed medicinal plants of the studied area.

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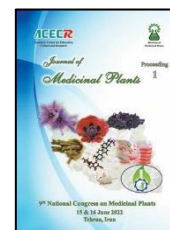
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### A Review on the Effect of *Foeniculum vulgare* (Fennel) on Post-menopausal Women

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#### ARTICLE INFO

##### Keywords:

Fennel  
*Foeniculum vulgare*  
Menopausal women  
Menopause

#### ABSTRACT

Vaginal atrophy is a common concern among postmenopausal women that occurs due to lower level of estrogen hormone after menopause (1). It may lead to inflammation of vagina and outer urinary tract in post menopause women affecting their quality of life and sexual function (2,3). One of mostly used source of phytoestrogens which is being used as a traditional remedy for controlling menopausal symptoms is *Foeniculum vulgare* (fennel). This review aimed to evaluate the effectiveness and safety of fennel for managing menopausal symptoms. Six databases were searched. We included randomized controlled trials (RCTs) that investigated both types: oral and topical forms of fennel treatment in menopausal women. 9 eligible RCTs were identified and included in this review. No significant side effect was reported. The cytology methods, vaginal pH, Menopause-Specific Quality of Life (MENQOL), Female Sexual Function Index (FSFI) and Menopause Rating Scale (MRS) questionnaires were used in this studies. There were no significant differences between intervention and control groups in vaginal pH and Maturation Vaginal Index (MVI) in oral treatments while topical ones showed significantly higher MVI and lower vaginal pH in fennel group ( $P < 0.005$ ). Menopausal symptoms were significantly improved in fennel groups. Studies also reported significantly higher Female Sexual Function Index in fennel groups comparing with control ones ( $P < 0.005$ ). Quality of life overall score results were contradictory. Our review indicates evidence for fennel on improving menopausal symptoms and Sexual Function although, the topical form of treatment showed a statistically more valid proof on this claim. However, the effectiveness and safety of fennel in improving Quality of Life remain unclear.

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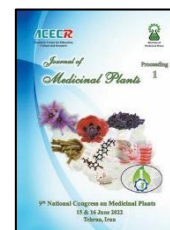
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Poster Presentation ID: 209

### High Throughput Virtual Screening Studies in Identification of Anti gastric Cancer Natural Products

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#### ARTICLE INFO

*Keywords:*

Anti gastric Cancer  
Natural products  
High Throughput  
Virtual Screening  
3D-QSAR model  
Pharmacophore  
generation

#### ABSTRACT

Gastric cancer (GC) is the fourth most common malignancy and remains the second leading cause of cancer-related death worldwide. Although chemotherapy and radiotherapy have been employed to treat GC, invasion and metastasis of cancer cells remains the main cause of GC related death, with a 5-year survival rate below 25%. Therefore, the development of effective and low toxicity drugs for the inhibition of tumor recurrence and metastasis is required. Natural biologically active products are widely used in clinical and basic research due to their low toxicity and often potent effects. At present, plant-derived anticancer drugs used clinically include vinblastine, vincristine, paclitaxel, and camptothecin. [1,2]. The development of novel drugs is a time-consuming process, and generally, several years of work are required for clinical approval. Hence, computational methods can be utilized for the design and engineering of drugs. The short time requirements of computational methods are conducive for high throughput screening of available medications to identify potential drugs for new diseases and predict the adverse effects of novel drugs. The purpose of this study is to find new natural compounds with the best and most effective anti-gastric cancer properties. So, pharmacophore generation, 3D-QSAR, virtual screening and molecular docking are used to discover these compounds. In this regard, a database of natural compounds was created and by using pharmacophore generation, 3D-QSAR model, virtual screening and molecular docking, 22 lead compounds were selected from this database, eventually. These selected lead compounds have the most anti-gastric cancer effects among the 183,885 compounds in the database and in the future can be considered as candidates for anti-gastric cancer drugs for further studies.

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Poster Presentation ID: 210

### Essential Oil Composition of *Onosma Microcarpum*

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#### ARTICLE INFO

#### ABSTRACT

*Onosma microcarpum* belongs to the Boraginaceae family and is native to Iran [1]. The genus *Onosma* encompasses several species endowed with significant pharmacological activities such as antioxidant, antiinflammatory, and antimicrobial [2]. In this study, the essential oil composition of the herb was characterized by GC/MS analysis. Analysis of the essential oil composition allowed to identify 38 volatile compounds in the volatile oil from the aerial parts. n-Heptacosane (21.9%), hexahydrofarnesyl acetone (17.8%), trans-phytol (7.3%), and (Z)-nerolidyl acetate (7.1%) were found as the major components. These findings showed that the EO of this herb contains oxygenated sesquiterpenes and alkanes as major constituents.

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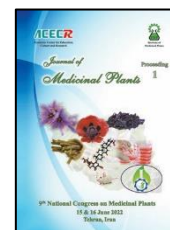
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Poster Presentation ID: 212

### Application of *Laurencia caspica* Seaweed to Improve Planting Circumstance of *Thymus vulgaris* L.

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#### ARTICLE INFO

##### Keywords:

Red Algae  
Biofertilizer  
Seed Germination  
Thyme  
Medicinal Plants

#### ABSTRACT

*Thymus vulgaris* L. is an important medicinal plant belongs to Lamiaceae family. In recent years, this species is regarded as the most economic and industrial medicinal plant in Iran and therefore it is cultivated in large scale in the country [1]. Also native seaweeds of Iran are fully natural resources of mineral and nutrients which distributed in Maritime areas in the north and south of the country [2]. The aim of this study was to investigate the effect of *Laurencia caspica* seaweed (Red Algae) extract as a biofertilizer on germination and growth indices of thyme. The seeds were embedded in different concentration (1%, 1.5%, 2%, 2.5%, 5%) and control (without treatment) of seaweed extract. After 10 days in vitro, some plant germination parameters such as germination percentage, root length and shoot length of seedlings treated with control seeds were examined. Obtained data were analyzed using Spss. ver.20 and graphs were prepared using excel softwares respectively. The results of this study showed that the extract of *L. caspica* seaweed had a significant effect on germination of *Thymus vulgaris* and therefore it can be used as suitable bio-fertilizer by manufacturers and companies of medicinal plants as a free and accessible resource in the Caspian Sea in the north of the country.

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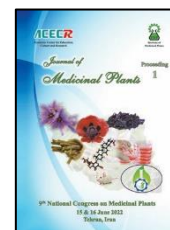
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Poster Presentation ID: 213

### The Effect of Precursor Feeding and Silicon Dioxide Nanoparticles (SiO<sub>2</sub> NPs) Elicitor on Antioxidant Enzyme Activity and Total Alkaloid Content in *Hyoscyamus reticulatus* Hairy Roots Culture

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#### ARTICLE INFO

**Keywords:**

Hairy Root

*Agrobacterium*

*rhizogenes*

Precursor

Tropane Alkaloids

Silicon Dioxide

Nanoparticles

#### ABSTRACT

The *Hyoscyamus reticulatus* L. is a rich source of the tropane alkaloids such as hyoscyamine and scopolamine which are widely used in pharmacy. Hairy root (HR) induction is the result of the infection of plant tissues with *Agrobacterium rhizogenes* and subsequently integration of The T-DNA regions of root inducing (Ri) plasmid into the plant genome and its subsequent expression. Hairy root cultures and elicitation are proposed to enhance important metabolites production. The use of nanotechnology and nanomaterials for elicitation is rapidly expanding and recent research indicates that silicon dioxide nanoparticles (SiO<sub>2</sub> NPs) can be used as an efficient elicitor to enhance the antioxidant capacity and production of hyoscyamine and scopolamine in *Hyoscyamus* species. In the present study, the effects of different concentrations (0, 10 and 200 mg L<sup>-1</sup>) of silicon dioxide nanoparticles (SiO<sub>2</sub> NPs) and precursor feeding with phenylalanine and putrescine (3mm) on catalase antioxidant enzyme activity and total alkaloid content of *H. reticulatus* hairy roots were investigated. Polymerase chain reaction (PCR) analysis with specific primers for *rolB* gene confirmed the insertion of *rolB* in putative transgenic hairy roots genome. The results show that the highest catalase enzyme activity (8.73 U/ g fw) was obtained in hairy root treatment with 200 mg L<sup>-1</sup> SiO<sub>2</sub>NPs and phenylalanine precursor. Also, the highest total alkaloid content (66.81 µg/g fw) was observed in culture medium supplemented with 200 mg L<sup>-1</sup> SiO<sub>2</sub>NPs and putrescine precursor, that 1.4-fold higher than compared to the lowest amounts. The results demonstrated that silicon dioxide nanoparticles can be used an effective elicitor to increase secondary metabolite production in hairy root cultures of *H. reticulatus*.

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Poster Presentation ID: 217

### Comparative Investigation of Fatty Acids Composition of Olive Leaves (*Olea europaea* L.) in Various Cultivated Varieties in Iran

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#### ARTICLE INFO

##### Keywords:

Fatty acids  
Palmitic acid  
Olive leaves

#### ABSTRACT

Olive, *Olea europaea* L., is one of the most important crops in the Middle East countries. Olive leaves are one of the byproducts of olive farming that available throughout the year they accumulate during the pruning of the olive trees (about 25 kg of byproducts (twigs and leaves) per tree annually). The olive leaves could have other substances with potential health benefits in addition to phenolic compounds, but few studies have been carried out to evaluate them. In this study, leaves of 30 different cultivars of olives (Iranian, Spanish, Italian, Syrian and Greek) grown in research station of Qom city were collected and a chemical fatty acids investigation was evaluated. Determination of Fatty Acids Profile were extracted from dry olive leaves according to the Folch method and analysis were performed by gas chromatography. The results showed that palmitic acid (C16:0) is the major fatty acid in olive leaves (from 39.1 to 73.14%), followed by myristic acid (C14) and oleic acid (C18:1). Kazeroni and Gorgan were the varieties with the highest concentration of saturated fatty acids. The Mastoidis variety contained lowest saturated fatty acid levels.

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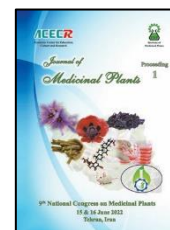
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Poster Presentation ID: 218

### Distribution Pattern and Conservation Status of the Four *Thymus* spp. from Iran

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#### ARTICLE INFO

*Keywords:*

Conservation

Distribution

MaxEnt

*Thymus*

#### ABSTRACT

The genus *Thymus* L. comprised of 220 species is widely distributed all over the world. The Mediterranean region is major centre of diversification of this genus. The genus *Thymus* is represented in flora of Iran by 18 species of which four are endemics. *Thymus* species contain valuable compounds such as thymol, carvacrol and cymene and have been used for many centuries in traditional medicine for their antiseptic, carminative, antimicrobial, antiviral and antioxidant properties. Assessing the distribution pattern of species of this genus and determining their conservation status is very important for conservation planning. In this study, the distribution pattern and conservation status of *Thymus daenensis* Clak., *T. fedtschenkoi* Ronniger, *T. kotschyanus* Boiss. et Hohen. and *T. persicus* (Ronniger ex Rech. f.) Jalas were investigated using GIS and GoCat software with IUCN criteria. In addition, environmental factors affecting the distribution of this species were identified using MaxEnt software. The results showed that *T. fedtschenkoi* had the maximum range and *T. persicus* showed the lowest limited range of distribution among other species (Fig. 1). The most important environmental factors affecting the distribution of different species were annual mean temperature, max temperature of the warmest month, min temperature of the coldest month, mean temperature of the warmest quarter, mean temperature of the coldest quarter, precipitation of driest quarter, solar, slope and soil (Tab. 1). In terms of conservation status, *T. persicus* and *T. daenensis* had critical and near threatened status. According to rarity index *T. persicus* had very rare and *T. daenensis*, *T. kotschyanus* had rare status. According to the results of this study, it is suggested that *T. persicus* be protected in-situ and ex-situ and other species be conserve in in-situ, and new protected areas be introduced to conserve some populations.

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### Investigation of some Morphological Features and Performance of *Satureja hortensis* in the Face of Lead and Cadmium Stress

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#### ARTICLE INFO

*Keywords:*

Stress

Heavy elements

Summer savory

Chlorophyll content

#### ABSTRACT

Heavy elements in the soil come from natural components or geological resources, as well as from human activities and resources [1]. Unlike organic pollutants, cadmium and lead cannot be degraded naturally or by microbial communities and therefore remain in the soil for a long time after being added to the environment [2]. In order to investigate the yield and some morphological characteristics of *Satureja hortensis* L. under heavy stresses of lead and cadmium, a factorial study was conducted in a completely randomized design. Lead at concentrations of 10, 20 and 40 mg/l and cadmium at concentrations of 1, 2 and 4 mg / l, control treatment was applied without stress with three replications. Traits such as chlorophyll index, plant height, stem diameter, internode length, fresh and dry weight of vegetative body were measured. The results showed that the chlorophyll index showed a decreasing trend due to stress, but cadmium stress had a great effect on reducing the chlorophyll index. Cadmium had the lowest plant height, in relation to stem diameter, only concentrations of 40 mg / l lead and 4 mg / l cadmium could make a significant difference in stem diameter compared to control and other concentrations. Fresh and dry weight of vegetative body showed a decreasing trend due to stress of lead and cadmium, but this decrease was more pronounced in lead stress. In general, it can be concluded that increasing concentrations of lead and cadmium led to further reduction of morphological characteristics of *Satureja hortensis*. Complementary experiments using growth modulators may help to better manage savory in fields with high cadmium and lead.

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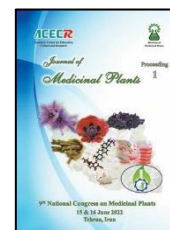
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### Evaluation of Effective Factors in Surface Disinfection and Germination of Khella Plant Seeds *In vitro*

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#### ARTICLE INFO

##### Keywords:

Disinfection  
Seed germination  
*In vitro* culture  
Medicinal plant  
*Ammi visnaga*

#### ABSTRACT

Increasing population and increasing human tendency to medicinal plants have been among the reasons for researchers' attention to *in vitro* cultivation of medicinal plants. The science of biotechnology provides the opportunity for micropropagation methods to produce several species of medicinal plants by culturing cells, tissues, or organs under *in vitro* conditions. The Khella belongs to the genus *Ammi*, an annual or biennial plant native to the Mediterranean region of North Africa, Asia and Europe. This plant has long been used in traditional medicine. Today, it is used in modern medicine to treat many diseases such as colic and coronary artery insufficiency and is used as an antioxidant, antifungal and antibacterial with a larvicidal effect on mosquito larvae. Seed disinfection and germination is one of the critical steps in establishing sterile plant cultures *in vitro*. Failure to optimize these conditions can lead to lack of optimal removal of contaminants, inefficient germination or the production of abnormal seedlings. In this study, the effect of different disinfection methods on disinfection and seed germination in *in vitro* cultivation was investigated in a completely randomized and factorial design. The best conditions for seed disinfection were the use of 8% sodium hypochlorite for 15 minutes, and then 70% ethanol for 1 minute. Seed germination percentage was 90% under these conditions. The seedlings produced under these conditions were completely natural.

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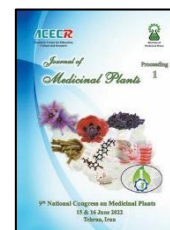
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## 9<sup>th</sup> National Congress on Medicinal Plants

15 & 16 June 2022  
Tehran, Iran



Poster Presentation ID: 221

### Optimization of Disinfection and *In vitro* Germination of Medicinal Plant *Sium sisarum*

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#### ARTICLE INFO

##### Keywords:

*In vitro* culture  
Medicinal plant  
Seed germination  
*Sium sisarum*

#### ABSTRACT

*In vitro* culture techniques provide useful tools for rapid propagation and improved plant species production. *Sium sisarum*, commonly known as skirret, belongs to the Apiaceae plant family and is resistant to cold and diseases. This plant has many medicinal properties and is used in many cases, including maintaining bone and cardiovascular health, and strengthening the immune system. Due to the limited geographical distribution of this plant and its improper exploitation, the need to preserve and propagate it with novel techniques such as tissue culture is felt more than before. Due to having deep physiological dormancy and abundant surface contamination, disinfection and germination of skirret seeds is of great importance for creating *in vitro* cultures. In this study, in order to achieve a suitable method for surface disinfection and seed germination under *in vitro* conditions, different methods of disinfection and germination conditions and seedling growth was evaluated in a completely randomized factorial design. The results showed that the best disinfection treatment was the combined use of 8% sodium hypochlorite for 15 minutes and 70% ethanol for 1 minute. Finally, the seeds were sown in 1/2MS medium after washing three times with sterile distilled water.

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### Comparison the Effect of Commercial and Homemade *Calendula officinalis* Ultra-high Dilutions on the Health, Germination and Rooting of *Oryza sativa*

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#### ARTICLE INFO

Keywords:

Ultra-high dilutions  
(UHDs)

*Calendula officinalis*

*Oryza sativa* L

#### ABSTRACT

Ultra-high dilutions (UHDs) have been widely used in the control and treatment of humans, animals and plants [1,2]. In the present study, the effects of UHDs on the root germination quality of rice plants (*Oryza sativa* L.) were investigated. To investigate the effect of commercial *Calendula officinalis* UHDs (Calen potency 30C) on rice seed rooting, 54 experiments were designed and performed in experimental conditions including placebo, blank and Iranian homemade *Calendula officinalis* UHDs, in the same potency. To evaluate the effects of UHDs on rice, a favorable response percentage of the number of healthy seedlings produced and the weight of aerial parts and main roots were investigated. The results showed that the samples treated homemade UHDs had longer roots (35%), with lateral branches and greener seedlings. Also, these samples had a higher percentage of healthy seeds (30%), than the samples under the treatment of placebo and blank conditions. Samples treated using homemade UHDs weighed more (25%), than placebo and control treatment. The lowest weight was related to placebo-treated samples.

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### The Effect of Feeding by Ornithine Precursor and Fungal Extract of *Aspergillus niger* on the Growth Parameters and Total Alkaloids in *Hyoscyamus reticulatus* L. Hairy Roots

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Hairy root Precursor feeding Elicitor Total alkaloids</p>	<p>Herbal drugs have been used since ancient times as medicines for the treatment of various diseases. Medicinal plants have played a key role in world health (Calixto, 2000). <i>Hyoscyamus reticulatus</i> is an important medicinal plant that all the organs of the plant contains alkaloids especially hyoscyamine and scopolamine (Bahmanzadegan et al., 2009). The most effective strategy to increase the <i>in vitro</i> production of target metabolites include precursor supplementation and elicitor (Murthy et al., 2014). In this study, hairy roots were fed with ornithine precursors at 0, 1, 2 and 3 mM concentrations at the beginning of growth. After 21 days, they were exposed to <i>Aspergillus niger</i> extract (as a stimulant) at 0, 1 and 1.5 mg L<sup>-1</sup> concentrations for 48 h. Fresh weight, dry weight and total alkaloid content were measured after hairy root harvest (30 days). According to the results, fresh weight and dry weight of hairy roots were recorded between 1.631 to 2.380 g and 0.153-0.252 g, respectively. The lowest total alkaloid (21.66 µg g<sup>-1</sup> DW) were obtained in control hairy root while the highest total alkaloids (68.03 µg g<sup>-1</sup> DW) were observed in hairy roots treated with the highest concentrations of ornithine (3 mM) and fungal extracts (1.5 mg L<sup>-1</sup>). The combination of precursor feeding and fungal extracts improved the accumulation of alkaloids in <i>Hyoscyamus reticulatus</i> L. hairy roots.</p>

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Poster Presentation ID: 225

### Proteolysis of Wheat Gluten to Enhance Functional Properties and Compare Different Digestion Methods

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#### ARTICLE INFO

##### Keywords:

Wheat gluten  
Protein  
Hydrolysis

#### ABSTRACT

Recently, New sources of food proteins are needed because of increasing global demand. Wheat gluten can be an economical and diverse alternative to animal proteins as nutrients [1]. The expanding utilization of wheat gluten in food and non-food industries has been limited by lack of some desirable functional properties, such as solubility and emulsifying ability. Consequently, wheat gluten have been hydrolyzed by physical, chemical and biochemical methods [2]. The objective of this present research is to compare various wheat gluten hydrolysis methods; therefore, the modification of wheat gluten is made by mild acid treatment (hydrochloric acid), a commercial proteolytic enzyme (papain) and microbial proteases. The hydrolytic efficiency of these techniques on wheat gluten also compared. Moreover, wheat gluten hydrolysates (WGHs) had superior solubility (>60%) over a pH range 2-12. The molecular mass of peptides released during hydrolysis was in the range of 5-15 kDa and determined by SDS-PAGE and size exclusion chromatography on Ultrahydrogel linear. The results showed that with the increasing of degree of hydrolysis (DH) values, there occurred a large amount of smaller polypeptides and Papain represent best for the preparation of products with the maximum DH 31.2%.

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Poster Presentation ID: 226

### Nanoencapsulation of *Symphytum Kurdicum* and *Symphytum Asperrimum* *N*-Butanol Extracts: Phytochemical Analysis, Antioxidant and Antibacterial Activities

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#### ARTICLE INFO

**Keywords:**

Boraginaceae

Comfrey

Nanoparticle

Antioxidants

Microbial sensitivity  
testing

#### ABSTRACT

The current study's goals were to obtain different extracts and essential oils of *Symphytum kurdicum* and *Symphytum asperrimum* and determine their chemical composition, as well as to evaluate free radical scavenging activity (IC<sub>50</sub>) and minimum bactericidal concentration (MBC), as well as the effect of liposomal formulation on antimicrobial properties. *S. kurdicum* and *S. asperrimum* powdered aerial parts were used. The antioxidant and antibacterial properties, essential oil compositions, total phenol and flavonoid contents, and antioxidant and antibacterial properties of different fractions were determined using the DPPH test, disk diffusion assay, gas chromatography-mass spectrometry, Folin-ciocalteu reagent, and colorimetric assay method, respectively. Nanoparticles were created using the film hydration process. According to GC-MS analysis, hexafarnesyl acetone was a significant essential oil component. *S. kurdicum* extracts in *n*-butanol and ethyl acetate exhibited the best antioxidant activity. Both plant extracts demonstrated antibacterial activity. The maximal inhibitory zone against *Staphylococcus epidermidis* was determined using the extracts. The formulation size was 140 nm, according to a particle size analyzer. The ideal liposome composition has 75 mg lecithin, 25 mg cholesterol, and 50 mg herbal extract. Despite the nanoparticles' proper particle size, the antibacterial impact of the liposomal extract was lower than that of the free form. Our results show that extracts have considerable antibacterial and antioxidant properties, which may be ascribed to their bioactive ingredients [1].

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Poster Presentation ID: 227

### Optimization Extraction of Natural Pigment from Black Hollyhock Flower

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#### ARTICLE INFO

Keywords:

*Althaea rosea*

Response surface  
methodology  
Pigments  
Optimization

#### ABSTRACT

*Althaea rosea* L. is a majestic ornamental plant that produces large single, semi-double, double, or multi-colored flowers of the Malvaceae family. It's commonly called Hollyhock. There are no comprehensive studies on extracting anthocyanins from black hollyhock flowers. Food and pharmaceutical manufacturers require new natural pigments because of safety problems associated with synthetic dyes. In this project, we investigate the extraction of natural pigments from black hollyhock flowers. To obtain the maximum quantity of pigment, the extractions of anthocyanins from black Hollyhock were optimized and independent variables such as temperature (40-80 °C), acid percentage (0.5-2%) and feed: solvent ratio (1: 30-100) were considered. The three-level box-Behnken experimental design protocol has been applied by using the response surface methodology. Total anthocyanin content was used as response criteria. The results showed that the anthocyanin levels herein reported (about 70 mg/g dry flower) are higher than most of those found in the literature; moreover, extraction yield is about 50%, and the duration of optimized extraction is less than 10 minutes, which supports the potential use of H.hock as a sustainable source of natural colorants with application in different industrial sectors.



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Poster Presentation ID: 229

### Comparison of Properties of *Zataria multiflora* and *Cinnamomum cassia* Essential Oils in Infected Wound Healing Activity

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#### ARTICLE INFO

##### Keywords:

Essential oil  
*Zataria multiflora*  
*Cinnamomum cassia*  
Bacteria growth  
Infected wound healing

#### ABSTRACT

**Aim:** Wound infections are important challenges that cause the suffering for patients and economic losses. Today, plant components are utilized as therapeutic options owing to their antibacterial, antioxidant properties [1, 2]. The aim of this study is to compare properties of *Zataria multiflora* essential oil (*Z. multiflora*) and *Cinnamomum cassia* essential oil (*C. cassia*) in inhibiting bacteria growth and wound healing. **Methods:** Following the induction of anesthesia and shaving of the back hairs of all the mice, a full-thickness circular wound was created, the wound site was impregnated with *S. aureus* as gram positive and *P. aeruginosa* as gram negative bacteria. Animals were divided into groups including control, mupirocin and treated group with ointments containing *Z. multiflora* and *C. cassia*. Minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) and disc diffusion tests against *E. coli*, *P. aeruginosa*, *S. aureus*, *S. epidermidis*, *S. typhimurium*, *S. pneumonia*, *L. monocytogenes* and *B. anthracis* were also performed to evaluate the antibacterial activity of the *Z. multiflora* and *C. cassia*. **Results:** The results showed that ointments prepared from both essential oil significantly decreased the wound area from 3 to 14 days following their application compared to the control group ( $P < 0.05$ ). Our findings for MIC and MBC showed that *Z. multiflora* had effects on *E. coli*, *P. aeruginosa*, *S. aureus* and *S. epidermidis* and *C. cassia* showed highest antibacterial activity against *E. coli*, *S. typhimurium*, *P. aeruginosa* and *S. aureus*. The obtained values for *C. cassia* were lower compared with *Z. multiflora* against the growth and inhibition of bacteria. MBC for *E. coli*, in relation to *C. cassia* and *Z. multiflora* were  $2.69 \pm 0.61$  and  $4.16 \pm 0.92$ , respectively. The obtained values for MBC against *P. aeruginosa* in *C. cassia* and *Z. multiflora* were  $2.50 \pm 0.00$   $\mu\text{g/mL}$  and  $5.00 \pm 0.00$   $\mu\text{g/mL}$ , respectively. The results for MBC against *S. aureus* in *C. cassia* and *Z. multiflora* were  $1.25 \pm 0.00$   $\mu\text{g/mL}$  and  $2.50 \pm 0.00$   $\mu\text{g/mL}$ , respectively. **Conclusion:** In sum, ointments prepared from both essential oil had wound healing activity but *C. cassia* was stronger in inhibiting bacteria growth.

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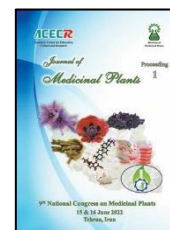
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### Comparison of Properties of *Carum carvi* and *Mentha pulegium* Essential Oils in Inhibiting Bacteria Growth and Wound Healing

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#### ARTICLE INFO

##### Keywords:

Caraway essential oil  
*Mentha pulegium*  
essential oil  
Inhibiting bacteria  
growth  
Wound healing

#### ABSTRACT

Today, plant components are utilized as therapeutic options due to their properties. **Aim:** The aim of this study was comparison of properties of *Carum carvi* essential oil (*C. carvi*) and *Mentha pulegium* essential oil (*M. pulegium*) in inhibiting bacteria growth and wound healing. **Methods:** Following the induction of anesthesia and shaving of the back hairs of all the mice, a full-thickness circular wound was created, the wound site was impregnated with *S. aureus* as gram positive and *P. aeruginosa* as gram negative bacteria. Animals were divided into groups including control, mupirocin and treated group with ointments containing *C. carvi* and *M. pulegium*. Minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) and disc diffusion tests against *E. coli*, *P. aeruginosa*, *S. aureus*, *S. epidermidis*, *S. typhimurium*, *S. pneumoniae*, *L. monocytogenes* and *B. anthracis* were also performed to evaluate the antibacterial activity of the *C. carvi* and *M. pulegium*. **Results:** The results showed that *C. carvi* significantly decreased the wound area from 3 to 14 days following their application compared to the control group ( $P < 0.05$ ). The results also showed that *M. pulegium* reduced wound area in 3, 7 and 14 days compared to the control group ( $P < 0.05$ ) significantly. Our findings for MIC and MBC showed that *C. carvi* had effects on *E. coli*, *P. aeruginosa*, *S. aureus* and *S. epidermidis* and *M. pulegium* showed highest antibacterial activity against *E. coli*, *S. typhimurium*, *P. aeruginosa* and *S. aureus* [1, 2]. **Conclusion:** *M. pulegium* of apiaceae family, was more successful than *C. carvi* a mint family, but both essential oils were effective in inhibiting the growth of bacteria. MBC for *E. coli*, in relation to *M. pulegium* and *C. carvi* were  $2.69 \pm 0.61$  and  $4.16 \pm 0.92$ , respectively. MBC for *P. aeruginosa*, in relation to *M. pulegium* and *C. carvi* were  $6.69 \pm 1.55$  and  $8.54 \pm 1.56$ , respectively. MBC for *S. aureus*, in relation to *M. pulegium* and *C. carvi* were  $5.89 \pm 1.22$  and  $8.69 \pm 1.67$  respectively.

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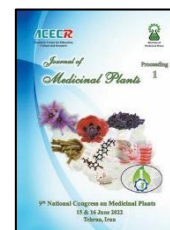
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Poster Presentation ID: 232

### Medicinal Plants of the Lamiaceae and Rosaceae Family of Kahkuh Forest Area in Siahkal City of Iran

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#### ARTICLE INFO

**Keywords:**  
Medicinal  
Lamiaceae  
Rosaceae  
Kahkuh  
Iran

#### ABSTRACT

Kahkuh forest (Siahkal city) Located at 10 km southeast of Lahijan city and 4 km east of Siahkal-Lahijan road at an altitude of 300-1100 meters above sea level. Which has significant environmental diversity and is also rich in plant species diversity. Medicinal plants have been using for treatment of different health problems since ancient times. In the present study, several hundred plant species were observed, collected and scientifically identified. The results showed the area has a nearly 50 curative species. The lamiaceae and Rosaceae family were found as the most medicinal plant containing families. Rosaceae, the rose family, is a medium-sized family of flowering plants that includes 4,828 known species in 91 genera. [1][2]. Rosacea is one of the most diverse and populous families. Its various plants can be seen with different uses. Many economically important products come from the Rosaceae. The Rosaceae have a cosmopolitan distribution, being found nearly everywhere except for Antarctica. Flowers of plants in the rose family are radially symmetrical, and almost always hermaphroditic. Rosaceae generally have five sepals, five petals, and many spirally arranged stamens. The bases of the sepals, petals, and stamens are fused together to form a characteristic cup-like structure called a hypanthium. The Lamiaceae [3] or Labiatae are a family of flowering plants commonly known as the mint or deadnettle or sage family. Many of the plants are aromatic in all parts and include widely used medicinal plants. Many members of the family are widely cultivated, not only for their aromatic qualities, but also their ease of cultivation, since they are readily propagated by stem cuttings. this family has a cosmopolitan distribution and contain about 236 genera and to contain 6,900[4] to 7,200 species. In the Lamiaceae family, the species *Clerodendrum bungei*, *Lamium album* subsp. *Mentha aquatica*, *Mentha pulegium*, *Origanum vulgare* subsp. *Viride* and *Teucrium hyrcanicum*, and in the *Rosaceae* family, the species *Agrimonia eupatoria*, *Crataegus microphylla* var. *dolichocarpa*, *Clerodendrum bungei*, *Fragaria vesca*, *Geum urbanum*, *Mespilus germanica*, *Potentilla reptans*, *Prunus divaricate*, *Pyrus communis*, *Rubus discolor*, *Rubus hirtus*, *Rubus persicus*, *Rubus sanctus*, *Rubus saxatilis* are known medicinal plants of the study area. In accordance with the ecological conditions, geophyte herbs constituted the majority of the species.

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Poster Presentation ID: 233

### The Effect of Row Distance, Growth Regulators of Ethephon and Daminozide on Biochemical Characteristics of *Salvia hispanica* L.

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#### ARTICLE INFO

##### Keywords:

Daminozide

Ethephon

Chia

Secondary metabolites

#### ABSTRACT

Chia (*Salvia hispanica* L.) is an annual plant of the Lamiaceae family, native to Mexico and northern Guatemala. Its seeds have commercial value due to their omega-3 and omega-6 content, a potential source of antioxidants and dietary fiber, and are widely used in food and pharmaceutical industries. Due to the high value of this plant and little information about its introduction, and cultivation in Iran, in this study, its proper cultivation density has been investigated according to the climate of Gorgan. This study was conducted in a factorial design based on randomized complete blocks with three replications. Treatments include cultivation distance (50, 60 and 70 cm), ethephon (0, 10, 30 and 60 mg), and daminozide (0, 25, 75, 150 mg). Measured parameters included phytochemical traits (total phenol, total flavonoid, antioxidant activity by DPPH method) in chia leaves and seeds. Based on the analysis of variance, different treatments were significant on the measured parameters. Thus, the highest amount of total phenol in leaves and seeds (43.61 and 17.01 mg.g<sup>-1</sup>, respectively) was observed in the interaction treatment of 60 mg of ethephon and 25 mg of daminozide with a row distance of 70 cm. The highest antioxidant activity in leaves (91/53%) was related to 150 mg of daminozide treatment with a 70 cm row distance, and in seeds (86.95%) was related to 30 mg of ethephon, 150 mg of daminozide with a 50 cm cultivation distance. Also, the highest amount of total flavonoids in seeds and leaves (1.09 and 10.56 mg.g<sup>-1</sup> respectively) were seen in 10 mg of ethephon treatment with a 50 cm row distance. The controlled use of growth regulators along with unquestionable benefits can also affect other living organisms, including human beings and plant metabolism by causing abiotic stress in plants. Growth regulators may influence levels of secondary metabolites like flavonoids, hydroxycinnamic acids, anthocyanins, tropane alkaloids, and volatile terpenoids by non-specific mechanisms or interfering the key biosynthesis steps [1, 2].

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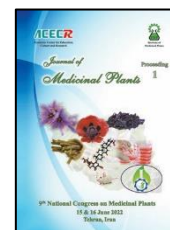
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Poster Presentation ID: 234

### Evaluation of the Effect of *Zataria multiflora* Essential Oil on Various Enterotoxins (type A-D) of *Staphylococcus aureus* Using in BHI Broth Environment

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> <i>Zataria multiflora</i> Essential oil <i>Staphylococcus aureus</i> Enterotoxin</p>	<p>Due to the antibacterial effect of some natural compounds as flavorings in the food industry and the increasing use of natural compounds in the food industry instead of chemical preservatives, many studies have been performed on the replacement of chemical essential oils with natural samples [1, 2]. <i>Zataria multiflora</i> Boiss (<i>Z. multiflora</i>) belongs to the Lamiaceae family and is used traditionally for culinary and medicinal purposes. Different pharmacological effects have been described for the plant including; bronchodilation, vasodilation, and effect on lung inflammation. The plant is also used as a remedy against a cough in traditional medicine [3]. The aim of this study was to investigate the effect of <i>Z. multiflora</i> essential oil on the production of <i>Staphylococcus aureus</i> enterotoxin. In other words, <i>Z. multiflora</i> essential oil has been studied as a natural preservative. The research method in this experiment is that first <i>Z. multiflora</i> essential oil was prepared and analyzed in different concentrations, then the amount of bacterial inoculation was determined [4, 5]. The results show that concentrations of 0.03% of <i>Z. multiflora</i> completely inhibit the growth of <i>Staphylococcus aureus</i> and lower concentrations inhibit the production of enterotoxin by <i>Staphylococcus aureus</i>. <i>Z. multiflora</i> has antibacterial properties and can be used as a natural preservative to prevent the production of enterotoxin by <i>Staphylococcus aureus</i> in some foods [2].</p>

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Poster Presentation ID: 235

### Preparation of Stable Nanosuspensions from *Fraxinus excelsior* Fruits by Rapid Expansion of Supercritical Solution into Aqueous Solutions (RESSAS)

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#### ARTICLE INFO

*Keywords:*

Supercritical CO<sub>2</sub>  
Nanosuspension  
RESSAS  
Antioxidant activity  
*Fraxinus excelsior*  
fruits

#### ABSTRACT

The present study sought to stabilize the nanoparticles of phyto-compound such as Fraxetin, Quercetin, and Ursolic acid from *Fraxinus excelsior* fruits by employing the supercritical procedure. These compounds include low efficacy and bioavailability since they are rarely soluble in aqueous media. Hence, the preparation of a stable suspension of can solve the related problem by decreasing the size of the particle. Moreover, central composite design (CCD) was exploited for analyzing the importance of pressure, CO<sub>2</sub> flow rate, volume modifier and oven temperature on the antioxidative activity index (AAI) in the consequence of supercritical procedure. Furthermore, dynamic light scattering (DLS), field-emission scanning electron microscopy (FE-SEM), energy-dispersive X-ray spectroscopy (EDS), and liquid chromatography–mass spectrometry (LC-MS) techniques were implemented for evaluating the features of nanosuspension. Based on the outcomes, the behavior of the particles after forming particle was emphasized, which demonstrated that the supercritical procedure (RESSAS) results in minimization of particle agglomeration and improvement of AAI for the extract. Hence, the bioavailability of the medicinal herb can be significantly enhanced in biological media and in vitro testing determined their valuable antioxidant properties by comparison with standards and classifications.



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Poster Presentation ID: 236

### Chemical Properties and Optimization of Antioxidant Activity and Extraction Efficiency of internal Septum Extract of Iranian Walnut Obtained from Supercritical Fluid and Sonication Extraction

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Internal Septum of Walnut Ultrasonic-Assisted Extraction, Antioxidant Properties Supercritical Fluid Liquid chromatography - mass spectrometry</p>	<p>Due to the increasing need for natural antioxidants in the food industry, agricultural and herbal wastes are becoming an ideal material for extracting phenolic compounds as natural antioxidants. The internal walnut septum is one of the substances known in the food processing process as waste. The biologically active substances of the internal septum of the walnut are classified into flavonoids, polyphenols, tannins, and unsaturated fatty acids. These compounds have caused properties such as antioxidant activity, antiviral, anti-cancer, antibacterial, etc [1]. In this study, walnut inner septum extract was obtained by supercritical fluid extraction (SFE) and ultrasonic-assisted extraction (UAE). Identification of active ingredients of internal septum of the walnut extract was performed by liquid chromatography - mass spectrometry (LC-MS) and, the (DPPH) assay was used for antioxidant activity evaluation [2]. In order to achieve the highest extraction efficiency and have more antioxidant properties, the parameters of pressure, modifier volume and dynamic time in SFE process and solvent volume, extraction time and temperature parameters in UAE process were optimized using Statgraphics software and response surface methodology. Extraction efficiency and IC<sub>50</sub> were obtained 7.9% and 1021 μg/ml for SFE and 14.5% and 14 μg/ml for UAE, respectively. The results showed that the extraction efficiency and antioxidant properties of the extract obtained by UAE were higher than SFE. However, the use of less organic solvent has led to the SFE method being considered an environmentally friendly method.</p>

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Poster Presentation ID: 237

### Preparation of Polystyrene Based Macroporous Beads through Suspension Polymerization for Separation of Anthocyanin from Saffron plant Petals: Effect of Porogen Solvent and Divinylbenzene (DVB) as a Crosslinking Agent

**Nima Soltanieh<sup>1</sup>, Mozghan Noorizadeh Dehkordi<sup>1</sup>, Hassan Rezaeost<sup>2</sup>, Abbas Rezaee Shirin-Abadi<sup>1,\*</sup>**

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#### ARTICLE INFO

##### Keywords:

Bead suspension  
polymerization  
Macroporous resin  
Anthocyanin isolation  
Porogenic solvent

#### ABSTRACT

Saffron plant petals, which are waste of saffron production in the food industry, has high level of anthocyanin. Annually, 20,000 tons of saffron petals are discarding during production, harvesting and processing. In this study, we prepared macroporous resins in order to separate and purify anthocyanin from saffron plant petals. We investigated the effects of cross-linking agent, divinylbenzene (DVB), and the porogenic solvent on pore volume and specific surface area of the beads. n-Heptane as a non-solvating solvent for polystyrene exhibited higher amount of porosity and more specific surface area (> 500 m<sup>2</sup>/g) in comparison with toluene, which is a solvating solvent. Static adsorption was used in this investigation, and the adsorption data illustrated that the efficiency of resins would increase with increasing the DVB content[1, 2].

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Poster Presentation ID: 238

### Growth Response of Licorice (*Glycyrrhiza glabra* L.) to Lead Contamination by Application of Biological Amendments and Silicon

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#### ARTICLE INFO

##### Keywords:

Bacterial inoculation  
Chemical supplement  
Heavy metal  
Licorice

#### ABSTRACT

Soil contamination by heavy metals is a critical environmental concern due to their adverse effects on plant growth and human health via entering the food chain. Since heavy metals can be taken up and accumulated in edible parts of plants such as licorice (*Glycyrrhiza glabra* L.) root, therefore, their production in contaminated area should be seriously taken into consideration. In order to investigate the growth response of licorice to lead (Pb) stress along with detoxification effects of bacterial inoculation and chemical supplement such as silicon (Si), a factorial experiment was carried out based on complete randomized design with four replications at Research Greenhouse of Department of Horticultural Science and Landscape Engineering, University of Tehran during 2020-2021. Treatments were included Pb (0, 150, 350 and 550 mg kg<sup>-1</sup> soil), bacterial inoculation (non-inoculated, *Pseudomonas fluorescens* and *Bacillus subtilis*) and silicon (0 and 150 mM). After six months of plant growth cycle, some traits such as plant height and diameter, number of lateral branches, internode length, leaf number, herbal fresh and dry weight, root fresh and dry weight were evaluated. Results indicated the main and interaction effects of applied treatments significantly affected most measured traits. Non-contaminated plants under no application of Si or inoculation with *P. fluorescens* performed better in terms of plant height. Integration of Si and *B. subtilis* in non-contaminated plants resulted in 21% increase in plant diameter. By increasing Pb concentration up to 550 mg kg<sup>-1</sup> combined with *P. fluorescens* and no application of Si, the internode length was 31% higher than control. Plants exposed to 550 mg kg<sup>-1</sup> Pb along with no application of both Si and bacteria caused 67.56 and 86.66% decrease in number of leaf and lateral branches compared to control, respectively. Herbal dry weight increased in non-contaminated plants by using *B. subtilis* along with no foliar application of Si rather than control. Inoculation with *P. fluorescens* combined with foliar application of Si in non-contaminated plants resulted in 53.65 and 65.30% increase of root dry weight rather than control. According to the results, although licorice performance was better under no exposure of Pb stress (with/without amendments) but application of bacterial inoculation and silicon could alleviate the adverse effects of Pb contamination on plant growth in some extent, although, further research is needed to confirm the present results.



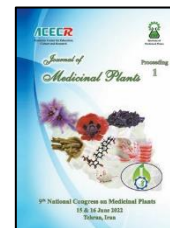
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Poster Presentation ID: 239

### Effect of Different Levels of Irrigation and Humic acid and Amino Acid Spraying and Application of Bacillus Bacteria in the Rootstock on some Germination Characteristics and Seedling Growth of Cumin (*Cuminum cyminum* L.)

**Mohammad Sepehri<sup>1,\*</sup>, Farzad Najafi<sup>1</sup>, Mohammad Behzad Amiri<sup>2</sup>**

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#### ARTICLE INFO

##### Keywords:

Drought stress  
Eco-friendly input  
Germination rate  
Medicinal plant  
Organic acid

#### ABSTRACT

In order to evaluate germination characteristics and seedling growth of medicinal plant of cumin (*Cuminum cyminum* L.) seeds resulting from the rootstock in conditions of water stress and eco-friendly inputs, an experiment based on CRD design with three replications was conducted in the 2021 year, in Shahid Beheshti University, Iran. The experimental factors included seeds resulting from treated cumin with different irrigation levels (full irrigation, deficit irrigation, and rainfed irrigation), and 3 nutritional fertilizer (bacillus, amino acid, and humic acid) and control (non-application of fertilizer). The results showed that the highest germination percentage (88%) in full irrigation was obtained in treatments of bacillus and humic acid. In full irrigation, the application of humic acid increased the germination rate by 19% compared to control. The use of amino acid in deficit irrigation, improved plumule length by 30% compared to control. The highest ratio of radicle dry weight to plumule in full irrigation was observed in the treatment of bacillus so that in conditions of this fertilizer, the ratio of radicle dry weight to plumule increased by 45% compared to control. In general, based on the results of this research, it seems that the application of ecological inputs in conditions of drought stress can be improved germination characteristics and seedling growth of cumin.



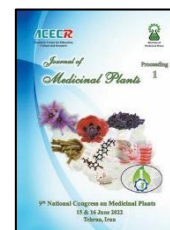
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### Investigating Expression of the Key Genes in Biosynthesis Pathway of *Ziziphora persica* Bunge Essential Oil: Drought Stress in Focus

**Mozhdeh Jalilifar<sup>1,\*</sup>, Khosro Mehdikhanlou<sup>1</sup>, Lila NejadSadeghi<sup>1</sup>, Qing-Yan Shu<sup>2</sup>**

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#### ARTICLE INFO

Keywords:

Bioinformatics

KEGG

Sequencing

Genomic information

#### ABSTRACT

Iranian Kakoti (*Ziziphora persica*) is a plant belonging to the mint family, with a wide range of distribution throughout the country, that has edible and medicinal properties with antioxidant and antimicrobial properties. In order to conduct this research, Iranian Kakoti was cultivated in two conditions of control and drought stress treatment at 30% of field capacity (30% FC) in the Faculty of Agriculture at Shahid Chamran University of Ahvaz. Using the KEGG database, the metabolic pathway and genes involved in the production of this pathway were identified. The active ingredient of this plant is Polgen, with four key genes including: Isopiperitenol dehydrogenase, Limonene synthase, limonene hydroxylase and Isopiperitenone reductase involved in the path of biogen synthesis. Due to the lack of genomic information of the studied plant, these four genes were studied by examining their sequences in families close to this genus and species, namely *Mentha Logifolia* and *Mentha Piperita*. After predicting the sequence of these four genes, the corresponding primers were designed. In this study, the properties and the intracellular position of proteins showed that the protein belongs to all four cytoplasmic genes. Investigation of physical and chemical properties of unstable proteins in all four genes signal prediction of potential peptides in proteins and prediction of spatial structure of proteins, which includes structural evaluation and estimation of structural model quality through bioinformatics identification. The results of bioinformatics study showed that there was no peptide signal sequence for any of the studied proteins. The quality of the structural model was evaluated through QMEANDisCo Local and QMEAN Z-Scores and showed that all four genes have a high similarity with the model. The authors of this article believe that the bioinformatics study of genes at the protein level is a cheap way to gain more knowledge for future studies.

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### Evaluation of Heme Polymerization Inhibition Potential of *Artemisia oliveriana* Extract Fractions Separated by Preparative HPLC

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#### ARTICLE INFO

Keywords:

*Artemisia oliveriana*

Antimalarial activity

Heme polymerization  
inhibition

HPLC

#### ABSTRACT

Malaria is a serious and sometimes fatal disease caused by *Plasmodium falciparum* that commonly infects a certain type of mosquito which feeds on humans. Globally, there were an estimated 241 million malaria cases in 2020 in 85 malaria endemic countries, increasing from 227 million in 2019, with most of this increase coming from countries in the WHO African Region. The malaria parasite digests hemoglobin in vacuole to amino acids and heme. Plasmodium enjoys several detoxification mechanisms to protect itself from toxic heme. The most important mechanism is heme polymerization. Identifying compounds that inhibit heme polymerization is an approach for reaching antimalarial drugs. In this work, a HPLC-based activity profiling was applied to localize the effective antimalarial components of the methanol extract of *Artemisia oliveriana* by an inhibition test of heme detoxification (ITHD). For this, aerial parts of the *A. oliveriana* was extracted through a maceration method using the methanol solvent. In continue, it was fractionated using a preparative HPLC system to give 11 different fractions (F<sub>1</sub>-F<sub>11</sub> Fractions). Inhibition of heme polymerization of the crude methanolic extract and obtained fractions was evaluated by the ITHD method at a concentration of 200 µg/mL. In brief, Hemin chloride, tween 20 and samples were added in each well of a 96-well plate, and incubated at 60°C for 24 hours. Chloroquine was used as the positive control. Then, the absorbance of plates was recorded with a micro-ELISA reader at 405 nm, and percentage of heme polymerization inhibition was calculated. The crude extract revealed no inhibition of heme polymerization, whereas F<sub>4</sub> and F<sub>6</sub> fractions showed 47 and 38 percent inhibitions, respectively. This study showed a good agreement with other researches on antimalarial activity of the plant. Finally, it can be considered by researchers for further studies specially in respect of the isolation and biological evaluation of the components of effective fractions [1, 2].

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### Astragalus and Gum Tragacanth

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#### ARTICLE INFO

Keywords:

Astragalus

Gum

Tragacanth

Medicine

#### ABSTRACT

Astragalus belongs to the legume family (Leguminosae). The flowers are pink, red, blue, purple and white and are located near the end of the flowering branches. This plant is drought tolerant and grows well in saline soils. There are more than 800 species of Astragalus in Iran. Astragalus is widely used in traditional medicine. Astragalus is found in both shrubs and grasses. This plant is suitable for arid and desert areas. Some species of Astragalus contain a toxin, which has a pungent odor of selenium and can poison cattle, sheep, and horses. The most important product of the Astragalus plant is called tragacanth. Tragacanth is a dried gum secretion that is obtained by scratching the lower part of the stem of the plant Astragalus. A good tragacanth is a tragacanth that comes out from the old branches of the plant. The clearer and colorless the tragacanth we get, the better the quality. The desert highlands of Northern and Western Iran, particularly Zagros Mountains are the primary source of gum tragacanth. Accounting for about 70% of the gum supplies are from the arid and mountainous regions of Iran. Tragacanth is odorless and nearly tasteless. It occurs either in flaky, leaf-like pieces, irregularly oblong or roundish, or in tortuous vermicular filaments, rounded or flattened, rolled up or extended, of a whitish, yellowish-white, or slightly reddish color, marked by parallel lines or ridges, somewhat translucent, and resembling horn in appearance. The tragacanth gum is yielded, for instance, by the following species of *Astragalus*: *A. adscendens* Boiss. et Hausskn. (southern Iran); *A. leiocladus* Boiss. (in middle and western Iran: Isfahan and Hamadan); *A. brachycalyx* Fisch. (Iran: Kurdistan and Luristan); *A. gummifer* Labill. (widely distributed from Lebanon to Armenia and in the northern regions of the Euphrates and Tigris); *A. microcephalus* Willd. (the same as *A. gummifer*, and also in Asia Minor); *A. pycnocladus* Boiss. et Hausskn. (particularly in western Iran); *A. stromatodes* Bunge (Turkey); *A. kurdicus* Boiss. (Turkey). Other species that yield the tragacanth gum are *A. heratensis* Bunge, of Khorasan mountains, which yields a gum known as "kutira," and *A. parnassi* Boiss., found on the mountains of Peloponnesus (southern Greece). Some species like *A. gossypinus* Fisch. and *A. microcephalus* produce high grade of gum, while other species and varieties produce inferior one.

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Poster Presentation ID: 243

### Extraction and Isolation of Anthocyanin from Saffron Petals by using Styrene-Divinylbenzene-Butylacrylate (St/DVB/BuA) Copolymer Beads Prepared via Suspension Polymerization

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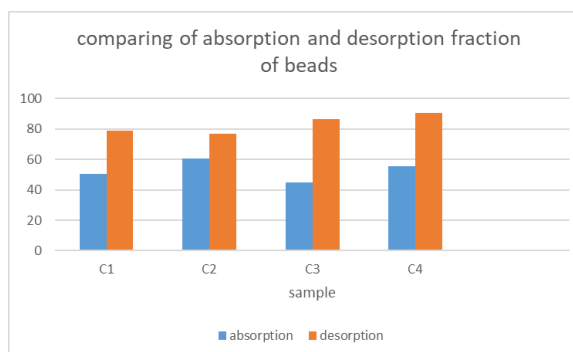
#### ARTICLE INFO

##### Keywords:

Suspension  
polymerization  
Polymeric porous beads  
Extraction of herbal  
compounds  
Extraction of  
anthocyanin

#### ABSTRACT

In recent years, macroporous resin absorption as an efficient technique has been widely used for the purification of herbal compounds such as anthocyanin from different plants. In this study, we prepared styrene divinylbenzyl butyl acrylate copolymer beads, copoly (St/DVB/BuA) through suspension polymerization. The beads prepared were efficiently used to extract anthocyanin from the saffron petals. The results showed that combination of heptane and dodecane as porogen solvents with different ratios, has a great influence on efficiency of anthocyanin extraction. The synthesized polymeric beads revealed more than 70% desorption after absorption of anthocyanin, which could be reasonable value for using in practical applications[1, 2].



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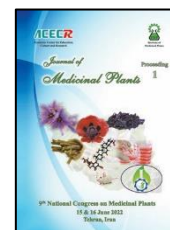
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15 & 16 June 2022  
Tehran, Iran



Poster Presentation ID: 244

### Effect of Cold Plasma (DBD and Gliding arc) Technique on Drying Time and Microbial Load of Saffron and Mint

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#### ARTICLE INFO

##### Keywords:

Cold plasma  
Saffron  
Mint  
Drying  
Microbial load

#### ABSTRACT

Saffron (*Crocus sativus* L.) as a medicinal and the most expensive spice in the world is produced in Iran as an important export crop. Despite producing more than 90% of the world's saffron in Iran, Iran's share of world trade is less than 5%. Drying is a common way to prevent spoilage of products and increase their shelf life. Risks associated with the transmission of foodborne pathogens have become a global concern in the food industry. The use of thermal methods to inactivate the microbial flora of saffron is not recommended due to the effect on the color, taste, and aroma of saffron. Non-thermal disinfection methods such as gamma rays and fumigation with ethylene oxide can be useful in inactivating the microbial flora of saffron. However, according to the reported disadvantages, an alternative method is needed. Cold plasma at atmospheric pressure has recently been considered as a food disinfectant. Two medicinal plants, saffron and mint, are typical ones for studying cold plasma techniques. To investigate the effect of plasma on reducing the drying time of saffron, four levels of pretreatment (control, 10, 20, and 30 seconds) were done using a Gliding arc device (Plasmatech- $\delta$ B) in two repetitions. To investigate the plasma on reducing the microbial load of saffron and mint, DBD plasma (Enhancedtech 15I) treatment was performed at 18 Kv voltages in three levels (control, 1, and 5 minute; control, 5, and 10 minute respectively) and three replications. Chemical analysis of saffron samples was performed according to ISO standard (36-32-1). The main qualitative characteristics of saffron including metabolite contents of crocin, picrocrocin and safranal were assayed by spectrophotometry. Aerobic microbial analysis was performed according to standard 5272-1. Also, mold and yeast analysis was performed according to standard 10899-2. The results of this study showed that gliding arc plasma could reduce the drying time of saffron, which 20s and 30s treatments had better and more effective results. The mentioned treatments reduced the drying time of saffron by 15 minutes. Also, gliding arc and DBD plasma had no negative effect on saffron quality indices such as picrocrocin, safranal and crocin. In addition, DBD plasma had no significant effect on reducing the total microbial load, as well as mold and yeast of saffron and mint. Due to the fact that decreasing in microbial load may be depends on applied voltage and type of injected gas, it is recommended that more experiments be performed.

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Poster Presentation ID: 245

### Chemical Composition of the Essential Oil From *Varthemia persica* DC. from Alborz, Iran

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#### ARTICLE INFO

##### Keywords:

*Varthemia persica*  
Essential oil  
Antioxidant  
Antimicrobial  
GC-MS

#### ABSTRACT

The aster family which is also known as Asteraceae is one of the largest angiosperm families, with more than 1,620 genera and 23,600 species throughout the world which have many medicinal properties. *Varthemia persica* DC. is a species of genus *Vartemia* from the Asteraceae family that grows wild in Iranian plateau [1]. To study the essential oil composition of *Varthemia persica* DC., plant aerial parts include leaves and flowers were collected from Chalous Road region, Alborz province. The essential oil was extracted by steam distillation and has been analyzed by GC-MS [2,3]. Among the identified compounds, beta-borbonone (19.3%) and beta-caryophyllene (11.1%) have the highest amounts. Results from this study indicated that essential oil of *V.persica* DC. can probably have anti-inflammatory, antimicrobial and antioxidant effects because of existing some known active terpene compounds. This report is the first one about the mentioned plant from Alborz province; so, it could be very useful to complete scientific information about this species of the valuable genus of *Varthemia*.

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Poster Presentation ID: 246

### The Effect of Fulvic Acid and Methyljasmonate on Chlorogenic Acid, Caffeic Acid and some Morphological Traits in Aerial Parts and Roots of *Echinacea purpurea* (L.) Moench

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Fulvic Acid Methyl Jasmonate Root Stem Coneflower</p>	<p>Coneflower (<i>Echinacea purpurea</i>) is a plant whose organs, especially its roots, are widely used in the pharmaceutical industry. This study aimed to investigate the effect of different concentrations of fulvic acid and methyl jasmonate on some morphophysiological and biochemical traits of root and aerial herbal parts of coneflower. This study was conducted as a factorial experiment based on a completely randomized design with three replications at Gorgan University of Agricultural Sciences and Natural Resources in 2017-2018. Treatments included: fulvic acid at three levels (0, 1000, and 2000 ppm) and methyl jasmonate at four levels (0, 90, 100, and 110 <math>\mu</math>M) in two tissues (root and herbal part). The measured variables included: fresh and dry weight of root and shoot, shoot and root length, chlorogenic acid and caffeic acid. The results showed that the treatments and their interactions on morphological and biochemical traits were significant at one and five percent probability levels. Based on the mean comparison, the maximum root length (24.33 cm) was recorded in control, and the maximum stem length (35.33 cm) was seen in 90 mM methyl jasmonate concentration and 2000 ppm of fulvic acid. Also, the maximum fresh weight of root (20.49 g) was related to 100 ppm of fulvic acid. The highest dry weight of root (71.180 g) was seen in 2000 ppm of fulvic acid, and the highest Fresh weight (44.16 g) and shoot dry weight (15.42 g) were observed at the concentration of 2000 ppm of fulvic acid in shoots. Also, the results of mean comparison showed that the highest amount of chlorogenic acid (7.46 mg.g<sup>-1</sup>) was observed at 110 mM of methyl jasmonate and 1000 ppm of fulvic acid and the maximum amount of caffeic acid (28 mg.g<sup>-1</sup>) was observed at 110 <math>\mu</math>M of methyl jasmonate and 1000 ppm of fulvic acid.</p>

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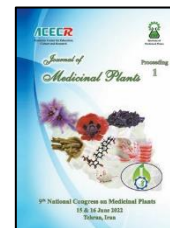
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Poster Presentation ID: 247

### Enrichment of California Poppy Extract for Increasing Alkaloid Content and Bioavailability

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#### ARTICLE INFO

##### Keywords:

California poppy  
Alkaloid  
Bioavailability  
Design-expert software  
Sonication

#### ABSTRACT

The California poppy (*Eschscholzia californica*) has been used in folk medicine for sedative, anxiolytic, and antinociceptive activities. The extract from California poppy contains isoquinoline alkaloids such as californidine, eschscholtzine, protopine, allocryptopine, reticuline and n-methylaurotetanine. These phytochemicals demonstrate relaxing, analgesic, and anti-anxiety properties by acting on the central nervous system (CNS). Due to their poor bioavailability, these alkaloids cannot be distributed in the body, so their concentration adjacent to the place of effect will not be placed in the treatment window. For this purpose, this study aimed to determine the optimum conditions for extracting californidine from *E. californica* to increase the concentration of californidine and decrease the content of undesired compounds. The aerial plant material was subjected to ultrasound-assisted extraction, and different parameters such as solvent type, the solvent: plant ratio and percentage of the acid optimized by application experimental design using response surface methodology. The probe extraction power, temperature, and sonication time were selected constant at 75% KW, 25 °C, and 15 min. According to the obtained data, the optimum condition was established to solvent ratio of 1:30 and 2% formic acid in ethanol: water 50:50. All data were analyzed by application of the HPLC-PDA instrument.

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Poster Presentation ID: 248

### A New Modified Method of Measuring Essential Oil Content of Herbal Hydrolates

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#### ARTICLE INFO

##### Keywords:

Aromatic plants  
Essential oil Content  
Hydrolates  
Rose water  
Iranian National  
Standard Methods  
Liquid-liquid extraction

#### ABSTRACT

Herbal hydrolates are one of the most important groups of the food products from aromatic plants. These products are widely used by the Iranian people. So, many standard methods are defined about them, by the National Standard Organization of Iran. One of the most important of these methods is the method of essential oil content evaluation. In this research a modified method is described for determining the amount of essential oil of herbal hydrolates. This modification, leads to a more simple, rapid and inexpensive method. Briefly, the method is the same way of two-phase extraction but the yield have become very better by using high amount of a hygroscopic salt of sodium sulfate and reducing the temperature until 0 °C. Results showed that the yield of extraction increases up to 2.81 and 1.71 times for Rose water and Peppermint hydrolates, respectively. Comparison of the results from GC-MS analysis also showed that number and types of the essential oil compounds which is extracted are more in the modified method.

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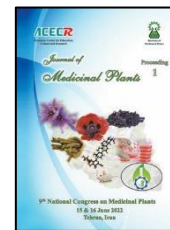
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Poster Presentation ID: 249

### Study of Phenol and Flavonoid Contents and Biological Activity from Aerial Parts of Hydro-alcoholic Extract of *Anthemis lorestanica*

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#### ARTICLE INFO

##### Keywords:

Brine shrimp lethality  
assay  
Total phenol  
Total flavonoid  
Antimicrobial activity

#### ABSTRACT

*Anthemis* is one of the most important genera of the family Asteraceae, consists of about 200 species. The genus *Anthemis* is represented by 39 species growing wild in Iran, of which 15 are endemic. Different genus of *Anthemis* has been known from Roman times as important members of medicinal plants with having many valuable phytochemical compounds and secondary metabolites [1, 2]. However, there is no information about phytochemical properties of *Anthemis lorestanica* which is one of the endemic species naturally distributed in west and central of Iran. In this study hydro-alcoholic extracts of *A. lorestanica* growing in west of Iran have been screened for antimicrobial, antioxidants and anticancer activity. Also, total phenolic (TPC) and total flavonoid (TFC) contents were assessed by using Folin-ciocalteu method and aluminum chloride colorimetric method respectively [3]. The antioxidant activity was measured by two different methods of DPPH free radical scavenging assay and  $\beta$ -carotene bleaching assay; moderate antioxidant activity was obtained with the  $IC_{50}$  of  $100 \pm 0.543 \mu\text{g/ml}$  and inhibition percent of  $61.264 \pm 0.003$  for the mentioned assays respectively. The phenol and flavonoid contents of the sample were not very high which is in agreeing with the measured antioxidant activity. TPC of ethanolic extract is much higher than the TFC one. Measuring antimicrobial and anticancer capacity of the sample showed that it is active against gram-positive and gram-negative bacteria. Also, high anticancer activity with  $LC_{50} < 300 \mu\text{g/ml}$  in brine shrimp lethality assay was observed. Results from this study is the first report from *Anthemis lorestanica* which shows existing some valuable phytochemical properties and biological activities in this species.

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Poster Presentation ID: 250

### Comparative Study of Phytochemical Screening and Biological Activity of Polar and Non-polar Extracts of *Anthemis lorestanica* from Iran

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#### ARTICLE INFO

Keywords:

Antioxidant

Cytotoxicity

Total phenol content

Total flavonoid content

#### ABSTRACT

*Anthemis*, which is an important genus of medicinal plants, has widespread usage in pharmaceutical, cosmetic and food industry. This genus belongs to the Asteraceae family with more than 210 species. Out of the 39 species known to exist in Iran, fifteen are endemic. [1]. *Anthemis* genera has been distributed widely through North Africa, West/Southwest and Central Asia and Europe. There are some reports considering anti-inflammatory, antioxidant, antibacterial, and antispasmodic characterization of this genera. *Anthemis lorestanica* is an endemic plant, which is widely grown in central and west of the Iran. In this investigation, in vitro biological activities of aerial parts of methanol and chloroform extracts were studied. Antioxidant, Antimicrobial, cytotoxicity, total phenol and flavonoid content of this species was evaluated using different methods and standards. Modified Folin-Ciocalteu and Aluminum Trichloride (AlCl<sub>3</sub>) methods were used for determining total phenol and flavonoid contents of extracts. Surprisingly, chloroform extract of flower indicated the highest total phenol quantity (79.75 mg GAE/g), however, methanol extract of stems and leaves was more rich of flavonoid compounds (45.12 mg QE/g fraction). For assessing the antioxidant activity, DPPH radical scavenging and  $\beta$ -carotene/linoleic assay were performed [2]. Chloroform extract did not show significant antioxidant activity in DPPH assay, whereas methanol extract exhibited moderate antioxidant activity ( $99.87 \pm 1.0821$ ). In addition, methanol and chloroform extracts of stem and leaf had higher inhibition percent in  $\beta$ -carotene bleaching assay with 81/617% and 73.047% respectively. Both extracts did not exhibit cytotoxicity against *Artemia laerveya*. Antimicrobial activity was much higher in chloroform extract than methanol one against both gram-positive and gram-negative bacteria. This study showed that there are some active valuable compounds in *A. lorestanica* and demonstrated that many of them are less polar components.

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Poster Presentation ID: 251

### Role of *Nigella sativa* L as an add-on Treatment in Patients with Hypothyroidism: a Triple-blind Randomized Controlled Trial

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#### ARTICLE INFO

Keywords:

Persian Medicine

Hypothyroidism

*Nigella sativa* L.

#### ABSTRACT

Hypothyroidism is the second most common endocrine disease in the world and it considered as the morbidity and mortality factor along with metabolic diseases. Although Levothyroxine is the standard treatment for hypothyroid patients, but expected results are not achieved in some patients; and long term use of it results some side effect [1]. In Persian medicine, *Nigella sativa* was used for treatment of disease with cold temperament and hypothyroidism could be classified in this category [2]. In a 2- months triple-blind randomized trial, 42 hypothyroid patients (TSH: 2 to 10) were randomly allocated to receive either 2 g of *N. sativa* or a placebo 2 times a day as an add-on to their routine treatment (Levothyroxine). Variables, which were measured before and after intervention were TSH, FT4, T3, Anti TPO, Glucose and lipid profiles and also the BMI, body temperature, pulse, blood pressure and hypothyroidism questionnaire. FT4 and TSH variables only in the placebo group with AntiTpo of less than 40 had significant changes (decreased FT4 and increased TSH). The Energy Reduction ( $p = 0.001$ ) and cold feel ( $p = 0.008$ ) variables in *N. sativa* group significantly decreased in the placebo group. In the *N. sativa* group, 5 participants had complications severe stomachache ( $n=2$ ), headache and hypertension ( $n=1$ ), severe bloating and increased appetite ( $n=1$ ), spotting ( $n=1$ ), and 5 patients had complications in the placebo group, severe lethargy ( $n=1$ ), severe stomach bloating and stomachache ( $n=1$ ), severe headache and stomachache ( $n=2$ ), and severe headache ( $n=1$ ). As the results of the current study, use of *N. sativa* along with common treatment in hypothyroid patients could promote their health and improve their symptoms. More studies with larger sample sizes and longer durations of follow-up are needed for the confirmation of results.

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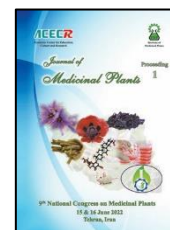
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Poster Presentation ID: 252

### Gamma Radiation and its Effects on the Essential Oil and Extracts (Rosmarinic Acid and Caffeic Acid Contents) of Summer Savory

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#### ARTICLE INFO

##### Keywords:

Carvacrol  
Gamma rays  
Rosmarinic acid  
Summer savory

#### ABSTRACT

Summer savory (*Satureja hortensis* L.) is an annual, valuable medicinal plant and aromatic of the Lamiaceae family. This research was conducted to evaluate how gamma rays at different doses (0, 20, 40, 60, 80 and 100 Gy) can affect summer savory plants, their essential oil and Rosmarinic acid and Caffeic acid content in plant extracts. The experimental design was A completely-randomized block with three replicates. The natural products obtained from summer savory (extracts and essential oil) are dominated by polyphenols and flavonoids, responsible for their antioxidant, antimicrobial, antiparasitic, pesticidal, anti-inflammatory, analgesic, hepatoprotective and anticancer [1]. Essential oils were obtained from dried flowers and leaves (25 g) of the summer savory using a Clevenger (hydro-distillation method). Following GC-MS analyses, essential oils were extracted and their volumes were estimated. A high treatment dose (80 Gy) caused increases in carvacrol (31.74%),  $\alpha$ -thujene (2.67%),  $\alpha$ -pinene (3.72%), M-cymene (9.26%),  $\gamma$ -terpinene (21.33%), 2, 3, 6-trimethylanisole (3.98%), durenol (3.21%), and  $\beta$ -bisabolene (1.88%). While *Satureja* species generally have strong antioxidant capacities, summer savory EO contains abundant amounts of isoprenoids such as  $\gamma$ -terpinene, carvacrol, flavonoids, and other phenols [2]. Its methanolic extracts are mostly known for their rosmarinic acid content. The contents of rosmarinic acid and caffeic acid were determined using methanol extracts in HPLC. Measuring the amounts of rosmarinic acid and caffeic acid revealed substantial differences between irradiated and non-irradiated samples. HPLC analysis revealed a rich content of phenolic compounds in the summer savory extract, having rosmarinic acid 0.7165 mg/g DW (80 Gy) as the main compound, followed by caffeic acid 0.1834 and 0.1806 mg/g DW (60 and 100 Gy, respectively). These findings contributed to the idea that gamma-rays are effective in bringing stability to rosmarinic acid.

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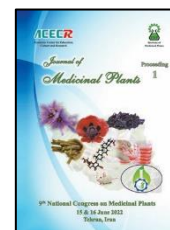
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## 9<sup>th</sup> National Congress on Medicinal Plants

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Tehran, Iran



Poster Presentation ID: 254

### Evaluation of Chemical Composition, Total Phenolics, Flavonoids and Anthocyanins in *Satureja hortensis* L.

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#### ARTICLE INFO

##### Keywords:

Carvacrol

Essential oils

Gamma rays

*Satureja hortensis* L.

#### ABSTRACT

*Satureja hortensis* L., (summer savory) is an important medicinal crop of the Lamiaceae family. It is widely grown throughout the world and is known for having anti-cancer, anti-diabetic, anti-microbial and hypocholesterolemic properties. Dry seeds (12% moisture) of savory were irradiated with five doses of gamma rays 20 Gy, 40 Gy, 60 Gy, 80 Gy, 100 Gy and 0 Gy (control) using cobalt 60 sources at a dose rate exposure of 121.58Gy/hr. The effect of these treatments on total flavonoid and phenol content, anthocyanin and essential oil constituents of *S. hortensis* L. were recorded. A significant increase in phenols and flavonoid content were observed in the methanolic extracts of *Satureja hortensis* L. The maximum frequency of flavonoid content (0.13497 mg /g FW) was obtained using a 100 Gy treatment. Also, the highest phenol content was found at 0.03448 mg /g FW in 100 Gy. The phenolic and flavonoid content of the control samples were found to be 0.0182 and 0.11412 mg /g FW, respectively. The anthocyanin content in plants that had grown from irradiated seeds was significantly higher than in the control. The highest anthocyanin content of 4.128 µg/g FW was recorded by the 100 Gy treatment, compared to untreated plants. This result indicates that gamma irradiation corresponded with a positive relationship to the rise in anthocyanin [2]. Essential oils make up a large part of aromatic substances in plants. The essential oil was obtained from the aerial parts of the plant by hydrodistillation and analyzed by gas chromatography–mass spectrometry (GC-MS). A substantial increase in carvacrol occurred by gamma doses of 20, 40, 60, 80, and 100 Gy, compared to the control samples. A high treatment dose (80 Gy) caused increases in carvacrol (31.74%).

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### Evaluation of Antibacterial Synergistic Effect of Hydroalcoholic Extracts of *Aloe vera* and *Malva sylvestris*

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#### ARTICLE INFO

##### Keywords:

Antibacterial activity  
Synergistic effect

#### ABSTRACT

**Introduction:** Prevention of food spoilage and food poisoning pathogens is usually achieved with the use of chemical preservatives. Negative effects of using chemical preservatives include risks to human health and microbial resistance to the chemicals used. To prevent such side effects, the need to find potentially effective, healthier, and more natural preservatives increases. For this purpose, the use of natural compounds is a priority. In this paper, aloe vera and malva sylvestris extracts used to control food poisoning and preserve food. The antimicrobial activity of aloe vera and malva sylvestris against *Escherichia coli*, *Staphylococcus aureus* was investigated using the well method. **Methods:** *Staphylococcus aureus* (Atcc 25923) and *Escherichia coli* (Atcc 25922) were used for antibacterial testing by agar well diffusion method. To determine the antibacterial effect, a combination of aloe vera extract and malva sylvestris was used. Dilutions of 40 and 20 mg /ml extracts were prepared. Fresh culture suspension (18-20 hours) is prepared in normal saline and turbidity is adjusted with a standard McFarland tube. After preparing the wells and adding plant extracts, heating was performed for 24 hours (37 ° C) and after this period, growth inhibition was measured. **Results:** The antibacterial effect of hydroalcoholic extract of aloe vera and malva sylvestris alone (at concentrations of 10, 20 and 30 mg / ml) against *Escherichia coli* and *Staphylococcus aureus* was determined. The results showed that each plant alone has an antibacterial effect, but together they do not have a significant synergistic effect.

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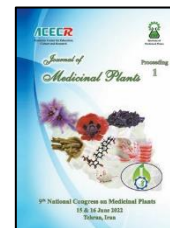
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Poster Presentation ID: 256

### An Unrecorded Taxon of Thymes (*Thymus* L.) for the Flora of Iran

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#### ARTICLE INFO

##### Keywords:

Flora of Iran  
Lamiaceae  
*Thymus*  
Thyme  
*Thymus pubescens*

#### ABSTRACT

The genus *Thymus* (Menthaeae, Lamiaceae) is represented by 18 species in Iran, of which 2 species are endemic. Thymes are mainly distributed over the northern, western and central mountains in Iran. Different thyme species are economically important and widely benefited in medicinal, culinary, perfume and beekeeping industries. The genus is taxonomically a complicated group as identification and delimitation of its taxa are mostly problematic. The present study reports *Thymus pubescens* Boiss. & Kotschy ex Celak. var. *cratericola* Jalas as a new record for the flora of Iran. This taxon is an almost mesoxerophyte plant mostly growing in mountain steppes. As mellow-scented aromatic thyme it is used by locals as flavoring agent and herbal tea. *Thymus pubescens* var. *cratericola* is a perennial, strongly branched stocky subshrub with lanceolate leaves, capitate inflorescence, teeth-ciliated purplish calyx and pinkish corolla. This taxon can be readily recognized from the type variety *Thymus pubescens* var. *pubescens* by the characteristics of indumentum of stems (villous vs. puberulent) and leaves (long patent vs. puberulent to glabrescent), petioles (distinctly petiolate vs. subsessile leaves) and also glands density (dense vs. sparse). Thymol, borneol and carvacrol have been reported as the major constituents of essential oil of the species. This is the first record of this medicinal plant from Iran, which was formerly only known as an endemic for the flora of Turkey.

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Poster Presentation ID: 257

### Fabrication of Nanofibrous Based Natural Polymers Containing Polyphenol Enriched Fraction of *Rosa damascene* Petals

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#### ARTICLE INFO

##### Keywords:

Electrospinning  
*Rosa damascene*  
Polyphenols  
Polyvinylalcohol  
Pectin

#### ABSTRACT

The production of rose water by steam distillation of flowers (*Rosa damascena* Mill) results in a water fraction of the distillate. This part of the production of rosewater is discarded as waste. The biomass could lead to ecological problems in the nearby area. This wastewater represents a severe environmental problem due to the high polyphenols content, which is difficult to decompose. The clay fraction of the soil generally contains iron and manganese oxides and adsorbs the polyphenol oxidases in plant and fungi exudates. Such catalysts promote polyphenol oxidation with the formation of reactive quinones that undergo polymerization and inclusion into the soil humic fraction. Natural polyphenols are valuable phytochemicals with beneficial properties as bioactive substances for the pharmaceutical and cosmetic industries. Many flavonoid derivatives have been identified as potent inhibitors of Tyrosinase. Tyrosinase is a key enzyme in the biosynthetic pathway of melanin production, so tyrosinase inhibitors are skin whitening agents in the cosmetic industry that prevent hyperpigmentation. It has been known meanwhile for quite some time that polyphenols, and especially flavonoids, are heavily metabolized by colonic micro-organisms. Thus, topical application indications seem to be more suitable for plant-derived polyphenols. Although active compounds can be directly applied to the skin, for the most effective results, they should be transferred to the skin in a specific amount over a particular period (controlled release). This is only possible with the development of functional contact layers. Materials in different forms (woven, nonwoven, film, etc.) can be used as a contact layer, but a surface made of nanofibers offers several advantages. The most advantageous and straightforward method for nanofiber production is the electrospinning technique. This method consists of nano-scale fiber spinning from either a polymer solution or molten polymer using electrostatic forces. In this research, polyphenol enriched fraction of rose distillation wastewater embedded in electrospun nanofibers containing polyvinylalcohol (PVA), polyvinylpyrrolidone (PVP) and pectin (PEC) was studied. Based on SEM images of the electrospun PVA/PVP/Pectin patches loaded with different concentrations of polyphenolic extract, all the fibers are smooth and bead-free with diameters in the range of 400-500 nm that are suitable for topical drug delivery.

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Poster Presentation ID: 258

### The Optimization Process of Preparation of Oleoresin from Red Pepper

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#### ARTICLE INFO

*Keywords:*

Oleoresin  
Red pepper  
Capsaicinoid  
Scoville heat

#### ABSTRACT

The sweet chilli and hot chilli produced from *Capsicum annuum* L. The chili peppers cause the sensation of heat or burning when consumed. The heat sensation is incited by the type and the amount of a group of alkaloids called capsaicinoids. These alkaloids are found only in red pepper pods. In the food industry, a variety of products contain pepper and demand for chili products is increasing. In the food industries, oleoresin of red pepper is applied to formulate and produce different sauces and dressings for snacks. Oleoresin is a concentrated or almost semi-solid oily extract flavor and coloring in food products. In addition to the main ingredients of color and taste, this product contains vitamin C, B vitamins, iron, magnesium and potassium. This project aimed at developing and optimizing conditions for producing oleoresin from red peppers. The plant material was collected from different regions of Iran (Sabzevar, Shiraz, Varamin) and subjected to extraction using other solvents such as ethanol, ethyl acetate, dichloromethane, acetonitrile and propylene glycol hexane using maceration and ultrasound-assisted extraction method. Nowadays, the Scoville organoleptic test is replaced by chromatographic methods. The amount of capsaicinoids quantified using HPLC-PDA analysis and Scoville heating unit was calculated for all samples. The results showed that applying the ultrasonic-assisted extraction method with ethanol as solvent showed the highest capsaicinoid amount. The results for the calculation of the Scoville heating unit demonstrated that ethanol has the highest value with 130 SHU.

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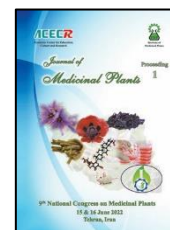
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Poster Presentation ID: 259

### Enhanced Production of Tanshinones in the Hairy Root Cultures of *Salvia miltiorrhiza* (Lamiaceae) by Elicitation

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#### ARTICLE INFO

**Keywords:**

Sage

Tanshinone

Hairy Root

Zn Nanoparticles

Coronatin

Methyl Jasmonate

#### ABSTRACT

Red sage (*Salvia miltiorrhiza*) commonly known as Danshen is one of the most important medicinal plants belonging to the Lamiaceae family. The plant is native to China and Japan. The plant contains a large number of lipophilic diterpenoids (tanshinones), phenolic hydrophilic compounds flavonoids, caffeic acid, and rosmarinic acid, which have anti-cancer effects. Tanshinones Anti-bacterial, cardiovascular and neuroprotective activities of tanshinones have been reported so far. These compounds are mainly biosynthesized and accumulated in the plant roots, therefore hairy roots (HRs) cultures are the main biotechnological strategies for the production of these medicinally important compounds. In the present study, different strains of *Agrobacterium rhizogenes* (A4, C58, LBA, and ATCC) were used to induce the plant HRs. The potency of used strains in the HRs induction was evaluated. The HRs lines (HRL) were selected based on their growth index (GI). Strain A4 had the lowest root induce time (12 days). The growth of HRLs showed a sigmoid pattern until the maximum growth at the fourth week. The highest biomass accumulation was obtained from HRL1 (6.32 g) and HRL4 (5.12 g), respectively. The effect of different elicitors including Zn nanoparticles (0, 50, 100 mg/L), coronatine (0.1 and 0.2  $\mu\text{M}$ ), and methyl jasmonate (50 and 100  $\mu\text{M}$ ) at different exposure times (24, 48, and 72 h) on the biomass and tanshinones production was also studied. The highest fresh and dry weight was obtained at a 50 mg/L Zn nanoparticle. The highest accumulation of tanshinones (7.30 mg/g) was measured in the elicited HRs with 0.1  $\mu\text{M}$  coronatine, followed by 50 mg/L Zn nanoparticles (4.45 mg/g), and 100  $\mu\text{M}$  methyl jasmonate (4.40 mg/g). This information can be considered for further commercial production of tanshinones from the plant HRs culture.

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Poster Presentation ID: 260

### The Role of Infochemicals in Tritrophic Relationship (Pistachio, the Common Pistachio Psylla and its Principal Parasitoid)

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#### ARTICLE INFO

##### Keywords:

Volatile organic compound (VOCs)  
headspace sampling  
olfactometer  
*Aganoscena pistaciae*  
Gas chromatography-Mass spectrometry (GC-MS)

#### ABSTRACT

The common pistachio psylla, *Aganoscena pistaciae* Burckhardt & Lauterer, 1989 (Hemiptera: Aphalaridae), is a primary pest of pistachio orchards, *Pistacia vera* L. in Iran and is known among farmers as dry sap. Their good adaptation to environmental conditions and potential for rapid population growth generates severe damage to the host. Pest management has been done using insecticides since the 1950s, and more than sixty kinds of insecticides have been tested. One of the new pest management methods is manipulating the behavior of insects by changing their instinctive behavior. Chemical communication in insects is the most significant type of communication, and the compounds involved in this communication are called semiochemicals or infochemicals. Herbivorous insects perceive a wide range of volatile substances released by plants called volatile organic compounds (VOCs) and use them as cues for finding food, mates, oviposition sites, and shelter. Parasitoid wasps also use these chemical cues that may originate from the host itself. In this research, VOCs of pistachio trees were collected by headspace sampling and were offered in a Y-tube olfactometer to psylla populations. Significant positive responses to volatiles of leaves were found in both males and females. The results of primary chromatographic analysis by GC-MS showed that VOCs consist of monoterpenes, esters, acids, alcohols, aldehydes and, aromatic compounds. The results will reveal several behavioral questions about chemical signals and some biological behaviors in their ecological interactions and useful in pest management strategies in the pistachio orchards.

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Poster Presentation ID: 261

### Effect of Foliar Application of Nickel on Morphological Properties and Photosynthetic Pigments of Moldavian Balm (*Dracocephalum moldavica* L.)

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#### ARTICLE INFO

##### Keywords:

Nickel; Chlorophyll  
Moldavian balm  
Photosynthetic  
pigments

#### ABSTRACT

Moldavian balm or moldavian dragonhead (*Dracocephalum moldavica* L.) is an aromatic and medicinal herb that belongs to the mint family (Lamiaceae). Nickel (Ni) is one of the important elements recognized as essential for plant growth and development. In order to investigate the effect of different concentrations of Ni on morphological properties and photosynthetic pigments, this research was conducted as a pot experiment. Treatments consisted of 5 different concentrations of nickel nitrate, including 0 (control), 0.07, 0.156, 0.234, 0.312 g L<sup>-1</sup> in three replications. Foliar application of different concentrations of nickel was performed in two stages. Results showed that different concentrations of nickel had significant effects on morphological properties and photosynthetic pigments of moldavian balm (*Dracocephalum moldavica* L.). The best treatment for improvement of plant growth parameters was observed at concentration of 0.07 g L<sup>-1</sup> but photosynthetic pigments were most frequently at control and 0.07 g L<sup>-1</sup> treatments. Ni at high concentrations had a negative effect on the photosynthetic pigments. Therefore, application of appropriate concentrations of Ni can improve the morphological properties and photosynthetic pigments of moldavian balm [1,2].

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Poster Presentation ID: 263

### Optimization of Extraction of Phenolic Compounds from Grape (*Vitis vinifera* L.) Pomace Using Response Surface Methodology

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#### ARTICLE INFO

##### Keywords:

Grape pomace  
phenolic compounds  
response surface  
methodology  
pilot scale.

#### ABSTRACT

The red skins, seeds, and stems (pomace) of grapes as by-products of the winery and soft drink production are rich sources of high-value phenolic compounds [1]. In this study, a green protocol was proposed for the extraction and separation of high-value phenolic compounds (PCs) from grape (*Vitis vinifera* L.) pomace. The effect of three independent variables, including extraction time (4-16 h), temperature (40-80 °C), and solvent-to-feed ratio (8-40 ml. g<sup>-1</sup>) on the extraction efficiency and yield of PCs were scrutinized by experimental design using Response Surface Methodology (RSM). The yield of PCs was quantified by monitoring the content of gallic acid (GA) and procyanidin B using the HPLC-UV analysis. The optimal extraction condition was attained at 80 °C, 10 hours and 20 mL/g of solvent to feed. The extraction efficiency of calculated to be 10.67 % w/w. The optimized condition was selected for handling in a pilot-scale operation and all the responses correspond to the lab-scale ones. The application of optimized extraction conditions leads to an increase in the production of value-added products from agricultural wastes. It also provides an opportunity to develop related spin-off industries in terms of human health and environmental pollution issues.

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Poster Presentation ID: 264

### Discovery of Selective Natural Inhibitors for Cortisol Synthase (CYP11B1) to Treat Cushing Disease

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#### ARTICLE INFO

##### Keywords:

cortisol synthase  
(CYP11B1)  
aldosterone synthase  
(CYP11B2)  
Molecular docking  
Pharmacophore

#### ABSTRACT

Cortisol is responsible for the inflammatory response of the immune system, the overproduction of which causes Cushing's disease, and its biosynthetic pathway is stimulated by glucocorticoid receptors and the activity of the enzyme cortisol synthase (CYP11B1). Cortisol synthase (CYP11B1) is structurally like aldosterone synthase (CYP11B2), which regulates blood pressure in the human body. The use of selective cortisol synthase inhibitors, which have more negligible effect on aldosterone synthase, is a more selective treatment for Cushing's disease and causes fewer side effects for hypertension-related diseases. Based on selective pharmacophores screening of around 10000 natural compounds obtained from the Zinc15 database. Over 10,000 natural compounds obtained from the Zinc15 database were selected for selective pharmacophore screening. Screening of these compounds based on selective pharmacophores showed 387 compounds that had a fitness score of  $\geq 1.5$  compared to the selected pharmacophore pattern and were selected to investigating their grid docking score. The Glide docking application with the extra precision protocol (XP) conducted the molecular docking with CYP11B1 receptor showed that more than half of the compounds revealed good scores ranging from -9.10 to -5.80 Kcal/mol. Ten ligands with the highest docking scores were selected for Induced Fit Docking (IFD) and molecular mechanics with generalized Born and surface area solvation (MM/GBSA) analysis. IFD docking results showed that selected compounds inhibit the CYP11B1 receptor well, but only 4 of these 10 ligands were able to selectively inhibit the CYP11B1 receptor and showed little interest in the CYP11B2 receptor. NP-5 (Zinc ID= 65057928) had the highest IFD score with CYP11B1 receptor and the lowest IFD score with CYP11B2 receptor. ADME and QSAR studies were also performed, and the result was that NP-5, as the superior ligand, could selectively inhibit CYP11B1 receptor.



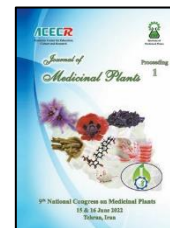
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15 & 16 June 2022  
Tehran, Iran



Poster Presentation ID: 265

### A Comparative Study of the Antimicrobial Effect of Thyme and Peppermint Essential Oils and Selective Antibiotics Against *Staphylococcus Aureus* Isolated from Poultry Eggs

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#### ARTICLE INFO

##### Keywords:

Thyme

Peppermint

*Staphylococcus aureus*

minimum inhibitory

concentration

#### ABSTRACT

*Staphylococcus aureus* is one of the main causes of food-borne illnesses [1]. Since the bacterial resistance to the chemical medicines has increased, nowadays the medicinal plants have been the focus of attention [2]. The aim of this study was to investigate the effect of thyme, peppermint essential oils on *S. aureus* isolated from poultry eggs. *S. aureus* strains were isolated from industrial eggs in Ardabil city, northwest of Iran. The essential oil of the plants used was obtained with a Clevenger Apparatus. Minimum lethal concentration and minimum inhibitory concentration were determined by microdilution method. Ampicillin, tetracycline, streptomycin, gentamicin and vancomycin were used as positive control and Antibiotic resistance of isolates was determined using agar disk diffusion method (Bauer-Kirby). After measuring the circle made out of them, the results were studied. All strains of *S. aureus* at concentrations of 1.56 mg/ml were inhibited by both thyme and pepper. The lowest lethal concentration of (3.12 mg / ml) for thyme and peppermint has inhibited one- and two-way, respectively. The results showed that thyme and peppermint essential oils inhibit the growth of *Staphylococcus aureus*. So, these medicinal plants with emphasis on antimicrobial activity of themselves, can replace chemical drugs to treat infections caused by *Staphylococcus aureus* bacterium [1,2].

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Poster Presentation ID: 266

### Effect of Microencapsulated Powder Containing Oak Extract Against on Biological Parameters of Spider Mite *Tetranychus Urticae* Chinaberry in Eggplant

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#### ARTICLE INFO

Keywords:

eggplant  
oak extract  
herbal formulated  
spider mite  
Farm

#### ABSTRACT

In recent years, the use of biocompatible pesticides in urban's pests control has been one of the goals of green space officials. spider mite *Tetranychus urticae* Koch 1836 (Acari:Tetranychidae) is one of the polyphagous pests of eggplant. In this study, to evaluate the effect of Microencapsulated formulation containing oak extract By the name of Maria-Peru from nano sabz avaran toba company, Knowledge enterprise company, was prepared and sampling leaf of Persian eggplant was done in salamat park of District 17. After identification and evaluation of biological steps, bioassays were performed in vitro with three replications and after preliminary tests, co-incubation of biological stage of protonymph and deutonymph mites with different concentrations of this compound on petri dishes containing 5% agar were treated and the LC50 results after 72 hours with essential oil composition were 865, 203 ppm respectively. the second test was performed to evaluate the toxicity of essential oak extract composition in comparison with Tondexir® (garlic and red pepper extract) in infected Persian lilac leaves for 7 days at a concentration of 2000 ppm, in two mentioned compounds. results showed that the percentage of losses in the composition of oak extract was 78/03%, 53/88% on the third day and 89/44%, 80/15% on the seventh day and in tondexir herbal pesticide , 75/67%, 62/93% and 62.93% on the third day and 77/3%, 65/42% On the seventh day respectively, was obtained. according to the results, the controlling effect of the formulated herbal composition containing oak extract has a higher mortality rate compared to the Tondexir and can easily replace the chemical pesticides in urban green space.

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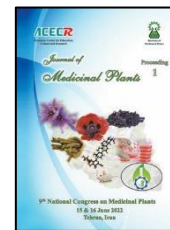
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Tehran, Iran



Poster Presentation ID: 267

### Semi-synthesis of Novel Derivatives of Noscapine by Three Component Mannich Reaction

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#### ARTICLE INFO

*Keywords:*

Noscapine  
Phthalidisoquinoline  
Microtubuline  
Mannich reaction

#### ABSTRACT

Noscapine is a phthalidisoquinoline alkaloid. It is the second abundant alkaloid in *Papaver somniferum*. Recently, it has been revealed that noscapine and its derivatives have anti-cancer properties because of inhibition of microtubuline polymerization [1]. In this project, new derivatives of noscapine were synthesized. First, Nor-noscapine was synthesized from the noscapine demethylation reaction and used as the starting material in the three component Mannich reaction [2]. Two series of derivatives were then synthesized using the Mannich reaction on nor-noscapine as a secondary amine [3]. The first group with paraformaldehyde and different ketones in ethanol solvent and hydrochloric acid as catalyst, led to the synthesis of 7 derivatives and the second series, with paraformaldehyde and different alkynes, led to 7 novel derivatives.

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Poster Presentation ID: 268

### New Organocatalysts Derived from Tetrahydropapaverine for Asymmetric Aldol Reaction

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#### ARTICLE INFO

*Keywords:*

Aldol reaction  
Tetrahydropapaverine  
Asymmetric catalysis  
Natural product  
Prolinamide

#### ABSTRACT

Hybrid compounds of natural products with amino acids and dipeptides have drawn scientists' attention due to their pharmacological and biological activities. However, these valuable compounds' application as organocatalysts has rarely been subject to investigation [1,2]. As far as our knowledge extends, tetrahydropapaverine derivatives have not been used as chiral ligands for asymmetric reactions. Due to natural products' vitality as chiral catalysts, our effort was to employ (R)-tetrahydropapaverine for the induction of enantioselectivity. Synthesis of prolinamide derivatives of (R)-tetrahydropapaverine as mono-, di- and tripeptide is reported. (R)-Tetrahydropapaverine-prolinamide hybrid derivatives were tested as organocatalysts in the asymmetric Aldol reaction of aldehydes and ketones within various solvents, temperatures, and molar ratios. Catalyst 2 (30 mol %) afforded the best result in the Aldol reaction of cyclohexanone with 4-nitrobenzaldehyde up to 90% *ee*. Although in the sole presence of L-proline the reaction proceeded with *anti*-stereoselectivity, its hybridization with (R)-tetrahydropapaverine yielded the formation of *syn* products as the major compounds.

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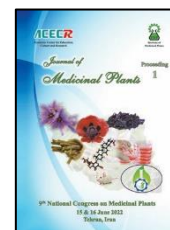
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Tehran, Iran



Poster Presentation ID: 271

### Analysis of Aracis Hypogay Peanut Lectin by Liquid Chromatography and Mass Spectrometry

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#### ARTICLE INFO

##### Keywords:

Peanut lectin  
2D chromatography  
Mass spectrometry  
MALDI-TOF

#### ABSTRACT

Lectins are proteins or glycoproteins that bind specifically and reversibly to carbohydrates. They are typically involved in chemical interactions and intercellular communication and have a variety of activities, including antitumor, antiviral (HIV inhibitor), and antifungal. Also, they can interact with glycoproteins such as antibodies and have effect on them. For these purposes, purification and identification of lectins is important. [1,2] In this project, the protein mixture was extracted from peanuts and since the studied glycoprotein is a tetramer with a  $M_w$  of 120 kDa. The sample was extracted by PBS buffer, then two-dimensional chromatography (IEC column and then SEC column, 2D-chromatography) was used. To detect lectin, polyacrylamide gel electrophoresis was used, then the desired band was separated from the gel and digested, and using mass spectrometry methods, the desired lectin called Galactose binding lectin was identified by MALDI-TOF, HDMS and IM-MS. The protein is separated by ion strength and after the detection of the collected fraction containing lectin from the peak ion exchange, the desired fraction is injected into the SEC. We used 12% gel for initial identification and observation and saw lectin in the range of 25-29 kDa. After the protein is seen in this band, the probable band of the desired protein was cut on electrophoresis gel. A solution containing trypsin enzyme was added to the sample. Digested samples were analyzed by MALDI-TOF. We used MASCOT to identify the data from digesting and the data that comes from MALDI-TOF. We used MALDI-TOF to see the mass of lectin without digesting. Also, used IM-MS to identify this protein then deconvoluted the spectrum of lectin and saw 25 kDa again. We have the drift scope of lectin that confirms the previous data. Finally, for the first time we could identify lectin by IM-MS.

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Poster Presentation ID: 272

### Separation, Identification and Scale-Up Purification of Cannabinoids

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#### ARTICLE INFO

##### Keywords:

Purification  
Preparative  
Chromatography  
Cannabidiol  
Tetrahydrocannabinol  
Epilepsy

#### ABSTRACT

Cannabinoids are potential compounds mostly produced by glandular trichomes located on the cannabis flowers. Hashish is the mechanical separation of these trichomes with less contamination in a gum form. Cannabidiol (CBD) is one of the most important cannabinoids with many medicinal properties. Recently, different research teams have studied these therapeutic effects on cancer treatment [1]. In 2018, cannabidiol was approved by Food and Drug Administration (FDA) for the treatment of a severe form of epilepsy [2]. Due to the importance of medications with high purity in the pharmaceutical industry, semi-preparative chromatography is utilized to produce pure CBD. Also, synthetic CBD derivatives with racemic forms have introduced to the pharmaceutical market with nonselective effects on related receptors in the human body. The main purpose of this project is to optimize separation conditions by analytical chromatography and scale-up process for semi-preparative purification of cannabinoids [3]. Isolation of natural cannabidiol and tetrahydrocannabinol (THC) from hashish with a concentration of 500 ppm was performed with the C<sub>18</sub> analytical column (250×4.6 mm, 5 μm, KHERAD AZMA Co.). Identification and characterization of CBD and THC are performed by LC-QTOF-MS and NMR. The separation method was developed using analytical chromatography, and the amount of CBD in the hashish sample was determined by quantitative analysis using an external standard. The method's flow rate and run time were optimized from analytical to semi-preparative. Purification of CBD and THC from hashish with a concentration of 300,000 ppm was performed with the C<sub>18</sub> semi-preparative column (250×26 mm, 10 μm, KHERAD AZMA Co.). CBD and THC fractions were collected, and their purities were obtained to more than 98% and confirmed by LC-MS and NMR. Nowadays, natural CBD turned into a valuable industrial compound by having a growing global market.

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Tehran, Iran



Poster Presentation ID: 273

### *In vitro* and *In vivo* Antiangiogenic Studies of Potassium Koetjapate

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#### ARTICLE INFO

##### Keywords:

*Sandoricum koetjape*

Koetjapic acid

Angiogenesis

Potassium koetjapate

#### ABSTRACT

*Sandoricum koetjape* Merr. (Meliaceae) is a traditional medicinal plant and native to Malaysia and a few other countries. Previously, we have described that koetjapic acid (KA) is the active principle of *S. koetjape* which contributes towards the anticancer activity of this herb against human colon cancer cell line While KA has a promising anticancer potential, it is highly insoluble in aqueous solutions. To increase aqueous solubility of koetjapic acid, we have previously reported a chemical modification of koetjapic acid to potassium koetjapate (KKA). In this study, anti-angiogenic efficacy of KKA was investigated in rat aorta, human endothelial cells (EA.hy926) and nude mice implanted with Matrigel. MTT assay was used to study the effect of KKA on proliferation of human endothelial cells. Rat Aortic Ring Assay was conducted with the *ex vivo* method described by Brown et al. *In vivo* antiangiogenic activity of KKA was studied using the Matrigel sponge model of angiogenesis followed by the protocol. The pharmacological results showed that KKA significantly suppressed sprouting of microvessels in rat aorta and demonstrated remarkable inhibition of major endothelial functions such as migration, differentiation, and expression of Vascular endothelial growth factor (VEGF) in endothelial cells. Further, KKA significantly inhibited vascularization in matrigel plugs implanted in nude mice. The mechanism of action for KA and KKA can be established that involves suppression of HIF-1 $\alpha$  and Wnt genes activity which in turn blocks VEGF pathway and subsequently inhibits angiogenesis. Findings of the present study demonstrated that potassium koetjapate (KKA) has shown improved cytotoxic as well as antiangiogenic effects compared to its native compound, koetjapic acid (KA). The improved efficacy of KKA can be a result of the improved solubility and bioavailability. [1,2].

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Poster Presentation ID: 275

### Phytochemical Study of Essential Oils of Different *Dorema ammoniacum* Organs and Gum from Birjand

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#### ARTICLE INFO

Keywords:

*Dorema ammoniacum*  
Gas Chromatography  
Bisabolene derivatives  
Gum

#### ABSTRACT

*Dorema ammoniacum* D. Don. is a perennial medicinal plant from Apiaceae family [1]. *D. ammoniacum* is an important perennial medicinal plant that grows wild in central and eastern regions of Iran such as Yazd, Isfahan, Kerman, Semnan and Khorasan provinces, and its local names are Kandal, Vasha or Oshagh and Koma-kandal [2]. There is some evidence in Iranian traditional medicine about the anticonvulsant and anthelmintic properties of *D. ammoniacum* gum resin exuding from its root and stem [2]. In this study, roots, stems, leaves, flowers and gums of *D. ammoniacum* were collected in spring 1398 from Birjand city in South Khorasan province. Essential oils were isolated by hydrodistillation and their oils content and compositions were investigated with gas chromatography techniques. The highest essential oils yield of *D. ammoniacum* was obtained in gum with 1.0% and the lowest yield of essential oil for roots with 0.2%. The results of essential oil analysis showed that a total of 73 compounds were identified in all organs and *D.ammoniacum* gum. In roots, stems, leaves, flowers and gum oils containing 91.3 %, 97.15 %, 91.8 %, 88.4 % and 89.4 % of oil were identified, respectively. (Z)-Sabinene hydrate, (2E, 6E)-farnesol, elemicin and n-hexacosane were identified as common compounds among all essential oils. There was also a few monocyclic bisabolene skeleton type like  $\alpha$ -bisabolol, Z- $\alpha$ -bisabolene,  $\beta$ -bisabolene, ar-curcumene, ar-dihydro turmerone in the EOs of *D. ammoniacum* different organs. The total percentages of bisabolene derivatives in root, stem, leaves, flower and gum are 35.5%, 3.4%, 1.4%, 14.5% and 8.5 %, respectively. Sesquiterpenes constituted the main chemical group in the essential oil obtained of *Dorema ammoniacum* from Birjand.

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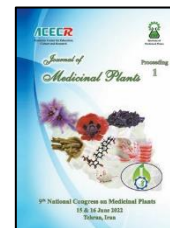
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Tehran, Iran



Poster Presentation ID: 276

### ***In vitro* Mass Propagation of High Glabridin Genotype from Iranian Licorice (*Glycyrrhiza glabra* L.) Populations**

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#### ARTICLE INFO

##### Keywords:

Liquorice  
Plant growth regulators  
Glabridin  
*In vitro* culture

#### ABSTRACT

Licorice (*Glycyrrhiza glabra* L.) as one of the valuable medicinal plants of the Fabaceae family contains metabolites widely used in the food, medicine and cosmetics industries [1]. Due to the low content of glabridin in wild licorice populations of Iran as well as the effect of environmental factors on the metabolite production, development and optimization of *in vitro* culture and propagation of the plant is important. After agromorphological and phytochemical evaluation of licorice populations cultivated in the Medicinal Plants and Drugs Research Institute (MPDRI) farm of Shahid Beheshti University, Ilam was recognized as a rich-glabridin genotype. Then this genotype was introduced to *in vitro* condition and the effect of types and concentrations of various cytokines and auxins on shooting and rooting of the plants in MS medium was examined to optimize *in vitro* culture for its mass propagation. According to the obtained results, the concentration of 2 mg/l benzylaminopurine (BAP) was the best treatment for obtaining the maximum number and length of branches. Adding the 3 mg/l indole butyric acid (IBA) into MS medium was also the best treatment for rooting. Also, the effect of different potting mixtures on the survival rate of *in vitro* micropropagated plant showed that the potting mixture of peat moss + clay + sand (1: 1: 1 v/v) with 80% survival rate was the best mixture for the hardening of licorice plants.

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Poster Presentation ID: 278

### Application of Response Surface Methodology for The Optimization of Supercritical Fluid and Ultrasonic-Assisted Extraction of Bioactive Components of *Alyssum* and Evaluation of Antioxidant Activity

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#### ARTICLE INFO

*Keywords:*

Alyssum  
Supercritical Fluid  
Extraction  
Ultrasonic-Assisted  
Extraction  
LC-MS  
DPPH

#### ABSTRACT

In recent years, natural antioxidants have received more attention than synthetic antioxidants because they are safer and have fewer side effects. Plants are good sources of natural antioxidants. In this study, Alyssum, as a good source of natural antioxidants, due to the presence of compounds such as phenols, flavonoids tannins, and lignins was considered [1]. Supercritical fluid extraction (SFE) and ultrasound assisted extraction (UAE) were used to extract bioactive components from Alyssum. Identification of Alyssum extracted bioactive components was performed by liquid chromatography–mass spectrometry (LC-MS) which showed this plant is a rich source of compounds with antioxidant properties. Antioxidant activity was evaluated using the 2,2-diphenyl-1-picrylhydrazyl (DPPH) assay to the determined  $IC_{50}$ . To achieve maximum antioxidant activity and extraction efficiency, the studied parameters were optimized using the RSM-CCD method [2]. In the SFE method, the highest yield of extraction and lowest value of  $IC_{50}$  have obtained at 3.3 % and 763  $\mu\text{g/ml}$ , respectively with optimization of pressure, modifier volume, and dynamic time. In the ultrasonic-assisted extraction method, the temperature, time, and volume of the solvent were investigated, which are based on the optimal points obtained, the amount of extraction efficiency, and  $IC_{50}$  are 4.9% and 856  $\mu\text{g/ml}$ . According to the results the percentage of extraction and antioxidant activity in extraction by UAE is higher than extraction with SFE. However, the SFE method is an environmentally friendly and acceptable method due to the use of smaller amounts of organic solvents.

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Poster Presentation ID: 280

### Antioxidant Activity of 30 Mushroom-forming Agaricomycotina Fungi

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#### ARTICLE INFO

##### Keywords:

Antioxidant  
Basidiomycetes  
Macrofungi  
ABTS  
*Hypholoma*

#### ABSTRACT

Today, the study of natural antioxidants and their effects in various fields, from food engineering to medicine and pharmacy, is of interest to the scientific community. This study aimed to investigate the antioxidant properties of 30 species of Iranian macrobasidiomycetes by the ABTS method. The majority of the species were investigated for the first time for their antioxidant properties. For this, fungal methanolic extracts with final concentrations (0.01, 0.025, 0.05, 0.075, and 0.1 mg/ml) were mixed with 980  $\mu$ l of ABTS solution, and the adsorption of the samples was read at 734 nm. PBS solution was used for control. The radical inhibition percentage was calculated, and IC50 was obtained using linear regression. Molecular identification of the species was performed using the nuclear ribosomal ITS region. The fungi studied have high phylogenetic (*Agaricaceae*, *Pleurotaceae*, *Cantharellaceae*, *Gyroporaceae*, *Hymenochaetaceae*) and morphological (agaric, bolete, polypore, corticioid) diversity and showed a variety of antioxidant effects, with IC50 values ranging from 0.04 to 1.10 mg/ml. The best results in trapping ABTS radicals belonged to *Sanghuangporus*, *Hypholoma*, and *Agaricus* genera. Due to the antioxidant properties in Iranian basidiomycetes especially edible species, further study of them as a powerful source in exploiting natural antioxidant compounds and formulation of food additives would be advantageous [1, 2].

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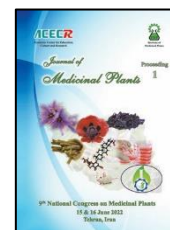
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Poster Presentation ID: 281

### Preparation and Application of the Magnetic Iron Oxide Nanoparticles Coated by Metal-organic Framework, Conjugated to a Cell-penetrating Peptide for Utilizing in Targeted delivery of Doxorubicin

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#### ARTICLE INFO

##### Keywords:

Metal-organic  
framework  
Iron oxide  
nanoparticles  
Cell-penetrating  
peptides  
Solid phase synthesis

#### ABSTRACT

A major focus of cancer nanomedicine is to achieve a high therapeutic index for cancer therapy. Smart carriers and drug reservoirs could overcome to the weaknesses of conventional therapy methods and provide targeted, localized, and adjusted delivery systems for genes, drugs, and radioisotopes. Metal-organic frameworks, a class of porous self-assembled materials composed of metal ions or clusters connected by organic linkers, are one of the most promising materials for biomedicine. Cell-penetrating peptides are composed of short stretches of amino acids that facilitate translocation of cargo molecules across cell membranes. Here, we are synthesized the Fe<sub>3</sub>O<sub>4</sub>@Fe-MIL-101-NH<sub>2</sub> magnetic nanoparticles containing doxorubicin (Dox) that are individually conjugated with a cyclic and linear peptide. These peptides containing three tryptophan, three arginine, and one cysteine amino acids [(WR)<sub>3</sub>C] are synthesized in the solid phase and attached to the organic linker of the MOF through an amide bond. In order to confirm the structure of the synthesized Fe<sub>3</sub>O<sub>4</sub>@Fe-MIL-101-NH<sub>2</sub> magnetic nanoparticles, several analyzes such as FT-IR, EDX, TGA, FE-SEM, XRD, and VSM were used. Mass spectrometric analysis was also performed to confirm the structure of the cyclic and linear peptides. Further, the fluorescence intensity of Dox was visualized in MCF-7 cells by confocal microscopy imaging techniques to confirm the improvement of cellular uptake. The results showed that the cells treated with Fe<sub>3</sub>O<sub>4</sub>@MOF@CPP@Dox had a higher fluorescence signal compared to that of Dox alone.

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Poster Presentation ID: 283

### Consideration of Absorption Effects of lanthanides on Soil and Plant Chemical Behavior

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#### ARTICLE INFO

Keywords:

*Zea mays*

*Solanum lycopersicum*

Rare earth elements  
(REEs)

Phosphate fertilizer

#### ABSTRACT

Several papers reported that elements that are not essential to plants could stimulate plant growth in certain circumstances. Rare earth elements (REEs) also stimulate plant growth, increase the quantity of plant products, and affect their quality. The presence of these elements is in a small amount in phosphate concentrates. With the extensive use of REEs-based fertilizers in China, the interest in research in this field has also increased. Many of the positive effects of rare earth elements were observed only in low doses of REEs and negative effects were observed with increasing REEs doses. The present study investigated the chemical effects of rare earth elements in phosphate fertilizers on *Solanum lycopersicum* and *Zea mays* and the cumulative presence and distribution of rare earth elements in soil chemistry and plant growth. All tested species in these experiments showed that Rare earth elements from the soil are absorbed and collected by these plants. Seed germination is not affected by rare earth elements. Also, these elements did not have negative effects on the germination rate. By increasing the REEs concentration in fertilizer, the amount of these elements increases in root and stem. The measured concentrations of soil elements at a given dose in the root were consistently higher than in the stem. To fully understand the effects of REEs on agriculture and human health, future research in the various field is required and it is necessary to review the cycle of rare earth elements in soil and plant species. In this study, the effect of REEs in the most consumed and most common chemical fertilizers in most Regions of Iran called SSP or single superphosphate in two standard varieties of *Solanum lycopersicum* and *Zea mays* and Chemical effects lead to adsorption on various plant components along with other major elements due to chemistry Soil is discussed. Comparison of phosphorus levels in *Solanum lycopersicum* and *Zea mays* from stems, roots and fruits are 3592, 4846 ppm, respectively, and in comparison with 20% phosphate fertilizer, these values have reached 3755 and 5450. The process of the effect on the improvement or change of different soil examined is components.

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Poster Presentation ID: 284

### Evaluation of the Effect of *Trachyspermum ammi* Extract on Gastric Ulcer Caused by Ibuprofen

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#### ARTICLE INFO

Keywords:

*Trachyspermum ammi*

Extract

Gastric ulcer

Ibuprofen

Animal model

#### ABSTRACT

*Trachyspermum ammi* is a plant of umbelliferae family and has been traditionally used in the treatment of many gastrointestinal disorders such as indigestion, colic, Anthelmintic activity and diarrhea. In this study, the effect of *Trachyspermum ammi* extract on treatment of gastric ulcer caused by ibuprofen in animal model to be examined. This study was performed on 30 adult female rats. Ibuprofen was used orally to induce gastric ulcer. The animals were randomly divided into 5 groups .After wounding, the animals were treated with omeprazole or *Trachyspermum ammi* extract at doses of 125, 250 and 500 mg / kg twice a day for two weeks. At the end of the study, the animals were examined for the number and extent of gastric ulcers. *Trachyspermum ammi* extract improved gastric ulcer in animals in a dose-dependent manner. This effect was significant compared to omeprazole at doses of 125 and 250 mg / kg. The average number and area of gastric ulcer in the receiving groups the extract was significantly lower than the omeprazole group. Consumption of *Trachyspermum ammi* extract is very effective in the treatment of gastric ulcer and its therapeutic effect is comparable to the well-known drug omeprazole. Therefore, understanding the mechanism of this effect requires further work.

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Poster Presentation ID: 285

### Simultaneous Extraction of Glycyrrhizic Acid from Licorice Rhizome and Hydrolysis to Glycyrrhetic Acid using Ultrasonic Technique

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#### ARTICLE INFO

##### Keywords:

Glycyrrhizic acid  
Extraction  
Ultrasound technology  
Purification

#### ABSTRACT

Various methods such as maceration, Soxhlet, ultrasonic and microwave irradiation have been used to extract the bioactive compounds of *Glycyrrhiza glabra* (licorice) [1]. Glycyrrhetic acid (GT), the aglycone of glycyrrhizic acid (GA), is among the active components of this valuable herbal plant, which also can be supplied from glycosidic bound hydrolysis of GA. The aim of this study was to optimize the extraction of active compounds from licorice followed by hydrolysis of GA to prepare GT and then to purify this compound. HPLC analysis was first applied to measure GA and GT. The optimized method, comprising acetonitrile:aqueous acetic acid mobile phase and gradient elution, which allowed quantification of both GA and GT in a short run. Then, we commenced the work by extracting GA from licorice rhizome utilizing an ultrasound probe 400W along with distinct solvents such as methanol, ethanol, and water with different added ammonia. Extraction efficiency was improved by modifying the time and temperature of the reaction. In the next step, the hydrolysis of GA to GT was studied. Optimization of the reaction by adjusting the various amounts of hydrochloric acid, time, and temperature of the reaction led to an efficient GT preparation.

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Poster Presentation ID: 287

### Study on the Interaction of Herbicide Paraquat with Human Serum Albumin (HSA) by Fluorescence and Infrared Spectroscopic Methods

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#### ARTICLE INFO

*Keywords:*

Paraquat  
Human Albumin Serum  
Stern-Valmer

#### ABSTRACT

One of the strongest herbicides to eliminate weeds in agriculture is paraquat poisoning which can be fatal. Distribution, free concentration, and metabolism of different toxins depend on how they bind to serum albumin and the three-dimensional structure of the protein binding site. Paraquat-bound and rational administration of albumin can prevent toxic and lethal effects in these patients. Since the interaction of paraquat toxin with HSA and its pharmacokinetic parameters have not been investigated. In this study, the procedure, type and location of paraquat toxin binding to human albumin serum were investigated. In the experimental part of the study, first, the fluorescence and infrared spectra of paraquat in ethanol solvent were obtained by spectrofluorimetric at 367 nm excitation wavelength and 447 nm emission, and the paraquat spectrum was plotted with human albumin serum at different concentrations of toxin at three temperatures. Using Stern-Valmer's relation, the parameters of protein and toxin interaction were analyzed. The results of spectroscopic studies showed that the interaction between albumin and paraquat resulted in a decrease in the emission or, in other words, a static type quenching occur. Spectroscopic studies showed that the interaction of albumin and paraquat reduced emission or, in other words, extinguished albumin fluorescence. Paraquat shutdown is static. Changes in FT-IR peaks of albumin structure in the presence of paraquat indicate the interaction between these two molecules



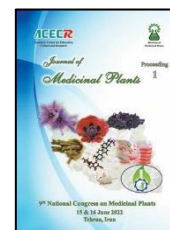
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Poster Presentation ID: 288

### Evaluation of a Tannin-based Herbal Formulation against Coccidiosis in Broilers

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#### ARTICLE INFO

##### Keywords:

Coccidiosis  
Prevention  
Herbal mixture  
Broilers

#### ABSTRACT

Coccidiosis is an important infectious disease in poultry production worldwide caused by a protozoan of the genus *Eimeria*. The occurrence of resistance, consumer concerns and the increasing regulations, as well as possible upcoming bans on the use of anticoccidial drugs as feed additives, have prompted the need for alternative control strategies [1]. Biologically active compounds from plants possess metabolites with a distinct mode of action capable of inhibiting different stages of the *Eimeria* species life cycle [2]. The present study was performed to evaluate effectiveness of a herbal tannin-based formulation in the prevention of coccidiosis. Totally, 120 broilers were divided into four treatment groups. Birds in the A and B groups were provided with the herbal formulation (75% *Quercus infectoria*, 16% *Artemisia annua* and 9% *Allium sativum*) and Monensin, respectively as feed additives during the rearing period. Groups C and D did not receive any anticoccidial feed additives. Chickens in treatment A, B, and C were challenged with a mixture of common *Eimeria* isolates at the age of 14 days. Body weight gain, feed conversion ratio (FCR), mortality rate, intestinal lesion scoring, and OPG were evaluated in this study. Results of the present study revealed that the highest mean body weight was gained in group D, followed by chickens in group A. The best FCR results were attributed to chickens in group D, followed by group B. In this study, both drugs decreased mortality rate, intestinal lesion scores, and oocyst shed in feces (OPG) in treated chickens. In conclusion, this herbal formulation could effectively act against coccidiosis and reduce the direct and indirect damages caused by *Eimeria* species in poultry.

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### Trial for Efficacy of *Rosa damascena* Mill. Product on Constipation during Pregnancy

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#### ARTICLE INFO

##### Keywords:

Constipation  
Pregnancy  
*Rosa damascena*  
Persian medicine

#### ABSTRACT

One of the most prevalent problems during pregnancy is constipation [1]. The use of safe laxatives to ease constipation during pregnancy has long been highlighted in Persian medicine [2]. The goal of this study was to see how *Rosa damascena* Mill. products affected constipation and quality of life during pregnancy. This is a single-arm clinical experiment that took place in Tehran and Qom, Iran, in 2018-2019, on 35 pregnant women (14-34 weeks) with constipation identified using Rome IV criteria. For four weeks, *R. damascena* products should be consumed every day. The severity of constipation and quality of life were then measured using the Rome IV criteria and the World Health Organization (WHO) quality of life questionnaires (WHOQOL-BREF). This research involved 35 pregnant women (14-34 weeks). The use of *R. damascena* products reduced the score of Rome IV criteria (Mean 9.4 to 1.1), increased bowel movement frequency, and improved overall quality of life ( $P < 0.001$ ). After consuming *R. damascena* products, the most common constipation symptoms, such as straining, lumpy and hard stools, a sensation of incomplete evacuation, a sensation of anorectal obstruction, manual facilitation maneuvers, and less than 3 spontaneous bowel movements per week, significantly improved ( $P < 0.001$ ). Constipation may be efficiently treated using *R. damascena* products, which can also improve one's quality of life.

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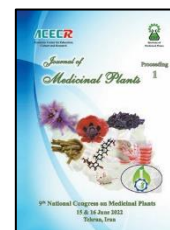
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### Poster Presentation

## Induction of Hairy roots by Different Strains of *Agrobacterium rhizogenesis* and Study of Growth and Production Pattern Centellosides in *Gutella Cola (Centella asiatica)*

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### ARTICLE INFO

#### Keywords:

*Agrobacterium  
rhizogenesis*  
*Centella asiatica*  
*Centellosides*  
*Hairy roots*  
*Triterpenoid*

### ABSTRACT

*Centella asiatica* (L) Urban is a perennial plant of the Umbelliferae family with creeping stems. Commonly known as centella, or Asiatic pennywort. Its global distribution is reported in Iran, Caucasus, Pakistan, India, Indonesia, Southwest Asia, China, Japan, Oceania and the United States. In Iran, it is distributed in Gilan, Anzali Lagoon, Lahijan, Rasht and Fooman. This plant contains a variety of triterpenoids, including madacoside, asiaticoside, madcasic acid and ascetic acid. Known as Cantellosides, they are used in the pharmaceutical and cosmetic industries around the world. These triterpenoids effectively cure skin diseases such as eczema, leprosy, and psoriasis, and exhibit a range of medicinal properties, such as antitumor activity, memory enhancement, immunomodulation, antioxidant activity, and antidepressant activity. However, the main content of bioactive triterpenoids in *C.asiatica* varies depending on plant organs, cultivation environmental conditions and genotypes. These compounds differentiate and accumulate mainly in leaf tissue and are present only in small amounts in undifferentiated root cells. Cell and plant tissue culture promised to be controlled Production of numerous beneficial secondary metabolites, That Hairy roots culture in vitro using *Agrobacterium rhizogenesis* is an efficient system for sustainable and commercial production of plant phytochemical compounds. The results of this experiment showed that the studied Hairy roots lines have a high growth pattern for biomass production until the fourth week and from the fifth week onwards the roots enter the aging phase with the appearance of symptoms such as browning and biomass production in it. This is due to the reduction of nutrients in the culture medium. Evaluation of fresh and dry weight of roots during different weeks showed that the highest amount of fresh and dry weight was related to Sqs strain. Also, the pattern of production of Centellosides in different root lines showed an increase until the fourth week and a decreasing or constant trend from the fourth to the sixth week, with the highest amount of production related to the Sqs strain. The results of this study, in addition to protecting the genetic resources of this valuable endangered species, will be very useful for semi-industrial production and sustainable use of compounds with controlled medicinal value in laboratory conditions and for supplying pharmaceutical raw materials to related industries.

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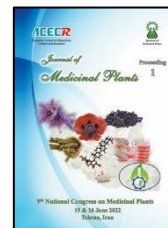
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