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Proceeding

3



**11<sup>th</sup> National Congress on Medicinal Plants**

**29 & 30 May 2024**

**Yazd, Iran**



## JOURNAL OF MEDICINAL PLANTS

Proceeding 3

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

29 & 30 May 2024

Yazd, Iran

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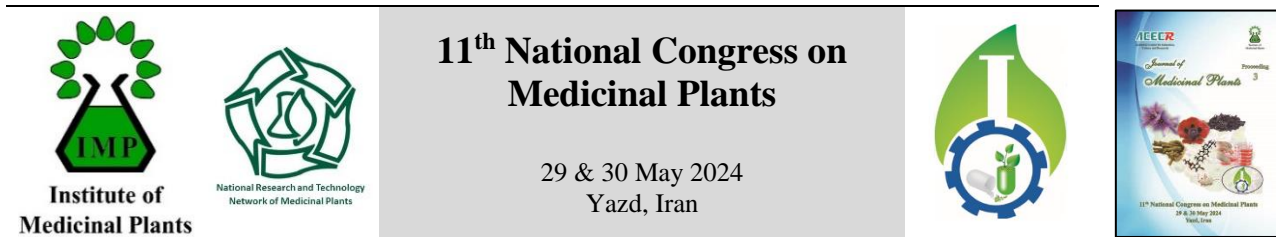
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**11<sup>th</sup> National Congress on  
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## Welcome Message

**Dear Esteemed Colleagues and Fellow Scientists,**

As the representative of the National Network of Research and Technology in Medicinal Plants, I am delighted and honored to extend a warm welcome to you all to the 11<sup>th</sup> National Congress of Medicinal Plants (NCMP2024). This prestigious event is set to take place at the University of Yazd, nestled in the enchanting city of Yazd, the vibrant heart of Iran.

We are privileged to host esteemed researchers specializing in medicinal plants and related disciplines. Our aim is to build upon the successful legacy of our previous meetings. The congress is designed to serve as a vital platform for researchers to showcase the latest breakthroughs in various fields related to medicinal plants. These fields encompass pharmacy, medicine, agriculture and natural resources, biotechnology, basic sciences, business, and industry. We received approximately 500 abstracts, out of which, after a meticulous review process, 440 have been selected for poster presentations and 25 for oral presentations.

In addition to the academic program, we will also host a professional exhibition. This will provide an opportunity for participants to share experiences and engage in discussions with producers and business sectors involved in medicinal plants and herbal medicines.

I would like to express my profound gratitude to the members of the organizing committee for their tireless efforts in orchestrating this event. I also extend my thanks to our colleagues on the scientific committee for their diligent and timely review of the papers. Lastly, I would like to acknowledge our sponsors for their generous financial support, which has enabled us to keep the costs to a minimum.

Sincerely,

**Prof. Peyman Salehi**

**Chair, NCMP2024 Scientific Committee**



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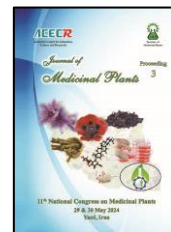
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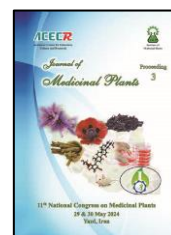
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# Oral Presentation



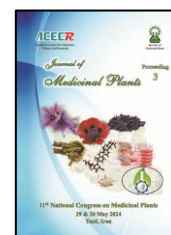
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Oral Presentation ID: -

### Synthesis of Novel Opioids with High Anticancer and Antinociceptive Properties

Peyman Salehi,<sup>1,\*</sup> Morteza Bararjanian,<sup>1</sup> Mehrdad Faizi,<sup>2</sup> Mona Kamelan,<sup>1</sup> Faeze Nemati,<sup>3</sup> Zahra Davarzani,<sup>1</sup> Kosar Babanezhad Harikandei,<sup>1</sup> Saman Gharenaghadeh,<sup>1</sup> Mona Khoramjouy,<sup>2</sup> Faeze Nourmandipour,<sup>1</sup> Reyhane Emadi<sup>2</sup>

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b>  <i>Papaver somniferum</i>            Noscapine            Morphine            Codeine            Pain</p>	<p>Opium is the latex extracted from the poppy plant, <i>Papaver somniferum</i> and is the source of many valuable alkaloids such as morphine, codeine, noscapine, papaverine and thebaine. These compounds have been used for the semi-synthesis of other drugs such as buprenorphine, naloxone and oxycodone. The aim of the structural manipulations on these compounds were reduction of their drawbacks and side-effects [1]. In this paper the synthesis of new derivatives of opioids and investigation of their biological activities is reported. A number of novel products have been prepared using the multicomponent reactions especially Strecker amino cyanation and Huisgen 1,3-dipolar cycloaddition reactions. The synthesized compounds have been studied <i>in-vitro</i> and <i>in-vivo</i> for their anticancer and antinociceptive properties, in which remarkable activities were observed for many of the triazole tethered compounds [2]. Also, <i>in-silico</i> docking studies were performed to compare the experimental and theoretical results, understanding the structure-activity relationships and interpretation the mechanism of their action.</p>

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2. Nemati, F., Bischoff-Kont, I., Salehi, P., Nejad-Ebrahimi, S., Mohebbi, M., Bararjanian, M., Hadian, N., Hassanpour, Z., Jung, Y., Schaerlaekens, S., Lucena-Agell, D., Oliva, M.A., Furst, R., Nasiri, H.R., Identification of novel anti-cancer agents by the synthesis and cellular screening of a noscapine-based library, *Bioorganic Chemistry*, 2021, 115, 105135.



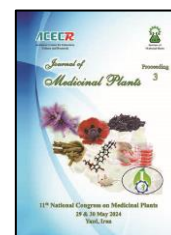
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Oral Presentation ID: -

### Medicinal and Aromatic plants in Yazd province

Valiollah Mozaffarian\*

Member of Scientific board of Research Institute of forests and Rangelands, Department of Botany, Retired

ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Iranian flora</p>	<p>Yazd province in the center of Iran covers about 4.5% of the total area of Iran with about 76,469 square kilometers. Yazd province is bordered by the provinces of Isfahan, South Khorasan, Kerman and Fars. According to the latest census, the population of the province is about 1,252,000 people, and the center of it is the city of Yazd, with a population of about 380,000 people. It is one of the central desertic provinces with a scattered population and cities such as Ardakan, Meibod, Aghda, Zarch, Kharvagh, Saghand, Tabas, Yazd, Taft, Abargho, Mehriz, Taft, Bahabad, Marvast and Harat. From the point of view of the plant geography, it is located in the Irano-Turani region and the central Iran province with two subprovince of the Eu- central Iran and the Alpine of central Iran, and its southern part has the feature of the southern Zagros subprovince, in addition, the city of Bafagh is in the southeastern part of the province and Its vegetation is similar to the Omani subprovince and affected by the heat of the south of Iran dominated by <i>Phoenix dactylifera</i>. The major growths and dominant features of the province in terms of vegetation are as follows.</p> <ul style="list-style-type: none"> <li>- Deserts and mountain slopes covered with <i>Artemisia</i> species, which can be seen on the mountain slopes and sometimes up to the top of the mountains together with <i>Astragalus</i>, and here most of the times we see the scattered small gardens with local usage products.</li> <li>-Mountainous heights with rocky and soily tops, often cold, with cushion-shaped and bushy vegetation, sometimes together with <i>Artemisia Aucheri</i>.</li> <li>- Deserts dominated by sand and sand dunes, whose dominant plant elements are <i>Calligonum</i> spp., <i>Astragalus</i> (<i>Poterion</i>) spp. and other sand-loving plants.</li> <li>-Salty deserts with high underground water with mostly salinity-resistant plant elements from the <i>Chenopodiaceae</i> family.</li> <li>- The mountain slopes of the southern part of the province which is covered by tree and shrub with dominant plants species of <i>Amygdalus scoparia</i>, <i>Pistacia atlantica</i> subsp. <i>mutica</i>, <i>Pistacia Khinjuk</i>, more or less similar to the southern Zagros subprovince vegetation.</li> </ul> <p>In terms of agricultural products, in the desertic parts, mostly cultivated by seasonal vegetables, fast-growing plants and scattered fruit gardens, and in the mountainous part, the main products are fruits. From the point of view of the diversity of medicinal plants, although the vastness and variety of Ecological conditions, make us look for a variety of medicinal plants, but due to the difficult growing conditions, little water, and soil salinity, we often do not taste much variety. With extensive research based on Medicinal and Aromatic Plants of Iran (Mozaffarian 2011) and the Flora Iranica from volume 1-181 (Reschinger 1963- 2015) I have obtained a number of 352 medicinal and aromatic plants species, of which only about 120 species are in the row Native trees, shrubs and herbaceous medicinal plant species that may be used in traditional medicine, and some of them are not known by practitioners of herbal medicine. 102 species are cultivated, 80 aromatical species and 50 of them in the row of by-products of some fruits, spices, which are marked with one, two or three stars in the list.</p>

### References

1. S Mozaffaria 2011, Medicinal and aromatic plants of Iran, Tehran, Farhang Moaser. In Persian language
2. Reschinger, K. H. 1963- 2015, Flora Iranica, Akademische Druck- U. Verlagsanstalt Graz - Austria.





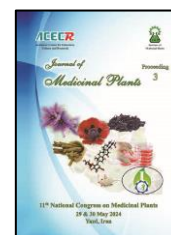
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Oral Presentation ID: -

### Revival of dryland agriculture using drought-adapted plants

### Introducing a very drought-resistant medicinal species of *Capparis spinosa*

Jalal Bakhordri<sup>1</sup>, Mohammad Ekrami<sup>2</sup>

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#### ARTICLE INFO

##### Keywords:

Drought and water loss  
Foreign exchange  
Sustainable  
employment  
Industrial medicinal  
species  
Dry and arid climate

#### ABSTRACT

In recent decades, among the natural disasters that have affected human populations around the world, the frequency of the drought phenomenon in terms of intensity, duration, extent, loss of life, economic losses and long-term social effects on the society is more than other natural disasters. Therefore, it requires that in the revival of agriculture and natural resources of the dry land, we go towards the plants that have the most adaptation to dry and drought conditions and create the most stable income for the arid watershed peoples. The aim of this article is to introduce the *Capparis spinosa* native plant adapted to dry and super dry climatic conditions with valuable potentials that can be grown in poor and low yielding soils in a rainfed manner with the possibility of producing medicinal food products with suitable foreign exchange for the country. Also, in addition to wind erosion control and soil conservation, this plant can provide adequate income and employment for deprived and underprivileged communities. Of course, there are problems such as the lack of awareness and lack of attention of the people and executive officials in the development of planting, and the processing of its products and the incomplete production chain of its great potential have been neglected. It is hoped that can be transformed by providing more awareness of this potential, agriculture and natural resources of the dry land.



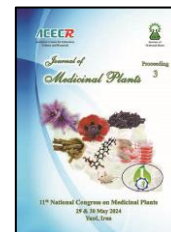
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Oral Presentation ID: -

### Challenges, capacities, and limitations in the development of medicinal plants in Yazd Province with a focus on the strategic document of medicinal plants

**Mohammad hadi Rad<sup>1</sup>**

<sup>1</sup>Assistant Prof, Research Division of Natural Resources, Yazd Agricultural and Natural Resource Research and Education Center, AREEO, Yazd, Iran

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#### ARTICLE INFO

*Keywords:*

Economic performance  
Plant products  
Traditional medicine  
Water stress

#### ABSTRACT

The necessity of utilizing the capacities of Yazd Province in the field of medicinal plants and traditional medicine to promote economic growth, create sustainable employment, and improve the public health system requires well-defined plans formulated in the form of a strategic document with the participation of all relevant organizations. This issue was pursued through the establishment of a working group on medicinal plants in the province. In drafting the document, upstream documents and expert opinions from executive, research, and educational organizations were utilized. Initially, efforts were made to identify the capacities and limitations in the development of medicinal plants and traditional medicine. By determining the roles and positions of executive, research, and educational organizations in the achieved progress and their potential in expected quantitative and qualitative development, a comprehensive provincial plan was formulated and presented. The results obtained from this research process have introduced 9 indicators as capacities and 12 indicators as challenges in the development of medicinal plants and traditional medicine. Despite the increasing challenges to the capacities of medicinal plant development, it can be stated that this province is known as one of the most thriving markets for the consumption and production of pharmaceutical products and herbal products in the country. In many cases, herbal products and even medicinal plants, health, and cosmetic products produced in Yazd Province have been the focus of consumers nationwide and part of the products are exported to various countries. Due to water stress caused by low average rainfall and salinity of water and soil resources, as well as other biological and non-biological stresses, although medicinal plants produced in Yazd Province have high quality, their economic performance is low, and their economic production management faces various challenges.

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1. Road map for the development of medicinal plants and traditional medicine of Yazd province (1404-1396), Science and Technology Development Headquarters of Medicinal Plants and Traditional Medicine, Vice President of Science and Technology, Tehran: 2021.



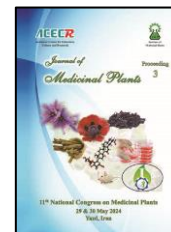
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### Oral Presentation ID: - Medicinal Plants in Drug Discovery; Can Nanotechnology Help?

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Department of Pharmaceutical Engineering, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran

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#### ARTICLE INFO

Keywords:

#### ABSTRACT

World Health Organization (WHO) estimates between 65 to 80% of the world's population have incorporated medicinal plants into their primary health care plan. Medicinal plants can be considered as an unlimited source of (1) bioactive compounds for direct use as drugs; (2) novel drug lead compounds for analogue development; (3) pure compounds as markers for standardization of crude extracts; (4) herbal medicines and related products.1-2 In this presentation, different aspects of the medicinal plant applications and their importance in drug discovery will be discussed. Moreover, major problems associated with the inappropriate physicochemical properties of the potential lead compounds will be disclosed. The application of nanotechnology to overcome many obstacles associated with the new compound development would summarize the presentation.

#### References

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2. Fabricant D.S., Farnsworth N.R., The value of plants in traditional medicine for drug discovery. *Environ. Health Pers.* 2001; 109: 69-75.
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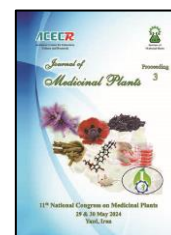
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Oral Presentation ID: 356

### Management, development and production technology of medicinal plants in the National Cropping/Planting Pattern

Maryam Mackizadeh Tafti<sup>1</sup>

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#### ARTICLE INFO

*Keywords:*

National  
Cropping/Planting  
pattern  
climate change

#### ABSTRACT

Designing and proposing the cultivation pattern is one of the most important topics in agricultural planning. In general, the factors affecting the cultivation pattern of agricultural and horticultural crops can be considered as natural factors and resources (climate, water and soil resources, etc.), environmental factors, social factors, government policies and economic factors. Paying too much attention to the economic well-being of farmers in recent decades has led to neglecting the harmful environmental and social consequences. For this reason, there is a need for efficient models that can simultaneously provide all economic, social and environmental aspects. Cultivation pattern as an agricultural system means the correct realization of production based on natural potentials, economic principles and strategic policies of each country. Cultivation pattern is a suitable planning system for growing agricultural and garden crops based on climatic conditions and optimal exploitation of water, soil and plant resources, corresponding to economic capacities and advantages. Considering the increase in the volume of global trade in medicinal plants and its products, Iran's rich background in traditional medicine, and the fact that in the comprehensive scientific map of the country, medicinal plants have been placed in priority "A" in the field of basic and applied sciences, and traditional medicine in priority "B" in the field of health. It is obvious that the management, development and production technology of medicinal plants in the National Cropping/Planting Pattern is necessary and inevitable. The national project for the management, development and production technology of medicinal plants in the national cultivation model with the aim of investigating the existing medicinal plant production systems and calculating the expected performance and performance gaps of common and proposed products, checking the compatibility of existing medicinal plants with cultivation potential in the region, determining the calendar agriculture based on different species and climates, investigation of cultivation methods such as mixed cultivation, under-tree cultivation and crop rotations and the feasibility of changing it, technical coefficients of fertilizer need and pesticide consumption, collection of technical coefficients for the use of agricultural machinery, calculation of technical coefficients of production in the current state and determination of standard conditions, calculation of technical coefficients of waste reduction and determination of standard conditions and determination of technical goals and limitations, investigation of the effect of stresses, investigation of medicinal plant production management methods is being implemented in different climates of all provinces in the country.





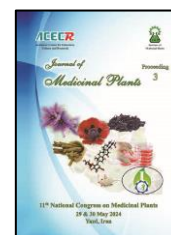
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Oral Presentation ID: 326

### qH NMR and GC-MS analysis for quantification of two sulfide compounds in oleo-gum-resin supplement of *Ferula foetida*

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#### ARTICLE INFO

*Keywords:*

Asafoetida

*Ferula foetida*

Oleo-gum-resin

Shelf stability

Sulfide compounds.

#### ABSTRACT

Asafoetida is an oleo-gum-resin mainly obtained from *Ferula foetida* in eastern Iran, which is employed for the treatment of stomachaches, acid reflux, nervous system disorders, and respiratory diseases (1). Asafoetida has attracted the attention of researchers due to its sulfide compounds and their proven effects on respiratory illnesses (2). In this study, the shelf stability of supplement of *F. foetida*'s oleo-gum-resin by quantifying two key sulfide compounds including E/Z-sec-butyl propenyl disulfane and E/Z-(methylthio)propyl 1-propenyl disulfane was evaluated by <sup>1</sup>H NMR (qH NMR) and gas chromatography-mass spectrometry (GC-MS). The similar results were obtained in both qH NMR and GC-MS methods. The qH NMR method showed good linearity (in the ranges of 2-12 mg/mL for E/Z-sec-butyl propenyl disulfane and 2.2-17 mg/mL for E/Z-(methylthio)propyl 1-propenyl disulfane with a correlation coefficient of 0.99 and acceptable stability (RSD% ≤ 2.72%) for the quantification of the compounds. Therefore, despite the volatility of disulfide compounds and according to the results, the qH NMR method could be considered adequate method for quantifying these compounds in supplements containing the non-volatile components that requires extra extraction steps before analyses by other method.

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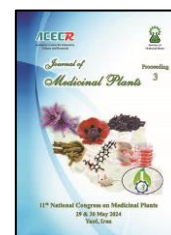
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29 & 30 May 2024  
Yazd, Iran



Oral Presentation ID: 272

### Chromatic signatures and phenolic profiles: unveiling the Flavonoid-Anthocyanin interplay in *Rosa canina* petals

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#### ARTICLE INFO

##### Keywords:

Flavonoid composition  
Anthocyanin diversity  
*Rosa canina* petals  
Phenolic profile  
Chromatography-  
Electrospray Ionization

#### ABSTRACT

The study of *Rosa canina* L. petals unveil a vivid narrative of flavonoid and anthocyanin diversity, correlating the spectral beauty of its blooms with their biochemical composition [1]. Utilizing liquid chromatography-electrospray ionization-tandem mass spectrometry (LC-ESI-MS) in both negative and positive ionization modes [2], the research delineates a detailed phenolic profile. This study, employing both negative and positive ionization modes, has meticulously detailed the phenolic profile of the petals. Rutin, myricetin, quercetin, kaempferol, and their derivatives are highlighted as the primary flavonoids, with gallic acid as the chief phenolic acid during the flower's growth phases. The structural complexity and antioxidant capabilities of these compounds are confirmed, with a special emphasis on the anthocyanins—cyanidin, delphinidin, and pelargonidin—which contribute to the petals' distinctive white and dark pink colorations. Spectrophotometric quantification revealed a higher total anthocyanin content (TAC) in dark pink petals, attributed to the diverse anthocyanin pigments that are part of the phenylpropanoid pathway and influence petal coloration. A comparative analysis across five developmental stages of white and colored *R. canina* cultivars showed a higher total phenolic content (TPC) in white-petaled cultivars. This comprehensive exploration not only augments our understanding of the flavonoid-anthocyanin interplay but also opens new avenues for their application in medicinal plant research, emphasizing the pivotal role of flower color in the study of plant bio actives.

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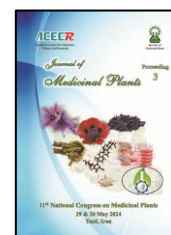
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### Three new isoquinoline alkaloids from the aerial parts of *Corydalis aitchisonii*

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#### ARTICLE INFO

##### Keywords:

*Corydalis aitchisonii*

Isoquinoline

Alkaloids

Papaveraceae

aitchisoniine

#### ABSTRACT

*Corydalis aitchisonii* Popov. is an herbaceous plant of the Papaveraceae family for which no phytochemical studies have yet been reported. However, the genus *Corydalis* is widespread throughout the world and has many uses in different traditional medicines, including analgesic for headaches, dysmenorrhea and neuralgia, hepatitis, respiratory and cutaneous infections. It is also known to contain pharmacologically active molecules of the benzyl-Isoquinolin alkaloids type (1). We therefore set out to fractionate a methanolic extract of the aerial parts of *C. aitchisonii* by means of separation methods such as Silica Column Chromatography and Partition Centrifuge Chromatography (CPC), antimicrobial and anticholinesterase activities have also been tested. The isolation of products was guided by several analytical techniques including Ultra High Pressure Liquid Chromatography, coupled with a diode array UV detector and mass spectrometry, which lead to the purification of seven Isoquinoline alkaloids. They have structurally elucidated by means of Nuclear Magnetic Resonance (NMR) and by High Resolution Mass Spectrometry (HREIMS). This experimental work, led to isolation of four compounds already known in the genus (protopine, N-methylstylophine, corysamine, dehydroisoapocavidin) (2), as well as three molecules with novel structures, of protoberberin type substituted in position C-13 or C-8 and C-13, which were named aitchisoniine A, B and C (3).

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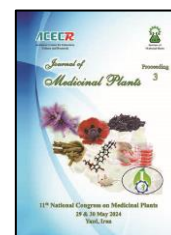
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Oral Presentation ID: 8

### Floristic study of plant species in Goodron Valley (Chaharmahal and Bakhtiari province)

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Flora Life form Goodron Valley Hemicryptophyte Asteraceae</p>	<p>The list of plant species in each region is called flora. The flora of each area is the result of Biological community Reactions to current environmental conditions and the evolution of plants in the past. Studying the flora of each region including determining the floristic list, bio spectrum and vegetative form of its species is important for understanding biodiversity and natural resource management [1]. Goodron Valley is located in Chaharmahal va Bakhtiari province with an area of 132 hectares. The aim of this study was to introduce the list, life forms and vegetative form of species in this area. A walk-field procedure, one of the common methods of regional taxonomic studies, was used to introduce the area's flora. In this method, we went to different study areas and collected plant samples, then they were dried, pressed and identified. Overall, 38 species from 14 plant families were collected and identified. Plant life forms were determined based on the Raunkiaer system [2]. In this system, plants are divided into five groups according to the location of the bud. The plant life forms of the region include hemicryptophytes (44.7%), therophytes (31.58%), chamephyte (18.42%) and geophytes (5.26%). In this study, the population of hemicryptophyte plants was higher than other plant life forms. The abundance of these plants in a region reflects its cold and mountainous climate [3]. Because the climate of this region is cold and mountainous, the abundance of hemicryptophyte plants in the altitudes of this area can be attributed to their adaptation to the severe cold in the unfavorable season and the grazing of the livestock (due to the location of their terminal buds at the soil level). Vegetative forms of plants included 36.84% perennial forbes, 26.32% annual forbs, 18.42% shrub plants, 10.53% annual grass and 7.89% perennial grasses. The high abundance of Asteraceae (23.68%) due to its prickly or secondary composition has a grazing avoidance strategy, indicating a strong grazing history in the region. The presence of 18.42% and 10.53% of the species in the Poaceae and Fabaceae families, which are valuable species for forage and soil conservation, respectively, indicate a high potential for this area, for livestock production.</p>

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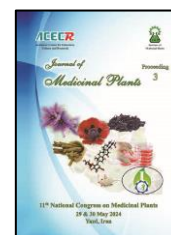
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Oral Presentation ID: 223

### Olive Fruit as a Potential source of Bioactive Phenolic compounds: Extraction and Determination from different genotypes of Minudasht olive collection

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#### ARTICLE INFO

##### Keywords:

Olive  
Polyphenol  
Oleuropein  
Hydroxytyrosol

#### ABSTRACT

The health benefits of using natural olive fruit in the diet are linked to its high levels of unsaturated fatty acids and phenolic compounds that display antioxidant, anti-inflammatory, anti-allergic, and anti-mutagenic properties. This study investigated the phenolic contents and type of methanolic extracts from the fruits of 107 olive genotypes in Minoudasht olive collection at 150 days after flowering. Total phenol concentration and total flavonoid content were evaluated by UV-vis spectrophotometry using the colorimetric technique. In the following, the HPLC method was utilized for methanolic extracts in order to determine the precise concentration of flavonoids, oleuropein, tyrosol, and hydroxytyrosol (HT). The methanol extracts of olive fruits contained total phenolics (mg gallic acid equivalent per gram of dry sample weight) ranging from 0.56 mg/gfruit to 28.22 mg/gfruit, with significant variations among all studied 107 genotypes. The results indicate that the methanolic extracts from a unique olive genotypes originated from Golestan province (Ghaznghayeh region) exhibited a high concentration of polyphenols, making them a promising candidate for use as a source of antioxidants and natural food preservative.

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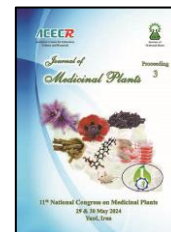
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Oral Presentation ID: 318

### Effects of Royal Jelly-Derived Exosomes on Ameliorating Experimentally Model of Ulcerative Colitis

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#### ARTICLE INFO

Keywords:

Royal jelly

Ulcerative Colitis

Exosome

Rat

IBD

#### ABSTRACT

Royal jelly (RJ) has been used in traditional medicine for centuries due to its antioxidant, anti-inflammatory, immunomodulatory and antimicrobial properties. RJ is a glandular product of *Apis mellifera* and interestingly contains significant amounts of extracellular vesicles including exosomes [1]. Ulcerative colitis (UC) is one of the major forms of inflammatory bowel disease (IBD) that is becoming a growing concern worldwide, due to rising prevalence [2]. After a fasting period, the healthy female Wistar rats with an average weight of  $200 \pm 25$ g were anesthetized and 4% acetic acid (AA) was administered intra-rectally to induce of UC. There were 4 groups (n=10) in this experiment including healthy control group, UC rats, and two treatment groups including the UC rats that received sulfasalazine (100 mg/kg/day-PO) or RJ-derived exosomes (100  $\mu$ g/kg/day-IP) for 10 days. At the end of the experiment, rats were euthanized and colonic tissues were collected for analysis [3]. Both treatment groups exhibited a significant decrease in disease severity index, TNF alpha levels, and nitric oxide (NO) levels. While total antioxidant capacity (TAC) was significantly increased in tissue samples. Notably, exosomes demonstrated a superior ability to reduce nitric oxide levels compared to sulfasalazine. Histopathological studies revealed that the colons of UC rats exhibited various injuries, including inflammation, destruction, and hemorrhage. Conversely, administration of sulfasalazine and RJ-derived exosomes preserved the normal structure of the colon and reduced inflammation and tissue damage. In conclusion, RJ-Exo exhibit protective effects against AA-induced colitis in rats, suggesting their potential therapeutic value in the management of UC.

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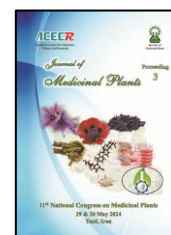
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Oral Presentation ID: 351

### Medicinal herbs consumption in relation to cardiometabolic indices and coronary artery stenosis in participants undergoing coronary angiography: A cross-sectional study

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#### ARTICLE INFO

#### ABSTRACT

**Background and objectives:** Few studies have investigated the association between herbal medicine consumption and coronary artery disease severity. This cross-sectional study aimed to investigate the association between the frequency of medicinal herbs consumption and coronary artery stenosis (CAS), lipid profile, fasting blood sugar (FBS), and blood pressure level in participants undergoing coronary angiography. **Methods:** This study was conducted on 662 participants aged 35-75 years. Serum cardiometabolic markers were measured using standard kits. The extent and severity of CAS were evaluated using the Gensini score (GS) and syntax score (SS). **Results:** Higher consumption of *Thymus vulgaris* and *Sumac* was associated with decreased odds of artery-clogging according to the GS ( $P < 0.05$ ). A higher intake of *Thymus vulgaris* and *Mentha* was associated with lower levels of serum cholesterol and triglyceride ( $P < 0.05$ ). Monthly intake of *Thymus vulgaris*, and weekly/daily intake of *Mentha*, *Nigella Sativa*, and *Cuminum Cyminum* were associated with lower low-density lipoprotein ( $P < 0.05$ ). Weekly/daily intake of *Turmeric* and *Thymus vulgaris* were associated with lower high-density lipoprotein levels and monthly intake of *Mentha* was related to lower serum FBS levels ( $P < 0.05$ ). Higher consumption of *Mentha*, *Mentha pulegium L*, *Lavandula angustifolia*, and *Nigella Sativa* was associated with lower levels of systolic blood pressure ( $P < 0.05$ ). **Conclusion:** According to the results of the present study, herbs consumption might be related to a reduction in CAS risk factors.



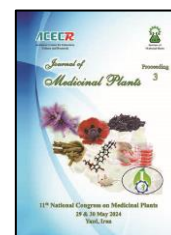
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Oral Presentation ID: 309

### Phytochemistry and biodiscovery and Biodiscovery Zebrafish Platform to Unveil the Secret of Traditional Antidiabetic

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#### ARTICLE INFO

Keywords:

*Eryngium* spp.

Essential oil

GC/MS

Zebrafish

$\beta$ -cell regeneration

#### ABSTRACT

*Eryngium* species is the largest genus in Apiaceae family and has a diverse therapeutical and even ornamental applications [1]. In Iranian traditional medicine, the hudrosol of one of the blue flower species seems to be the *E. billardieri*, has been proposed for lowering the blood glucose. In this research, we have collected the most famous *Eryngium* species including *E. billardieri*, *E. noeanum*, *E. planum*, *E. thyrsoideum* and *E. iranicum* and analyzed their volatile compounds. Results showed a diverse phytochemicals in different species. For example,  $\beta$ -elemene and  $\alpha$  and  $\beta$ -selinene in *E. planum*, 2,3,6-trimethyl benzaldehyde and ethyl linoleate in *E. thyrsoideum*, *cis*-falcarinol and amorpho-4, 11-diene in *E. noeanum* and myrtenol and *cis*-falcarinol in *E. iranicum* while in *E. billardieri*, 2,3,6-trimethyl benzaldehyde and sesquiceneol and  $\beta$ -bisabolene were the main compounds. In accordance to evaluate the anti-diabetic activity of different samples, a biodiscovery platform of  $\beta$ -cell regeneration in a tissue-specific transgenic zebrafish line of Tg (ins: GFP-NTR) embryos and larvae has been carried out. Results showed some interesting candidates for future larger animal investigations.

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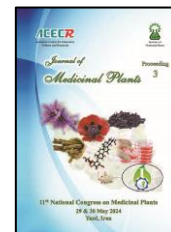
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Oral Presentation ID: 330

### Marketing analysis of licorice medicinal plant

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#### ARTICLE INFO

*Keywords:*

Marketing

Medicinal Plants

Rangelands

#### ABSTRACT

Rangelands are one of the most important and vital sources of human needs. Among the benefits of these areas should be noted the natural growth of beneficial plants. Exploitation in order to provide suitable products of medicinal and industrial plants, including the most important by-products of the country's rangelands and it is a suitable alternative of oil revenues in the country. For this purpose, in this research, widely used medicinal and industrial plants, licorice is introduced from the perspective of medicine and marketing. During this study, questionnaires were prepared in the field from several wholesalers and exporters of micro plants in a field method and the results of the questionnaires were analyzed with SPSS software version 16. According to the conclusion the results of the mentioned study show that one of the major problems of the retail and wholesale market of Bulk, unsanitary and interference in the process of selling the product, lack of proper processing and packaging, lack of fixed prices in the market per kilogram of product, insufficient information of sellers about the purchase of the product by retailers and finally the existence of brokers is important.

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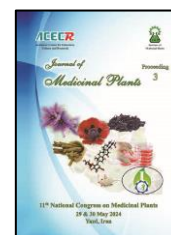
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Oral Presentation ID: 224

### Curcumin administration as Safe and Effective Therapeutic nutraceutical agent

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Nutraceutical agent Curcumin Hematological test Clinical symptoms</p>	<p>Curcumin, an active ingredient of turmeric, is derived from the rhizome of the plant <i>Curcuma longa</i> Linn, a member of the <i>Zingiberaceae</i> family (1, 2). HTLV-1-associated myelopathy/tropical spastic paraparesis (HAM/TSP) is a chronic, progressive, demyelinating, neuroinflammatory disease of HTLV-1 infection (3). Treatment of HAM/TSP patients is a major problem for clinicians. Therefore, we investigate the safety and efficacy of curcumin in HAM/TSP patients. 20 newly diagnosed patients were treated with 80 mg/day orally curcumin nanomicellar for 12 weeks. Clinical symptoms and complete blood count were investigated before and after treatment to monitor the safety of curcumin or its adverse effects on the peripheral blood parameters. Hematological tests were performed on whole blood samples collected from HAM/TSP patients before and after the treatment. There were no serious adverse effects responsible for withdrawal from the study. Clinical and Sensory symptoms and urinary disorders were significantly improved (<math>p=0.001</math>). Curcumin supplementation had no adverse effect on the peripheral blood parameters such as White Blood Cells, Red Blood Cells, Hemoglobin Concentration, Hematocrit, Mean Corpuscular Volume, Mean Corpuscular Hemoglobin, Mean Corpuscular Hemoglobin Concentration, Platelet Count, Red Blood Cell Distribution Width, Lymphocyte Count, Neutrophil Count, Mixed Cell Population Count containing Monocytes, Basophils, and Eosinophils after 12 weeks of treatment (<math>p&gt;0.05</math>). Results suggest that curcumin can safely improve the clinical and sensory symptoms and urinary disorders of patients and has no adverse effects on the peripheral blood parameters. Therefore, prolonged use or the use of curcumin with anti-viral drugs is a safe nutraceutical agent.</p>

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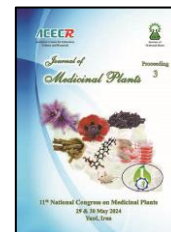
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Oral Presentation ID: -

### The Combined Effects of Rhizobacteria and Methyl Jasmonate on Rosmarinic Acid Production and Gene Expression Profile in *Origanum vulgare* L. under Salinity Conditions

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#### ARTICLE INFO

##### Keywords:

Oregano  
Rhizobacteria  
Gene expression  
Biosynthetic pathway

#### ABSTRACT

*Origanum vulgare* L. is a valuable flavoring, mainly due to its important essential oils and is widely used in different industries. This study aimed to compare the expression level of genes coding for key enzymes involved in rosmarinic acid (RA) biosynthesis pathway and some physiological responses in *O. vulgare* under two levels of salinity (2, 4 decisiemens/meter (dS/m), and 0 as a control), two levels of Methyl Jasmonate (MeJA) concentration (0.1, 0.5 mM, and 0 as a control), and a consortium of three bacteria (*Azotobacter chroococcum*, *Azospirillum brasilense*, and *Pseudomonas fluorescens*). The results showed that salinity negatively affected RA induction and rosmarinic acid synthase (*RAS*) gene expression and positively influenced DPPH radical scavenging capacity at all treatments. The combined application of bacterial consortium and 0.1 mM MeJA in absence of salinity showed 6.6- and 3.37-fold cinnamic acid 4-hydroxylase (*C4H*), *RAS* genes expression, respectively, compared to control. Application of bacterial consortium and 0.1 mM MeJA also increased RA induction (6.47 mg/g), total phenolic content (6.79 mg GAE/g), and positively affected all biochemical and physiological treats in *O. vulgare*. MeJA in concentration of 0.5 mM even with bacteria inoculation had negative effect on RA production. The *RAS* gene may be more responsible for controlling RA induction compared to *C4H* gene. Further studies are needed to identify all genes involved in RA production in *O. vulgare*. Our results may be used to improve RA production and tolerance mechanisms of *O. vulgare* under salinity conditions.

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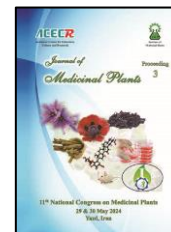
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Oral Presentation ID: -

### Encapsulation of Medicinal Plants and Herbal Products

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#### ARTICLE INFO

*Keywords:*

Herbal medicines  
Herbal Products  
Micro/nanoencapsulation  
Controlled release

#### ABSTRACT

Herbal medicines are interesting by researchers due to their high safety, low-cost, availability and lower side effects than chemical drugs; nevertheless, their extracts and essential oils are more effective than main plants. They have been used in pharmaceutical and medical industries as the incense materials, plaster, protective skin materials, lenitive and others for long time. Despite many benefits of essential oils and plant extracts, disadvantages such as high volatility, uncontrollable dosage and instability in the presence of air, light, moisture and high temperatures lead to difficult application. The best strategy to solve this problem is Micro/nanoencapsulation. Micro/nanoencapsulation has usually defined as a process of enclosing core materials into a polymeric wall material. This method can be increased the durability and stability through preventing from evaporation and unwanted wasting through controlled release. This also protects the active core materials from the external environment. In this lecture, first, a brief description of the primary fundamentals of micro/nanoencapsulation, morphology of micro/nanocapsules, application of natural polymers in preparation of micro/nanocapsules, and release mechanisms of essential oils from the micro/nanocapsules will be given. Then, new reported researches in the field of encapsulation of herbal medicines will be discussed. We hope this method can help the optimal application of medicinal plants in the treatment of many diseases in the future.



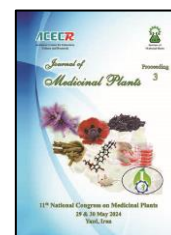
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Oral Presentation ID: 118

### Study of the Transcriptome in The Petals of Two Extreme Genotypes of *Rosa damascena* Mill.

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#### ARTICLE INFO

*Keywords:*

*Rosa damascena*  
transcriptome  
RNA-Seq transcription  
factors

#### ABSTRACT

In recent years, biotechnology has increased the effectiveness of medicinal plants in the production of drugs by utilizing methods such as transcriptome analysis with the help of sequencing techniques [1]. In the present study, two extreme genotypes of *Rosa damascena* were examined through RNA sequence in terms of quality and quantity of essential oil. For transcriptome analysis, RNA was extracted from fresh petals at the swollen bud stage before blooming at the full flower stage for genotypes 3 (low essential oil) and 7 (High essential oil) [2], each in two replicates using the CTAB method. Qualitative evaluation was done using Nanodrop and Bioanalyzer devices. Followed by sequencing on the Illumina Novaseq 6000 platform based on double-sided reading technology and 150-bp fragments. The findings revealed that the Trinity tool was the most suitable assembler for RNA-Seq data of *R. damascena* petals. The difference in the expression of the key genes in the terpenoid pathway showed that the expression of geranyl diphosphate synthetase, was significantly higher in G7. These results suggest that increasing the expression of this gene is crucial for enhancing and the quantity and quality of essential oil through molecular modification. The analysis of transcription factors identified a total of 3442 transcription factors in *R. damascena*. Genotype 7 (high essential oil percentage) exhibited higher levels of AP2/ERF, MYB, NAC, and C2H2 transcription factors, underscoring the importance of these transcription factors in the molecular modification of *R. damascena*.

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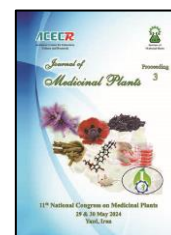
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Oral Presentation ID: 442

### Metabolic Potential of Native Iranian Medicinal Plants for the Production of Strategic Drugs Through Biotechnological Approaches

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#### ARTICLE INFO

*Keywords:*

Anticancer  
Anti Alzheimer  
Bioprocess  
Cell culture  
Specialized metabolites

#### ABSTRACT

Medicinal plants have historically demonstrated their value as a source of therapeutic molecules, and they continue to play a crucial role in the discovery of new drug candidates [1]. Currently, more than 50,000 plant species worldwide are utilized for pharmaceutical purposes. Over the past three decades, compounds like Taxol, vincristine, vinblastine, podophyllotoxin, berberine, withaferin, withanolide, colchicine, galantamine, lycorine, ginsenoside, centellosides, silibinin, artemisinin, resveratrol, and betulinic acid have emerged as key herbal medicinal compounds used in strategic drug development for various diseases, including cancer [2]. The economic and societal significance of these drugs has prompted many developed nations to adopt strategic approaches to their production and distribution. Challenges such as low concentrations of these compounds in plant sources, issues related to over-harvesting from nature, the impact of changing environmental conditions on compound quality and quantity, and constraints on water and soil resources for plant cultivation have driven the exploration of alternative biotechnological production methods. Despite the diverse array of medicinal plant species in Iran, a significant portion of strategic drugs is still imported from other developed countries. This study highlights the metabolic potential of native Iranian medicinal plants such as *Taxus baccata*, *Corylus avellana*, *Linum album*, *Withania coagulans*, *Withania somnifera*, *Thymus persicus*, *Salvia multicaulis*, *Narcissus tazetta*, *Galanthus nivalis*, *Leucojum aestivum*, *Centella asiatica*, *Satureja khuzistanica*, *Colchicum speciosum*, *Deracocephalum kotschy* and others for the production of strategic drugs using biotechnological approaches.

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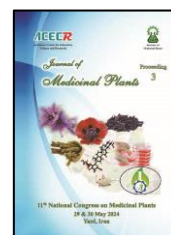
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# Poster Presentation



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Poster Presentation ID: 2

### Improved Thebaine Extraction from *Papaver bracteatum*

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#### ARTICLE INFO

*Keywords:*

Thebaine

Raw material

Pharmaceutical

#### ABSTRACT

*Papaver bracteatum* is a plant belonging to the Papaveraceae family that's rich of Thebaine (1). This caused it to be of great importance in the pharmaceutical industry. Thebaine is used as the raw material for the synthesis of many semisynthetic opiates (2) then It is important to find an improved method to extract it. This investigation was conducted to determine the optimal extraction method for *Papaver bracteatum*. The solvent, extraction method, and purification technique were assessed in this study. *Papaver bracteatum* Lindl. That was collected in Azerbaijan province (Iran) with herbarium code No. :( IMPH 4507), dried, and grinded by different solvents at room temperature in an ultrasonic and percolation device. Thebaine extracted was purified by the double solvent method and the pH adjustment method. The extracted material was examined by high-performance liquid chromatography (HPLC) and compared with the standard of Thebaine. Percolation method by Water: acetic acid (90:10) gives the highest result of Thebaine extraction (2.5%) and the best purification method was pH adjustment. Thebaine was white amorphous powder; m.p. 193°C; TLC (CH<sub>3</sub>Cl<sub>3</sub>: MeOH 9:1) R<sub>f</sub>: 0.45; <sup>1</sup>H NMR: 2.45(3H, s, NCH<sub>3</sub>), 3.59, 3.84(each 3H, s, 2 OCH<sub>3</sub>), 5.04, 5.54(each 1H, d, J = 8), 5.29(1H, s), 6.58, 6.64(each 1H, d, J = 9, o-H-Ar). Thebaine was purified as the most alkaloids of *P. bracteatum* Lindl in this study, and water worked well as a solvent in the Thebaine-specific extraction to produce the highest possible Thebaine content. It was economical, simple, eco-friendly and non-toxic method.

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Poster Presentation ID: 3

### Azadirachtin extracted from Neem

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#### ARTICLE INFO

Keywords:

*Azadirachta indica*  
Azadirachtin

#### ABSTRACT

The neem tree with the scientific name *Azadirachta indica* belongs to the family Meliaceae. This tree belongs to tropical areas and is native to India, Pakistan and Iran. About 140 chemical compounds have been identified from different parts of neem [1]. Neem extracts contain an array of compounds such as limonoids, nimbin, nimbidin, and azadirachtin. Azadirachtin is the most important ingredient, which is extracted from the seeds of neem. According to scientific sources, components of *Azadirachta indica* show promise as therapeutic agents to slow the spread of cancer. Neem extracts have the ability to inhibit the growth, migration, invasion, and inflammation of cancer cells [2]. Azadirachtin, a major active component present in neem, has shown remarkable antifungal effects against a wide range of pathogenic fungi [3]. In this research, Neem seeds were collected from Chabahar province (Iran), cleaned and ground after being verified by a botanist. An appropriate quantity of neem seed powder was added to a Soxhlet apparatus. Then Liquid-liquid extraction was used to extract total azadirachtin from neem oil. Afterward solvent was evaporated by a rotary evaporator and the residue was washed with water. The purity of product was examined by high-performance liquid chromatography (HPLC) and compared with the standard of azadirachtin-A. The fruit of the neem contained 0.7 % azadirachtin-A, which during this process, it was increased to 34 %. Due to the importance of neem, the enriched azadirachtin can be utilized as a raw material in the pharmaceutical or herbal pesticides industry.

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Poster Presentation ID: 5

### Study of ethnomedicinal knowledge of women in Zanjan County

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#### ARTICLE INFO

##### Keywords:

Flowering period

Habitat

Herbal medicine

Natural ecosystem

Medicinal plant

#### ABSTRACT

Considering the economic and therapeutic importance of medicinal plants and the development of herbal medicine attitude is very necessary to identify and introduce medicinal plants to use and develop optimally and sustainably manage these GOD-given resources. In general, plant seeds are not only very vital to natural ecosystems and agricultural activities, but also very important sources of food, feed, raw materials, and fuel [1]. *Ferula gummosa* Boiss. is a herbaceous, perennial, monocarpic, and highly aromatic medicinal plant with a height of approximately 100 cm that belongs to the Apiaceae family. It is often found in mountainous areas and sometimes scattered in the desert regions of Iran [2]. This study was carried out to isolate and identify the essential oils of *Ferula gummosa* Boiss. seed in one of its major habitats located in the western part of Isfahan province, Iran. Therefore, the seeds of *Ferula gummosa* Boiss. were collected at the end of the flowering period from its natural habitats, air-dried, milled, and weighed in a certain quantity. The essential oil of the plant was isolated through hydro-distillation method using Clevenger-type apparatus and examined by GC/MS. The findings showed that there were 61 compounds in the essential oils of *Ferula gummosa* Boiss. seeds. They belong to the two major chemical compound groups (i.e. terpenoids and hydrocarbons) and these compositions were identified along with some other chemical compounds. The major compounds were beta-pinene (10.55 %), alpha-pinene (9.15 %), alpha-terpinene (5.85 %), beta-cedrene (5.47 %), gamma-terpinene (3.76 %), and Myrtenal (3.39 %), respectively.

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Poster Presentation ID: 9

### Exploring Aldosterone Synthase Inhibitors for Cushing's Syndrome: Virtual Screening of Natural Compounds, 3D-QSAR, and MD Simulation

Majid Zareheidari<sup>1</sup>, Mohammad Hossein Jabbari<sup>1</sup>, Neda Shenavasari<sup>1</sup>, Mahshad Shahriari<sup>1</sup>, Samad Nejad Ebrahimi<sup>1\*</sup>

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Cushing's syndrome Cortisol Molecular docking Atom-based-QSAR Molecular dynamic In-silico studies Pharmacophore</p>	<p>Cortisol is a steroid hormone involved in many physiological processes. Excessive cortisol production leads to Cushing's syndrome (1). Surgery is the initial treatment of choice; however, in one third of patients, additional treatments are required. The discovery of new drugs for Cushing's disease is receiving significant attention. One applicable method in designing appropriate drugs is in-silico studies. In this study, we analyzed the ability of more than 1000 synthetic and natural compounds to inhibit the cortisol synthase CYP11B1 enzyme, which catalyzes the final stage of cortisol biosynthesis (2). Among 1000 compounds, 387 were screened based on the selective pharmacophore hypothesis with a fitness score of <math>\geq 1.5</math>. In the next step, glide extra precision (XP) docking and induced fit docking (IFD) studies were performed. Based on the obtained data, two ligands with Zinc ID 65057928 (No. 1) and 65057988 (No. 2) showed the highest docking scores of -8.49 and -8.23 kcal/mol and similar IFD scores of -103.48 kcal/mol, respectively. QSAR and ADME studies were conducted, revealing that the selected ligands complied with all of Lipinski's Rules and had pIC<sub>50</sub> values of 5.16 and 4.77 for No. 1 and No. 2 ligands, respectively, compared to metyrapone, the positive control, with a pIC<sub>50</sub> of 4.80. Finally, to evaluate the stability and reliability of the binding of the selected compounds to inhibit the CYP11B1 enzyme, molecular dynamic simulations of top-scoring ligand-receptor complexes were performed over a duration of 30 ns. The molecular dynamic study exhibited stable interactions of the No. 2 ligand (Zinc ID: 65057988) with the CYP11B1 receptor under physiological conditions, with a maximum protein RMSD of 1.56 Å.</p>

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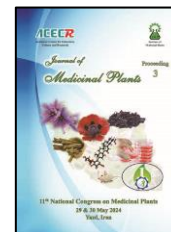
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Poster Presentation ID: 10

### Chemical composition of *Ferula assa-foetida* oleo-gum in two regions of Iran by using GC-MS

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#### ARTICLE INFO

Keywords:

*Ferula assa-foetida*

Oleo-gum resin

Essential oils

GC-MS

#### ABSTRACT

*Ferula assa-foetida* L. (Hing) is a medicinal plant of the Apiaceae family. The oleo-gum resin of Hing has been widely used in food and medicine since the distant past. The pharmacological effects observed from the gum of the hing indicate that these effects are closely related to diseases such as digestive disorders, cancer, diabetes, and high blood pressure [1]. Typical *Ferula assa-foetida* resin contains about resin (40-64 %), gum (25 %), and essential oil (7-10 %) [2]. The resin part contains ferulic acid and its esters, coumarins, sesquiterpene coumarins, and other terpenoids; the gum part contains glucose, galactose, L-arabinose, Rhamnose, glucuronic acid, Polysaccharides, and glycoproteins and the essential oil part also contains sulfur compounds, monoterpenes, and other volatile terpenoids [3]. Hing collection location contains Meshkan with DMS 29° 28' 36.14" N, 54° 19' 58.86" E, and Shahrehabak 30 7' 1.98" N, 55 7' 15.71" E. This study aimed to do a detailed phytochemical analysis of *Ferula assa-foetida* oleo-gum evaluated by gas chromatography coupled with mass spectrometry (GCMS). The analysis was performed on an AGILENT 7890A. The results of GC-Mass analysis in Meshkan show that one hundred and seven components,  $\gamma$ -Gurjunenepoxide-(2) (33.68 %), 4-Vinylguaiaicol (9.33 %), Digitoxigenin (7.86 %), Uvaol (4.79 %), Ferulic acid (3.28%) were the major compounds; and the results of GC-Mass analysis in Shahrehabak show that sixty components and the most frequent compounds contain Cis Propenyl Sec Butyl Disulfide (24.73 %), 7-epi- $\gamma$ -Eudesmol (13.93 %), Disulfide, methyl 1-(methylthio) propyl (10.57 %), Valerianol (5.19 %) were the major compounds.

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Poster Presentation ID: 12

### Evaluation compatibility of various ecotypes of *Ziziphora capitata* and *Ziziphora clinopodioides*

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#### ARTICLE INFO

Keywords:

Ecotype

Compatibility

Essential oil

*Ziziphora capitata*

*Ziziphora*

*clinopodioides*

#### ABSTRACT

The present study conducted in the randomized block design with three replications for four years in Fars province was focused on the planting, establishment, and compatibility of *Ziziphora capitata* and *Ziziphora clinopodioides*. The seeds of these species were collected from different regions of Fars province in 2017 and were transplanted or planted directly on the farm. The planting of annual plant *Z. capitata* was repeated in the following years and the perennial plant *Z. clinopodioides* was evaluated each year. The morphological characteristics and phenological characteristics of growth were recorded at the end of the test years. The results were analyzed based on composite analysis. According to the results, most traits such as seed germination percentage, seed weight-1000, seed yield, shoot dry yield, and essential oil percentage were significantly increased in the next year after planting. There was no significant difference in essential oil percentage, or plant height, while a significant difference was observed in other characteristics such as seed weight-1000, seed yield, and aerial dry yield. Piperitone was identified as the main compound in *Z. capitata* essential oil in both ecotypes. Two ecotypes of *Z. clinopodioides*, showed no significant difference among the measured traits except for essential oil percentage and seed yield. In general, the results of this research suggested direct sowing of seeds in late November for *Z. capitata* and producing plant in trays in mid-autumn and transplanting to the farm after expiring frost in spring for *Z. clinopodioides* as the best way of planting [1 ,2].

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Poster Presentation ID: 13

### Analysis of Volatile Constituents of *Achillea millefolium* L. by Hydrodistillation and Solid-Phase Microextraction Techniques

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#### ARTICLE INFO

##### Keywords:

Essential oil  
Nanotube  
Double hydroxide  
SPME

#### ABSTRACT

*Achillea millefolium* L. is one of the valuable medicinal plants, belongs to Asteraceae family. It is wound healer and because of having tannins, bitter and aromatic compounds effects on the nervous system and heart. Recent researches show that it has anti-cancer property. Solid phase microextraction (SPME) is a powerful, easy and solvent-free sampling method for direct and headspace extraction of volatile and semi-volatile chemicals from solid, liquid and gas samples through absorption of volatile on fibers coated with different chromatographic stationary phases. In this study, a SPME sampling method using fiber made from carbon nanotubes coated with a layer of double hydroxide coupled with gas chromatography was developed for a fast and reliable monitoring and recognition of volatiles (essential oils) from flowering shoot of *Achillea millefolium*. SPME parameters including sample quantity, water amount, extraction temperature, extraction time, desorption temperature and desorption time were investigated. The major constituents of volatile oil by hydro-distillation were 1,8-cineole (23.51 %), camphor (16.38 %), camphene (7.11 %), myrcene (4.21 %),  $\alpha$ -pinene (3.23 %),  $\alpha$ -terpineol (3.17 %), borneol (3/14 %) and by SPME method the major constituents were 1,8-cineole (20.15 %), camphor (10.24 %), camphene (5.24 %), myrcene (3.81 %),  $\alpha$ -pinene (3.11 %), methyl eugenol (2.70 %), borneol (2/31 %),  $\beta$ -pinene (2.25 %) and  $\alpha$ -terpineol (2.16 %). This study has conclusively demonstrated that SPME is a good alternative for classical extraction methods and can be precisely used in the sampling of very low amount of volatiles from *Achillea millefolium* L.

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Poster Presentation ID: 14

### Optimization of Extraction Conditions for Catnip Essential Oil Using the Single-Drop Microextraction Method

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#### ARTICLE INFO

Keywords:

*Nepeta*

Volatile oil

SDME

Extraction

#### ABSTRACT

Catnip (*Nepeta haussknechtii* Bornm.), belonging to the Lamiaceae family, is a plant native to Europe and also found in Central, Western, and Southwestern Asia, the Himalayas, North Africa, and North America. In Iran, it is distributed in the northern, northwestern, central, and southern regions. The essential oil of this plant possesses antibacterial, antifungal, and antiviral properties due to its pentacyclic triterpenoid content. In this study, the single drop microextraction method (SDME) was employed for the extraction of catnip essential oil. The following experimental parameters affecting the extraction efficiency of the essential oil were optimized: sample weight of 6 grams, solvent volume of 2.5 milliliters, extraction time of 150 seconds, microwave power of 350 watts, and the selective solvent n-heptadecane. According to the results of this research, SDME is a simple, rapid, and cost-effective method that does not require a preliminary sample preparation step. Moreover, this method can be an alternative to liquid-liquid extraction (LLE) and solid-phase extraction (SPE) methods for sample preparation prior to extraction.

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Poster Presentation ID: 16

### Effect of Humic Acid Modulator in Medicinal Plant (*Hyssopus officinalis* L.) Under Drought Stress

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#### ARTICLE INFO

##### Keywords:

Humic acid  
Drought stress  
Root length

#### ABSTRACT

The medicinal plant *Hyssopus officinalis* L. is from the Lamiaceae and is one of the most important plant species which is native to southwest Asia and southern Europe and grows in many countries of the world [1]. In order to investigate the moderating effect of humic acid in the medicinal plant *Hyssopus officinalis* under drought stress a factorial experiment was conducted in the form of a completely randomized design with three replications in the greenhouse of the Faculty of Agriculture of Urmia University in 2023. The experimental treatments included drought stress caused by Poly Ethylene Glycol (PEG) at three levels (0, 2 and 4%) as the first factor, humic acid (HA) spraying at three levels of 0, 200 and 400 mg l<sup>-1</sup> as the second factor and their combined effects. The results of the GLM showed that the application of humic acid alone could have a significant effect at the 5% probability level on the shoot fresh weight. The lowest amount of shoot fresh weight was related to the treatment of 4% Poly Ethylene Glycol and 200 mg l<sup>-1</sup> HA (6.2 g) and the highest amount was related to the treatment of 2% PEG and 400 mg l<sup>-1</sup> HA (9.76 g). The greatest decrease in shoot length was related to 4% PEG treatment (22.15%). The effect of drought stress on shoot length was significant at the 5% probability level. The effects of drought stress, HA and the interaction treatment on root fresh weight were significant at the 5% probability level. The highest amount of root fresh weight was obtained in the treatment of 400 mg l<sup>-1</sup> of HA (2.82% increase compared to the control treatment). The effect of drought stress and HA on root length was significant but the application of PEG along with HA hadn't significant effect. The lowest amount of root length was assigned to the 4% PEG treatment, which showed a decrease of 13.21% compared to the control. With increasing PEG level, the root length showed a downward trend compared to the control. The effect of drought stress and HA on the number of lateral branches was significant, but the interaction treatment of HA acid and PEG had not significant effect. The interaction between PEG and HA application had a significant effect on leaf width. The effect of PEG & HA and PEG+ HA application on the average leaf dry and fresh weight was not significant.

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Poster Presentation ID: 17

### The Effect of Foliar Application of Selenium on Growth Characteristics of *Hyssopus officinalis* L. Under Drought Stress

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#### ARTICLE INFO

##### Keywords:

Medicinal plant  
Shoot length  
PEG

#### ABSTRACT

Selenium has an antioxidant effect and increases the antioxidant capacity and plant tolerance in drought stress conditions [1]. In order to investigate the effect of selenium foliar application on growth characteristics of *Hyssopus officinalis* L. under drought stress, a factorial experiment was conducted in the form of a completely randomized design with three replications in the greenhouse of the Faculty of Agriculture of Urmia University in 2023. The experimental treatments included drought stress caused by Poly Ethylene Glycol (PEG) at three levels (0, 2 and 4%) as the first factor, selenium spraying at three levels of 0, 20 and 40 mg l<sup>-1</sup> as the second factor and their combined effects. GLM results showed that the effect of drought stress and selenium on shoot fresh weight and shoot length traits were not significant at the 5% probability level. The interaction effect of PEG levels × selenium at the 5% probability level showed a significant effect on shoot length, but did not show a significant effect on shoot fresh weight. The length of shoot significantly decreased with increasing drought stress (21.66 % in comparison with control) and increased with increasing selenium application. Application of 40 mg l<sup>-1</sup> selenium in plants that were subjected to 4% PEG resulting in 50 % increased shoot length in comparison with stressed plants. The results showed that the application of PEG and selenium alone and also PEG + selenium had significant effect on root fresh weight. In the plants that were subjected to 2% PEG and foliar sprayed with 40 mg l<sup>-1</sup> of selenium, root fresh weight significantly increased to 2.92 times in comparison with control. The root length significantly increased with increasing PEG levels, so that at 4% PEG, the root length increased by 52% as compared to the control. In stressed plants, by increasing the level of selenium to 40 mg l<sup>-1</sup>, the root length increased by 12% as compared to the plants that were treated with 4% PEG alone. Foliar application of selenium (40 mg l<sup>-1</sup>) under stress condition with 4% PEG led to a significant increase in leaf length by 38 % as compared to stressed plants with 4% PEG alone. Application of PEG, selenium and PEG + selenium could not have a significant effect on the leaf width and fresh weight of hyssop leaves. Drought stress significantly reduced leaf dry weight but selenium and PEG + selenium had no significant effect.

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Poster Presentation ID: 20

### Evaluation of salinity tolerance of some medicinal plant growth-promoting fungi

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Epicoccum Formulation Growth-promoting fungi Salinity stress Trichoderma</p>	<p>Plant growth promoting fungi are often useful for plants and make host plants adapt to living and non-living stressors, including salt stress, in different ways. In the present study, <i>Chaetomium globosum</i>, <i>Chaetomium interruptum</i>, <i>Clonostachys rosea</i>, <i>Coniothyrium sp.</i>, <i>Epicoccum nigrum</i>, <i>Serendipita indica</i>, <i>Trichoderma asperellum</i>, <i>Trichoderma atroviride</i>, <i>Trichoderma harzianum</i>, <i>Trichoderma longibrachiatum</i> and <i>Trichoderma reesei</i> with plant growth-promoting properties were obtained from the collection of the Department of Soil Biology and Biotechnology of the Soil and Water Research Institute in order to identify the fungal species tolerant to salinity. Their growth potential at different salinity levels including 0.045, 0.31, 0.63, 1.04, 1.36, 2.14, 3.04, 3.95 and 4.71 percent of sodium chloride. The results showed that <i>T. harzianum</i>, <i>T. atroviride</i>, <i>T. longibrachiatum</i>, and <i>T. reesei</i> were less affected by the salinity of 0.045 to 4.71% sodium chloride and were able to fill the entire surface of the Petri dish (8cm) at different salinity levels. <i>E. nigrum</i> was also able to grow at different salinity levels, although its growth decreased with increasing salinity. <i>T. harzianum</i> was the only species that was able to cover the entire Petri-dish surface in seven days at the culture medium containing 2.14% sodium chloride. The formulation results showed that the carrier effect was significant in both <i>T. harzianum</i> and <i>E. nigrum</i> species. Compost, sawdust, and vermiculite were the best carriers in terms of maintaining the <i>Trichoderma</i> population. The best carriers in maintaining <i>T. harzianum</i> population after six months at cold room temperature was vermiculite (<math>4 \times 10^9</math> CFU/g), compost (<math>3.66 \times 10^9</math> CFU/g) and sawdust (<math>3 \times 10^9</math> CFU/g) and in <i>E. nigrum</i> species was compost (<math>1 \times 10^8</math> CFU/g) and vermiculite (<math>8 \times 10^7</math> CFU/g). In general, the results showed that <i>T. harzianum</i> and <i>E. nigrum</i> species were able to grow in culture media containing 4.71% sodium chloride and the best carriers for the formulation of these two fungi were compost and vermiculite.</p>

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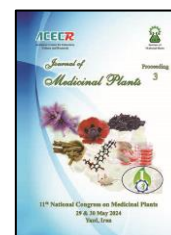
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Poster Presentation ID: 21

### ***Salvadora persica*; an effective herbal remedy for controlling acidic circumstances in oral cavity**

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#### ARTICLE INFO

Keywords:

Saliva  
*Salvadora*  
Mouthwash  
PH  
Meswak

#### ABSTRACT

Chewing of the sticks has been recently recommended by World Health Organization (WHO) as effective accessories for oral health. *Salvadora persica* plays an important role in maintaining the integrity of the tooth structure [1,2]. The purpose of the present study was to determine the effectiveness of *Salvadora persica* extract on saliva pH after acidic changes. Participants were asked to take part in three different days with one-week interval in our open label non-randomized clinical trial. The effects of aqueous ethanolic (80%) extract of fresh *S. persica* sticks, distilled water, and sucrose on pH of saliva were examined at some time points, immediately to 20 min. The obtained results showed that the pH of saliva was significantly increased following gargling the distilled water ( $p=0.007$ ) and *S. persica* extract ( $p=0.000$ ) compared to the control group. In addition, the pH of saliva in a group which applied mouthwash of *S. persica* was significantly increased compared to the distilled water ( $p=0.04$ ). Application of *S. persica* extract as a mouthwash increased the pH of saliva after acidic changes. Therefore, it may be recommended as an alternative to increase pH of oral cavity for oral health improvement.

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Poster Presentation ID: 22

### Evaluation of Diversity in the Composition of Essential oils in some of Iranian Peppermint (*Mentha piperita*) Genotypes

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#### ARTICLE INFO

Keywords:

Composition

Drying

Peppermint

Phenol

#### ABSTRACT

Historically, medicinal herbs have significantly influenced human's health, nutrition, and economy in all over the world. Peppermint (*Mentha piperita* L.), a natural hybrid of water mint (*Mentha aquatic* L.) and spearmint (*Mentha spicata* L.), is a medicinal plant that its extracted essential oil represents a viable source for therapeutic goals, perfume industry, and a flavoring or olfactory substance [2]. The medicinal significance of this aromatic plant is owing to the presence of compounds that terminate oxidation chain reactions that are a consequence of excessive ROS production. [1]. The *Mentha* chemistry is complex and extremely variable, and each species has a characteristic main compound. In this research, the diversity of essential oil compounds in different methods of harvesting and drying in different accessions of peppermint plants was investigated. This experiment was conducted in Meshginshahr climatic condition in 2021, based on randomized complete block design with three replications. Their essential oils were extracted by using of cleverger apparatus and were analyzed by GC-MS. In total, 8 compounds were identified, and the largest amount of compounds was found in the Noorabad accession in the harvesting and drying method 100 flowering-oven and the highest number of compounds was observed in the Shiraz accession. The most important components of peppermint essential oil were: Pinenene (0.34-6.24%), Menthol (0.33-31.16%), Phenol (0.20-6.24%), Terpeneol (0.21-2.85%), Mintfuran (0.29-7.71%), Decadiene (0.21-17.40%), Caryophyllene (0.21-12.65%) and Copaene (0.22-1.18%). The results suggested that *Mentha piperita* L accessions of Iran had a high genetic diversity that can be used in the breeding programs.

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Poster Presentation ID: 23

### Devil's claw (*Harpagophytum procumbens*) and the treatment of Chemotherapy-induced peripheral neuropathy

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#### ARTICLE INFO

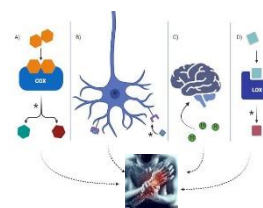
##### Keywords:

Devil's claw  
neuropathy  
Harpagoside  
*Harpagophytum-  
procumbens*

#### ABSTRACT

Chemotherapy-induced peripheral neuropathy (CIPN) is a prevalent condition affecting cancer patients who are receiving or have previously received Chemotherapy. Pain, tingling and numbness are some of its symptoms. Regretfully, CIPN not only makes treatment uncomfortable but also lessens the efficacy of Chemotherapy. [1] Devil's claw (*Harpagophytum procumbens*), however, is a possible natural treatment that has the ability to treat and prevent CIPN. It has anti-inflammatory and analgesic qualities. Devil's claw has been used to treat a number of inflammatory and painful disorders, such as CIPN. This study was conducted by searching databases such as PubMed, Google Scholar, etc, up to March 23, 2024, using keywords like “*Harpagophytum procumbens*”, “neuropathy”, “Harpagide”. The presence of bioactive substances such as Harpagoside and Harpagide adds to the plant's ability to reduce inflammation and provide pain relief. In neuropathic rats, the injection of 300 mg/kg of dried Devil's claw root extract reduced pain. It suggests that it might help people with neuropathy experience less discomfort. Harpagoside and other anti-inflammatory substances are thought to lessen neuropathy pain by lowering inflammation and the mediators of inflammation in the surrounding tissues and nerves. Nevertheless, more investigation is still required to fully validate Devil's claw's therapeutic efficacy for neuropathy.[2] The present findings are encouraging since they point to a viable substitute for prescription analgesics in the treatment of CIPN.[1]

Figure 1: The inhibitory effect of Devil's claw on Cyclooxygenase(A), nerve receptors(B) and the potential effects of Harpagide on CB1(C) and Lipoxygenase (D)



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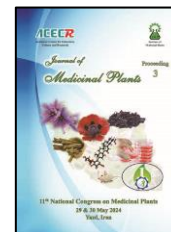
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Poster Presentation ID: 24

### Study the Bioactive Compounds of Saffron (*Crocus sativus* L.) Under Organic and Conventional Farming Systems

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#### ARTICLE INFO

##### Keywords:

Bioactive compounds  
Farming systems  
Organic farming

#### ABSTRACT

Nowadays, conventional plant production severely limited by some challenges like overuse of chemical fertilizers [2]. The negative effects of indiscriminate use of chemical fertilizers in conventional cultivation of saffron, can partially be solved by organic farming [1]. Therefore, in this study, the qualitative traits of saffron stigma (crocin, picrocrocin and safranal content) were investigated under organic and conventional conditions at the Agricultural Research Field of the University of Birjand, over three years. The treatments included field age (one, two, and three-year-old farm) and also organic and conventional cultivations with different levels (low, moderate, and high levels) of cow manure and chemical fertilizers, respectively. The results indicated that the crocin, picrocrocin and safranal contents were considerably increased using organic and chemical fertilizers compared to the control. However, this increase was higher under organic conditions rather than conventional conditions. The highest content of these compounds was obtained under applying a high level of manure in organic farming system (OFS-H), that safranal content in this level have no significant difference with applying a moderate level of manure in organic farming system (OFS-M), and applying a high level of chemical fertilizers in conventional farming system (CFS-H). According to the results, the highest content of bioactive compounds was observed in saffron cultivated under organic conditions. In addition, the three-year-old farm resulted in the highest qualitative yield compared to the one and two-year-old farm. The findings of this study could significantly contribute to identification of the best crop management strategy for increasing the qualitative of Saffron.

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Poster Presentation ID: 25

### Estimation of salinity tolerance threshold of licorice (*Glycyrrhiza glabra* L)

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#### ARTICLE INFO

*Keywords:*

Halophyte

Relative water content

Ion leakage

Plant dry weight

#### ABSTRACT

To evaluate the threshold of salinity tolerance of Licorice under different salinity levels, an investigation was conducted in a completely randomized design with 3 replications in a pot in the greenhouse of the National Salinity Research Center located in Yazd province. Experimental treatment included 7 levels of salinity of irrigation water: 0.6, 3, 6, 9, 12, 15 and 18 dS m<sup>-1</sup>. In this research, characteristics such as plant height, leaf area, shoot and root dry weight, relative water content, ion leakage, and potassium and sodium content of the plant were measured. The results showed that increasing salinity from control to 18 dS m<sup>-1</sup> reduced plant height by 90%, leaf area by 88%, shoot dry weight by 94%, root dry weight by 73%, relative water content by 22%, potassium content by 0.42% and increased the ion leakage by 13% and the Sodium 2.63%. The results of plant salinity tolerance threshold indicated the salinity threshold of the plant was obtained based on the salinity of the irrigation water and for the dry matter of aerial parts equal to 2.89 dS m<sup>-1</sup>. Also, the slope of dry matter yield reduction of aerial parts per unit of increase in salinity (dS m<sup>-1</sup>) was equal to 5.50%. Also, the salinity of the irrigation water, which caused a 50% reduction in yield and zero yield, was calculated as 10.98 and 21.06 dS m<sup>-1</sup>, respectively. In general, the results showed that licorice classified as moderately tolerant.

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Poster Presentation ID: 26

### Estimation of some growth characteristics of the Ajowan in response to salinity stress

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#### ARTICLE INFO

##### Keywords:

Ion leakage  
Medicinal plants  
Plant height  
Relative water content

#### ABSTRACT

Distributed in semi-arid and arid parts of the world, ajwain, or sprague, (*Carum capticum* L.) is a medicinal and industrial plant of the Apiaceae family with white flowers and small brownish fruits. A good source of secondary metabolites, the seeds of ajowan have been used in food and pharmaceutical applications. A variety of health properties was described for the ajowan seeds, which include antimicrobial, antioxidant, nematocidal, anti-inflammatory, carminative, and sedative effects. With the aim of estimation of some growth characteristics of the Ajowan in response to salinity stress, an experiment was conducted in a completely randomized design with 3 replications in a pot in the greenhouse of the National Salinity Research Center during 2020. Experimental treatment includes water salinity levels 0.4 (control), 3, 6, 9 and 12 dSm<sup>-1</sup>. The results showed that all investigated traits were affected by different levels of salinity. As by increasing the salinity from the control treatment (0.4 dSm<sup>-1</sup>) to a salinity of 12 dSm<sup>-1</sup> caused a decrease of 63% in the height of the plant, 58% in the shoot fresh weight, 42% in the shoot dry weight, 47% in the root dry weight, 13% in relative water content and 45% in potassium. Also, increasing salinity from control treatment 0.4 to 12 dSm<sup>-1</sup> caused an increase in the amount of sodium and ion leakage by 46% and 11.5%, respectively. In many studies, reports indicate a significant effect of salinity on the reduction of the growth characteristics of Ajowan plants. It seems that in the present study, with the increase in salinity stress level, plant height decreased due to the harmful effects of salinity. Correlation results showed that the highest effective traits on dry weight of shoot dry weight included potassium and ion leakage.

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Poster Presentation ID: 27

### The effect of *Boswellia* on the inflammatory factors in osteoarthritis

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#### ARTICLE INFO

##### Keywords:

Osteoarthritis  
Inflammatory factors  
Boswellia

#### ABSTRACT

Osteoarthritis (OA) is the most prevalent type of arthritis, that can lead to remarkable morbidity and disability affecting 73 % of adults older than 55 [1]. (OA) is a progressive joint deterioration resulting in cartilage degradation with subchondral bone remodeling, hypertrophy of the joint capsule, and osteophyte formation. There are no absolute treatments for (OA) and The current pharmacological treatments focus on reducing pain with acetaminophen and nonsteroidal anti-inflammatory drugs (NSAIDs). However, NSAIDs are correlated with gastrointestinal, renal, and cardiovascular risks. (OA), has long been associated with mechanical stress and aging but Evidence now suggests inflammation significantly contributes to OA's onset and progression, adding new dimensions to our understanding [2]. Hence, there is an increasing demand for herbal remedies with anti-inflammatory effects that do not produce significant adverse side effects to treat OA. Boswellia, also known as Indian frankincense derived from the *Boswellia Serrata* tree, is a resin that has been a staple in traditional medicine. this study was conducted by searching databases such as Pubmed and Google Scholar up to 2024. possesses potent anti-inflammatory properties, largely attributed to its boswellic acids. Researches demonstrate that Heightened proinflammatory cytokines, especially IL-1 $\beta$ , IL-6, and TNF- $\alpha$  play a crucial role in (OA) which are inhibited by boswellic acid [3]. Preliminary findings indicate that Boswellia is likely safe and effective in addressing joint inflammation; however, additional studies are warranted to confirm these results.

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Poster Presentation ID: 28

### Preparation of bee pollen powder using lyophilization technique and evaluation of its antioxidant and antibacterial activities

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#### ARTICLE INFO

##### Keywords:

Antibacterial activity  
Antioxidant activity  
Bee pollen  
Lyophilization  
Powder preparation

#### ABSTRACT

Bee pollen possesses significant nutritional value owing to its valuable bioactive compounds such as vitamins, proteins, carbohydrates, lipids, polyphenols, carotenoids and natural antioxidants. Due to these main bioactive compounds, BP has antimicrobial, anti-cancer, anti-tumor, anti-inflammatory and several medicinal benefits [1]. In the present study, hydro-alcoholic (50 % V/V) extract of the bee pollen was prepared and using freeze dryer, with chamber adjusted pressure and temperature of 100 Pa and -70 °C, solvent was removed and pollen powder was produced after 24 h [2]. GC-MS analysis indicate that 10 main bioactive compounds were in the prepared pollen powder which, Thymol and Carvacrol were its main phenolic compounds which cause pollen high biological activity [3]. Antioxidant activity, based on DPPH test, of the prepared pollen powder indicated that the prepared powder had 90 percent of free radicals inhibition. Furthermore, results indicated that the pollen powder had high antibacterial activity against both Gram-positive and Gram-negative bacteria selected strains. However, Gram-positive bacteria strains were more sensitive to the prepared pollen powder as compared to Gram-negative strains, due to difference in their cell wall structure [1, 3]. As conclusion, prepared pollen powder using lyophilization technique, due to high antioxidant and antibacterial activities, can be effectively used in the food, pharmaceutical and cosmetics as a natural antioxidant and antibiotic, without serious concerns related to the human health and environment.

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Poster Presentation ID: 29

### Potential application of the fig leaf extract in green synthesis of silver nanoparticles: Preparation and characterization

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#### ARTICLE INFO

##### Keywords:

Fig leaf extract  
Green synthesis  
Microwave heating  
Properties  
Silver nanoparticles

#### ABSTRACT

Fig leaves are a well-known source of bioactive components for industrial valorization. They are a rich source of tannins, flavonoids, and hydrocarbons, which have strong antioxidant properties that can be employed in treating and preventing many ailments. Fig leaf extract (FLE) is used for diabetes, high cholesterol, and skin conditions such as eczema, psoriasis, and vitiligo [1]. In the present study, reducing and stabilizing attributes of the prepared hydro-alcoholic (70 %V/V) FLE were assessed to green synthesis of silver nanoparticles (AgNPs) under microwave technique (800 W). FT-IR analysis indicated that hydroxyl, carboxyl and amid I are the main functional groups of the FLE which those can be utilized in reduction of silver ions and converted those into the stable AgNPs. A mixture solution containing 20 mL AgNO<sub>3</sub> (1 mM) and 3 mL of the prepared FLE subjected into the microwave irradiation for 180 s to accomplish AgNPs synthesis. Uv-Vis spectroscopy indicated that the mixture solution had a broad emission peak at 435 nm which, that related to SPR characteristic of the formed AgNPs [2]. TEM and DLS analyses revealed that the spherical formed AgNPs had particle size, polydispersity index and zeta potential values of 150 nm, 0.160 and -15 mV, respectively. Finally, results indicated that the synthesized AgNPs in the colloidal form had high antibacterial activities against *E. coli* and *S. aureus* bacteria strains [3]. As conclusion, FLE can be easily utilized in green synthesis of other metal and metal oxide NPs for using in various products and formulations.

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Poster Presentation ID: 30

### Green extraction of antibacterial silver nanoparticles using strawberry leaf extract: Optimization and characterization

Shirin Mizaee<sup>1</sup>, Parisa Afshari<sup>1</sup>, Saba Babakan<sup>1</sup>, Hoda Jafarizadeh-Malmiri<sup>1\*</sup>

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#### ARTICLE INFO

##### Keywords:

Antibacterial activity  
Green synthesis  
Response surface  
methodology  
Silver nanoparticles  
Strawberry leaf extract

#### ABSTRACT

Silver nanoparticles (AgNPs) due to high antimicrobial activity towards various microorganisms such as bacteria, fungi, algae and virus strains have gained much attentions and those well-known as new antibiotic generations. Due to presence of natural reducing and stabilizer bioactive compounds in the plants and their derivatives extract, green synthesis of AgNPs using plant extract has been developed in the last decade [1]. In the present study, potential application of the strawberry leaf extract in biosynthesis of Ag NPs was assessed. Using central composite design and response surface methodology, effectiveness of two independent variables, namely amount of extract (0.1-0.5 mL) in combination to 9 mL of 1 mM AgNO<sub>3</sub> solution and heating time (60-180 min) under Baine Marry adjusted at 60 °C, on the particle size and concentration of the synthesized AgNPs were evaluated. Results of optimization indicated that using 0.1 mL of the prepared strawberry leaf extract and 180 min heating time, spherical AgNPs were synthesized with mean particle size and a broad emission peak, and maximum concentration of 78 nm, 403 nm and 173 ppm, respectively. Antibacterial activity of the formed AgNPs using optimum conditions indicated high bactericidal effects toward *E. coli* and *S. aureus* by formed clear zone with diameter of 13 and 18 mm, respectively around the disc with 5mm diameter [2]. As conclusion, strawberry leaf extract act as both reducing and stabilizing agents in synthesis of AgNPs and by intensification of the synthetic process in one step, makes synthesis of AgNPs cost-effective and eco-friendly [3].

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Poster Presentation ID: 31

### Orange essential oil in water nanoemulsions preparation using three different emulsifiers and their physico-chemical assessment

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#### ARTICLE INFO

##### Keywords:

Green solvent  
Nanoemulsion  
Orange peel essential oil  
Optimization  
Subcritical water

#### ABSTRACT

Orange peel essential oil (OPEO) contains main bioactive compounds such as limonene as the major component, myrcene,  $\alpha$ -farnesene,  $\gamma$ -terpinene and linalool with high biological activities such as antioxidant, anti-tumor, anti-inflammatory and antimicrobial activities against numerous microorganism (e.g. bacteria and fungi strains) [1]. Non-polar nature of the OPEO, decrease its solubility in the aqueous formulations of the food, pharmaceutical and cosmetics. Furthermore, most of these valuable compounds are heat, oxygen, light and pH sensitive. Preparation of oil in water (O/W) OPEO nanoemulsions can overcome to the mentioned limitations [2]. In the present study, OPEO was extracted using Clevenger apparatus and GC-MS analysis indicated that limonene and myrcene are its main components. O/W OPES nanoemulsions were prepared using subcritical water (25 mL), as green solvent, at temperature and pressure of 120 °C and 1.5 atm for 1 h, and three different emulsifiers namely, Tween 80 (1.00 g), xanthan (0.25 g) and saponin (1.00 g). 0.25 g of OPEO was also used in the preparation of the samples. Results indicated that among different O/W OPEO nanoemulsions, prepared nanoemulsions using Tween 80, xanthan and saponin had minimum particle size of 8.164 nm, polydispersity index of 0.667, and maximum zeta potential of -24.1 mV, respectively. In fact, results demonstrated that prepared O/W OPEO nanoemulsions using Tween 80 and saponin had minimum and maximum particle size and stability, respectively, which, those are desirable attributes of the nanoemulsions [3]. It seems that by combination of different emulsifiers and optimization of the process, nanoemulsions with more desirable properties are produced.

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Poster Presentation ID: 34

### The effect of different concentrations of potassium thiosulfate on the amount of leaf photosynthetic pigments and total carbohydrates in tomato fruits

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#### ARTICLE INFO

##### Keywords:

Antioxidant  
Carbohydrate  
Chlorophyll  
Carotenoid

#### ABSTRACT

Tomato (*Solanum lycopersicum*) is one of the most important and widely used vegetables in the world. Its distinctive nutritional features play an important role in reducing the risk of cardiovascular diseases and diseases [1]. In addition, it is an important source of lycopene, which is a powerful antioxidant that acts as an anti-cancer because it contains high amounts of antioxidants such as carotenoids, chlorophyll [2]. The present study was conducted as a completely randomized design in the research greenhouse of Mohaghegh Ardabili University with the aim of investigating the effect of potassium thiosulfate fertilizer on the activity of photosynthetic pigments, total carbohydrates and total antioxidants in tomatoes. To perform this experiment, treatment with different concentrations of potassium thiosulfate at concentrations of 0, 5, 10, and 20 liters per hectare was performed simultaneously with the flowering of seedlings. The results showed that the amount of chlorophyll and total carotenoids increased under the influence of potassium thiosulfate at a concentration of 10 and 5 per hectare, respectively. Also, the results showed that the amount of total carbohydrates at a concentration of 5 liters per hectare of potassium thiosulfate and total antioxidants at a concentration of 10 liters per hectare of potassium thiosulfate were 10.88 and 33.64% respectively higher than the amount treated in the control samples.

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### Essential Oil Characterization of *Thymus daenensis* and *Thymus lancifolius* from Various Geographical Locations in Natural Habits of Fars, Iran

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#### ARTICLE INFO

Keywords:

*Thymus lancifolius*

*Thymus lancifolius*

Essential oil

#### ABSTRACT

This study investigated the effect of environmental conditions on the quantity and composition of essential oil (EO) in two *Thymus* species, *Th. daenensis* and *Th. lancifolius*. Aerial parts of these species were collected from various locations in the Fars province. The extracted EOs were analyzed using gas chromatography (GC) and gas chromatography/mass spectrometry (GC/MS) to determine their chemical compositions. The researchers also studied and determined the topographic and climatic characteristics, as well as the soil properties, of the habitats. The study found a significant negative correlation between elevation and rainfall amount with the quantity of essential oil in both *Thymus* species. Conversely, there was a significant positive correlation between temperature and the percentage of *Thymus* EO. Twenty-one chemical compositions were identified in the *Thymus* EO, with major components including thymol, carvacrol, p-cymene, linalool, 1,8 cineol, 8-terpinene, borneol, and e-caryophyllene. The analysis of variance showed significant differences in the essential oil composition of *Th. daenensis* at different study sites. The location effect on the percentage of p-cymene was also significant. *Th. daenensis* had a higher percentage of carvacrol compared to other components (74.3%), while *Th. lancifolius* had higher percentages of thymol, linalool, and e-caryophyllene (67.3%, 2.0%, 2.3 % respectively). The study also found a reverse significant correlation between electrical conductivity (EC) and 8-terpinene among variables. The high diversity of *Thymus* EO observed in this study suggests a wide range of options for selecting colonies of this plant with specific biological activity for use in cosmetic, food, and pharmaceutical industries [1,2].

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Poster Presentation ID: 37

### Effects of Explant Type and Plant Growth Regulators on Callus Induction and Cell Suspension Culture of *Vaccaria hispanica* (Mill.) Rauschert

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#### ARTICLE INFO

##### Keywords:

Cell Suspension  
Culture  
Plant Growth  
Regulators  
Tissue culture  
*Vaccaria hispanica*

#### ABSTRACT

Cow cockle (*Vaccaria hispanica* (Mill.) Rauschert) is an annual medicinal and ornamental herbaceous plant belonging to the Caryophyllaceae family, grown in many regions of Asia, South Africa, Australia, North and South America. It is considered for commercial production due to its seed composition [1] and as a potential plant for domestication. The seeds contain starch, cyclic peptides, and saponins. This plant is considered a medicinal plant in China and India having anticancer, anti-HIV, anti-inflammatory, antibacterial, insecticidal, and fungicidal properties [2]. The present study aimed to investigate the response of various cow cockle explants to the different concentrations of the plant growth regulators. The study was conducted as a factorial experiment based on a completely randomized design with three replications at the University of Mohaghegh Ardabili. Plant materials were collected from northwest Iran. To callogenesis, the explants (leaves, hypocotyl, cotyledon, and nodules) were cultured on an MS medium supplemented by three types of plant growth regulators (2,4-D, Kinetin, and BAP) at four concentrations (0.5, 1, 3, and 5 mg/L). Then, callus induction percentage and callus fresh weight were measured. According to the results of ANOVA, the effects of plant growth regulators, explant type, and also PGR × explant interaction effects were significant. The callus induction occurred in all explants and most of the plant growth regulator concentrations. However, the growth of calli differed among explants and components of growth media. The highest amount of callus fresh weight (0.85 g) in root explants were obtained in treatment with 0.5 mg/L 2,4-D, in leaf (3.20 g) the cotyledon (2.91 g) explants in 1 mg/L 2,4-D + 0.5 mg/L Kin, and in the hypocotyl explant in 1 mg/L 2,4-D + 1 mg/L Kin. In general, the leaf and the cotyledon explants showed the best response to the callus induction and growth, so the highest callus yield was obtained from these two explants, respectively. The cell suspension culture of this plant was established using calli obtained from leaf and cotyledon explants in MS medium supplemented with 1 mg/L 2,4-D and 0.5 mg/L Kin.

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Poster Presentation ID: 39

### Ethnobotany of medicinal plants of up-country fees village in amol city

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#### ARTICLE INFO

##### Keywords:

Ethnobotany  
Namarestaqh area  
Medicinal Plants  
up-country fees village  
Amol

#### ABSTRACT

The science of ethnobotany, which was first mentioned by Harshberg in 1895, investigates and studies how the people of a tribe or specific regions use the plants in that place [1,2]. The purpose of this study is to collect and identify and use local knowledge of medicinal plants in the researched village. The present study was carried out in Amol city, Namarestaqh area, Fees village. The village is located 50 kilometers away from the city center with an area of more than 50 hectares, longitude 52 degrees 9 minutes east and latitude 36 degrees 4 minutes and 2300 meters from the sea. In the summer of 1401 and 1402, the collected plants were identified with the help of old and expert residents of the village. Information including local name, use, usage method was recorded in face-to-face interviews. The results of this research determined more than 50 species, of which the genera of Lamiaceae, Asteraceae, Fabaceae, Boraginaceae, Apiaceae and Rosaceae took the most amount. The identified species have various uses, the most of which include colds, antitussives, antipyretics and analgesics, lowering blood pressure and blood sugar, antiflatulence, and skin hygiene. The studied village has a favorable flora that further research on its plants will help to discover new medicines and preserve and revive it.

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Poster Presentation ID: 43

### Effects of *Vaccaria hispanica* Seed and Leaf Extracts on Gram-negative and Gram-positive Bacteria

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#### ARTICLE INFO

##### Keywords:

Antibacterial effects  
Cow cockle  
Inhibition zone  
Minimum inhibitory  
concentration

#### ABSTRACT

*Vaccaria hispanica* is an herbaceous, annual medicinal and ornamental plant belonging to the Caryophyllaceae family. Its seeds contain 60-65% starch, 11-15% protein, 3-4% oil, and about 2-4% saponin, which are important in the food industry, especially for cosmetics [1]. In addition, cow cockle seeds also have bioactive components such as alkaloids, phenolic acids, flavonoids, and steroids, which show a wide range of biological activities and can have potential markets [2]. This research aimed to evaluate the antibacterial properties of the leaf and seed extracts of cow cockle on *Escherichia coli* and *Staphylococcus aureus*. Methanolic and aqueous extracts of seeds and leaves of this plant were prepared and filtered for use. Measurement of antimicrobial activity was made by disk diffusion method using tetracycline as control. The analysis of variance showed that the size of the inhibition zone produced in the plates containing the two types of gram-negative (*E. coli*) and gram-positive (*S. aureus*) bacteria was significantly ( $p < 0.01$ ) affected by the type of bacteria, the method of extracting (aqueous and alcoholic), and the different concentrations of the extract. Also, the interaction effect of bacteria type and extract concentration and the interaction effect of the extraction method and its concentration were significant. There was a significant difference between the two types of bacteria (*E. coli* and *S. aureus*) in terms of sensitivity to different concentrations of *V. hispanica* leaf and seed extracts. So, *E. coli* had a larger inhibition zone than *S. aureus* and was more sensitive. The largest inhibition zone was related to the 200  $\mu\text{L}$  of both leaf and seed extracts in the plates containing both bacteria. Also, the difference between *E. coli* and *S. aureus* in terms of the inhibition zone in the treatment with 50, 100, and 150  $\mu\text{L}$  of the extracts was significant. Whereas in the treatment with 25 and 200  $\mu\text{L}$ , they did not show any significant differences. The antibacterial properties of the leaf and seed extracts of *V. hispanica* were significantly increased with increasing concentration. On the other hand, although at low concentrations of the extracts (25, 50, and 100  $\mu\text{L}$ ) no significant differences were observed between the two extracting methods, but at 150 and 200  $\mu\text{L}$ , the size of the inhibition zone in the alcoholic extract was significantly greater than that of the aqueous extract. This shows more antibacterial compounds in the extract extracted with alcohol, which shows its effect in higher concentrations.

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Poster Presentation ID: 44

### Antibacterial Properties of Green Synthesized Zinc Nanoparticles using Aqueous Extract of *Vaccaria hispanica*

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#### ARTICLE INFO

##### Keywords:

Antibacterial properties

Leaf extract

*Vaccaria hispanica*

Zinc nanoparticles

#### ABSTRACT

Nanoparticles with catalytic, ionic, and photocatalytic properties can be widely used to combat human pathogenic microbes, bacteria, and fungi [1]. In recent years, using plant extracts for nanoparticle synthesis has received special attention as a green approach [2]. Considering the unique properties of the cow cockle and its importance in the pharmaceutical and food industries, and also considering the importance of new methods for producing nanoparticles to destroy various bacteria, this research aimed to investigate the green synthesis of zinc nanoparticles (ZnNPs) using the leaf extracts of cow cockle (*Vaccaria hispanica*) and determine their antibacterial properties on *Escherichia coli* and *Staphylococcus aureus*. The size and structure of zinc nanoparticles synthesized by *V. hispanica* aqueous extract were confirmed using a scanning electron microscope (SEM), dynamic light scattering (DLS), and Fourier transform infrared spectrometer (FTIR). The antibacterial properties of zinc nanoparticles (0.5, 1.0, 1.5, and 2 mg/mL) were measured using the disk diffusion on *E. coli* and *S. aureus* bacteria. Discs containing tetracycline were used as positive controls. According to the analysis of variance, the diameter of the inhibition zone and the percentage of the inhibition zone diameter compared to the control (tetracycline) in the plates containing the two types of bacteria *E. coli* and *S. aureus* was significantly ( $p < 0.01$ ) affected by the main effects of the bacteria type and different concentrations of zinc nanoparticles and their interaction effect. Considering the significance of the interaction effect between the type of bacteria and the concentration of zinc nanoparticles, a comparison of different concentrations of ZnNPs in each bacterial species was made. In most concentrations, *E. coli* was more sensitive than *S. aureus* to the applied treatments. The size of the inhibition zone produced in the medium containing *E. coli* and *S. aureus* bacteria increased significantly by increasing the concentration of zinc nanoparticles from 0.5 to 2 mg/mL. This means that inhibition of bacterial growth in both *E. coli* and *S. aureus* species by zinc nanoparticles is concentration-dependent and increases with increasing concentration. The use of zinc nanoparticles (especially at higher concentrations) showed proper antibacterial properties. In terms of the growth of cultured bacteria the minimum inhibitory concentration, for *E. coli* in equal concentrations was low compared to *S. aureus*, which demonstrated the higher sensitivity of *E. coli* compared to *S. aureus* bacteria.

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Poster Presentation ID: 45

### The effect of LED light combinations on the growth indicators of German chamomile (*Matrocaria chamomilla* L.) in vitro conditions

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#### ARTICLE INFO

Keywords:

German chamomile

LED lights

#### ABSTRACT

German chamomile plant with the scientific name *Matricaria chamomilla* L. It is a medicinal plant from the chicory family (*Asteracea*). The medicinal properties of chamomile are due to the presence of numerous flavonoid compounds such as apigenin and quercetin and essential oils such as camazolin [1]. The technology of producing LED lamps has provided a new opportunity for the production of medicinal, garden and ornamental plants in controlled environments and also to study the physiological effect of light wavelengths on plants [2]. In this research, the treatment of different combinations of LED lights was used in chamomile in vitro cultivation and the experimental design in this research was a completely random design. The results showed that the length of the main branch, the length of the root, the fresh weight of the shoot and the number of leaves in the samples had a significant difference at the level of 1%. Also, the amount of root fresh weight and the number of branches had a significant difference at the five percent level, but the plant height did not have a significant difference in the results. The results obtained were that the maximum length of the main branch was obtained in B100 light treatment with 15.08 mm. The maximum root length was obtained with 87.19 mm in R60B40 treatment. The highest weight loss of aerial parts was obtained in R100 treatment with an average of 1583.83 mg. The highest amount of root fresh weight with an average of 710.16 mg was in R20B80 light treatment. The highest number of leaves was respectively in W100 light treatments with 72.33, then R100 treatment with an average number of 64.66 and in R20B80 light treatment with an average number of 58.33. The number of branches in W100 light treatment with an average number of 4.33 was higher than other treatments. The maximum height of seedlings was obtained in light treatment B100 and there was no significant difference in the height of seedlings in other light treatments.

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Poster Presentation ID: 46

### Hairy root induction in German chamomile (*Matrocaria Chamomilla L.*) using *Rhizobium rhizogenes* bacteria strains

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#### ARTICLE INFO

##### Keywords:

Rhizobium bacteria  
German chamomile  
A4

#### ABSTRACT

German chamomile medicinal plant with the scientific name *Matricaria chamomilla L.* is a medicinal plant from the chicory family (*Asteracea*). Chamomile plant has valuable active substances in its roots, shoots and especially in its flowers. Among the valuable metabolites of this plant are essential oils and phenolic and flavonoid compounds such as camazolen, farnasine, apigenin, quercetin and luteolin [1]. *Rhizobium rhizogenes* is a Gram-negative soil bacterium that can induce hairy roots in various plants. The use of tissue culture and inoculation of medicinal plants with rhizobium rhizogenes to create hairy roots is a desirable method to increase the amount of secondary metabolites of valuable medicinal plants [2]. Considering the importance of hairy root production in medicinal plants, in this research the induction of hairy roots in German chamomile plant was investigated using *Rhizobium Rhizogenes* A4 and ATCC15834 strains. For this purpose, 8-week-old chamomile seedlings were inoculated with bacterial strains by insulin syringe and They were treated in the dark for 48 hours. After dark treatment, seedlings were transferred to MS culture medium containing 500 mg.l-1 antibiotic cefotaxime, and after six weeks, several lines were separated from induced hairy roots and cultivated in liquid B5 culture medium containing cefotaxime. After 14 days, the A4 strain that grew more was selected and divided into 2-3 cm pieces and transferred to liquid B5 culture medium containing cefotaxime and subjected to darkness treatment for 20 days. Roots inoculated with A4 strain had higher growth in this study.

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Poster Presentation ID: 51

### Standardization and stabilization of cold & immune system herbal syrup

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#### ARTICLE INFO

##### Keywords:

Standardization  
Herbal syrup  
Immune system  
Physicochemical and  
microbial test

#### ABSTRACT

The effectiveness and therapeutic effect of herbal products depends on the presence of active ingredients in the precise concentration, the absence of microbial and chemical contamination, as well as other physical and chemical properties. By using standardization processes, the accuracy of identification, safety, efficiency, effectiveness, stability and assurance of the presence of a certain amount of effective substances in the herbal product are achieved. In this study, in order to standardize the final product, at first, identification, determination of the amounts of active ingredients and other quality factors regarding the desired initial materials are done. Finally, the product prepared from raw materials with approved properties and specifications will be standardized and subjected to stability studies based on the amount of active ingredient, lack of microbial contamination and other physical and chemical properties. The stability of the product reached its maximum time (6 months of accelerated stability) using natural chemical stabilizers. Due to the fact that the stability of the product was investigated in both refrigerated and environmental conditions, it was found that storing the product in refrigerated conditions creates more stability. Refrigerated conditions and the use of chemical stabilizers to protect the active ingredients and not using alcoholic compounds in the formula improved the stability of sensitive and unstable compounds including anthocyanins [1,2].

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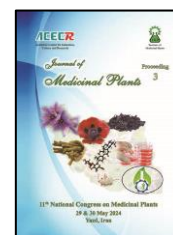
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Poster Presentation ID: 52

### Standardization of laxative herbal syrup for children and adults

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#### ARTICLE INFO

##### Keywords:

Standardization  
Herbal syrup  
Laxative  
Physicochemical and  
microbial test

#### ABSTRACT

In the last decade, the acceptance and popularity of using herbal and natural medicines and products has increased in developed and developing countries. By using standardization processes, the accuracy of identification, safety, effectiveness, stability and assurance based on a certain amount of effective substances in the herbal product are achieved [1]. In this study, in order to standardize the final product, at first, identification, determination of the amounts of active ingredients and other quality factors regarding the desired raw materials are done. Finally, the product prepared from raw materials with approved properties and specifications will be standardized and subjected to stability studies based on the amount of active ingredient, lack of microbial contamination and other physical and chemical properties. All physicochemical and microbial studies will be conducted based on standard spectroscopic methods and other relevant standard methods in the pharmacopoeia of Iran, England and America. The stability of the product reached its maximum time (6 months of accelerated stability) by adjusting the pH and the absence of microbial contamination using microbial preservatives. Environmental conditions, the use of edible buffer to stabilize pH [2] and the use of microbial stabilizers resulted in maintaining the tannin indicator compounds at a minimum amount of 1.4% in the product and microbial protection of the product.

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Poster Presentation ID: 53

### Phytochemical evaluation and antioxidant activity of some ecotypes of *Tribulus terrestris* L.

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#### ARTICLE INFO

##### Keywords:

Diversity  
Total saponins  
Antioxidant activity  
*Tribulus terrestris*

#### ABSTRACT

*Tribulus terrestris* (family Zygophyllaceae), its various parts contain a variety of chemical constituents that are medicinally important, such as flavonoids, flavonol glycosides, steroidal saponins, and alkaloids [1]. The plant is known to have diuretic, aphrodisiac, antiurolithic, immunomodulatory, hypolipidemic, antidiabetic, cardiogenic, antispasmodic, anti-inflammatory, analgesic, and hepatoprotective activities [2]. In order to investigate the phenolic compounds, total saponins content and antioxidant activity of *T. terrestris* ecotypes, samples were collected from different regions (West Azerbaijan, East Azerbaijan, Fars, Qazvin and Zanjan provinces) of Iran at the fruiting stage. Phytochemical characteristics of total phenol content (Folin-Ciocalteu method), total flavonoid content (Aluminum Chloride method), antioxidant activity (DPPH method), and total saponins were evaluated. The highest level of phenolic and flavonoid contents was recorded for the fruit extracts from the Khorramdareh ecotype, with 4.96 mg GAE/g DW and 3.22 mg RE/g DW, respectively. The results of DPPH test showed that the extract of *T. terrestris* exhibited potent activity, so that the highest (26.90%) antioxidant activity in the Sardasht ecotype and the lowest (8.60%) antioxidant activity related to Darangoon ecotypes. The highest content of total saponins was observed in the Sardasht ecotype (8.41 µg oleanolic acid/g DW) and the lowest in the Khormadareh ecotype (5.64 µg oleanolic acid/g DW). The high diversity in terms of the studied parameters indicates the ability of the *T. terrestris* ecotypes to be selected and used in breeding, cultivation and production programs.

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Poster Presentation ID: 56

### Analysis of alkaloids content in *Sophora alopecuroides* L., ecotypes

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#### ARTICLE INFO

##### Keywords:

Diseases  
Chemical compound  
Gas chromatography  
Mass Spectrometry  
Sophora

#### ABSTRACT

The use of medicinal plants to treat diseases and improve health has always been attractive to humans. *Sophora alopecuroides* is mostly known as a weed, and for this reason, the study of the therapeutic properties of its compounds has received less attention. Therefore, a phytochemical study of its extract and the identification of its compounds are indispensable for this valuable plant [1]. The subject of this study is the analysis of the phytochemical constituents of methanolic extracts from 10 ecotypes of *S. alopecuroides* L. in both natural environments and controlled greenhouse conditions. The results showed that in natural environments, the Karaj ecotype had the highest percentage of alkaloids (5.7%), while the Fars ecotype had the lowest (0.2%). In controlled greenhouse conditions, the Kermanshah ecotype had the highest percentage of alkaloids (6.9%), and the Mazandaran ecotype had the lowest (1.2%). The application of gas chromatography-mass spectrometry (GC-MS) allowed for the isolation and identification of 71 compounds in the studied ecotypes in natural environments and 68 compounds in the studied ecotypes under controlled greenhouse conditions. The differences in the quantity and percentage of compounds may be due to varying planting conditions, including soil composition, nutrient availability, irrigation conditions, latitude and longitude, hours of light exposure, temperature, and other environmental factors. The synthesis and accumulation of secondary metabolites are complex processes influenced by many factors, including internal developmental genetic circuits (regulated genes and enzymes) and external environmental factors (light, temperature, water, etc.) [2].

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Poster Presentation ID: 57

### Callogenesis of *Daucus carota* for the synthesis of nanoparticles with pharmaceutical purposes

Ardeshir Qaderi<sup>1</sup>, Reza Ghaffarzadegan<sup>1</sup>, Nasim Zarinpanjeh<sup>1</sup>, Hadi Kalantari Khalil Abad<sup>1\*</sup>, Hamideh Jeddi<sup>1</sup>

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#### ARTICLE INFO

##### Keywords:

Callus induction

*Daucus carota*

#### ABSTRACT

*Daucus carota* L. belongs to the family of Apiaceae and is very worthwhile because of the presence of significant amount of bioactive compounds like polyphenols [1]. They are also helpful in preventing cancer, oxidative stress, inflammation, obesity, and microbe proliferation [2]. Since plant callus extracts have a large number of bioactive compounds that act as reducing and capping agents, they have been used for the synthesis of nanoparticles [3]. In this study, callus induction from *D. carota* has been optimized with the aim of synthesizing nanoparticles for pharmaceutical purposes. Healthy roots from *in vitro* germinated seeds were used as explants and cultured on a solid MS medium fortified with NAA and BAP in concentrations of 1, 1.5, and 2 mg/l and sucrose in concentrations of 30, 45, and 60 g/l. The cultures were maintained in the dark at 25 ± 2 °C. The percentage of callus induction, fresh weight (FW), and dry weight (DW) of calli were recorded 4 weeks after culture. Callus induction was observed after two weeks with a frequency of 100 %. Maximum 0.470 biomass accumulation (FW and DW) was obtained by culturing hypocotyl explant on MS medium augmented with 2, 4-D at 0.5 mg/L. The maximum FW and DW were 7.6 g and 3.7 g, respectively. The range of mean FW (g) and DW (g) in different treatments were from 0.37 to 7.6 and 0.024 to 3.03, respectively.

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Poster Presentation ID: 58

### Antibacterial effect of essential oil of some medicinal herbs on *Escherichia coli* bacteria

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Essential oil <i>Escherichia coli</i> <i>Zataria multiflora</i></p>	<p>Recently, the use of a plant's essential oil has been received more attention because it is for benefits to health without side effects. The essential oils have a bactericidal ability against a wide range of microbes, as well as with minimal side effects [1]. In this experiment, the antibacterial effect of <i>Zataria multiflora</i> essential oil, <i>Matricaria chamomilla</i>, <i>Mentha piperita</i>, <i>Mentha pulegium</i> and <i>Satureja hortensis</i> on <i>Escherichia coli</i> was investigated. The experiment was conducted in a completely randomized design with five treatments (Essential oils of <i>Zataria multiflora</i>, <i>Matricaria chamomilla</i>, <i>Mentha piperita</i>, <i>Mentha pulegium</i> and <i>Satureja hortensis</i>) and three replications. The essential oil of the plants was extracted by steam distillation method by Klevenger apparatus. Then, using the wells method, the diameter of the inhibition zone of the bacteria was measured. By using inoculation method, minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) of essential oils were determined against one bacterial strain. The results showed that the highest and lowest diameters of the inhibition zone were observed. The <i>E.coli</i> strain belonged to <i>zataria multiflora</i> essential oils (48.33 mm) and <i>Mentha pulegium</i> (16.66 mm). In <i>E.coli</i> bacteria, MIC and MBC, the essential oil of Shirazi thyme was 0.43 mg/ml and 0.87 mg/ml, respectively to 1.14 mg/ml and 2.29 mg/ml. The finding of the experiment indicated that <i>zataria multiflora</i> has an antibacterial effect on <i>E. coli</i> bacteria. Thymol is an aromatic compound derived from <i>zataria multiflora</i> that exhibits considerable broad-spectrum antimicrobial effects. Therefore, biological effects, along with their favorable toxicity, make thymol an option as an additive to inhibit microbial spoilage of foods and potent antimicrobial agents against antibiotic-resistant bacteria [2].</p>

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Poster Presentation ID: 61

### Investigating the application of biofertilizers on fennel seed germination parameters

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Biofertilizer Fennel Germination Seed</p>	<p>Considering the effect of biofertilizers on germination, germination speed and some germination parameters, an experiment was conducted with the combination of biofertilizers. In order to investigate the effect of phosphate, potassium, zinc and iron soluble biofertilizers as well as nitrogen bio fixation on germination parameters in fennel plant, a statistical experiment was conducted with 8 treatments in three replications in laboratory conditions. The results showed that biological fertilizers had no effect on germination and germination speed, but had a significant effect on root length, stem length, seedling length, seed vigor, fresh and dry weight at the 5% level. According to these results, it is possible to recommend the use of biological fertilizers in the seeds of the medicinal plant fennel before planting. Therefore, according to these results, it can be said that for faster plant growth and germination, it is better to use organic fertilizer in bulk in medicinal plants.</p>

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Poster Presentation ID: 67

### ***Zingiber officinale* suppositories for managing post-cesarean shivering: a randomized clinical trial**

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#### ARTICLE INFO

##### Keywords:

Ginger Suppository  
Spinal Puncture  
Shivering  
Cesarean Section  
Alternative Medicine

#### ABSTRACT

Postoperative shivering is a common and unpleasant complication of spinal puncture. Various pharmacologic and non-pharmacologic options have been studied to control shivering. This study aimed to evaluate the effectiveness of ginger in treating post-spinal puncture shivering in patients undergoing cesarean section. A placebo-controlled, single-blinded, randomized controlled trial was conducted. A total of 242 eligible participants were assigned to the ginger or placebo suppository groups using block randomization. Suppositories were administered immediately after the operation. The shivering scores were recorded for both groups at six time points (20, 35, 50, 65, 80, and 95 minutes) after the intervention. The participants' shivering scores were analyzed using a repeated-measures analysis of variance (ANOVA) test. The results showed significant differences between the two groups in the mean shivering scores at 20, 35, 50, 65, and 80 minutes ( $P < 0.05$ ), with no significant difference at 90 minutes. The trend of changes at six time points demonstrated that shivering intensity significantly differed between the two groups over time ( $P < 0.001$ ) (Figure 1). No significant side effects were observed in patients in the two groups. Ginger suppository reduces shivering after spinal puncture in patients undergoing CS. Due to the lack of side effects and lower cost of ginger suppositories, it can be considered as an option for post-CS shivering.

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Poster Presentation ID: 69

### Anti-anxiety and hypnotic effects of hydro alcoholic extract of *Lawsonia inermis*

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#### ARTICLE INFO

Keywords:

*Lawsonia inermis*

Insomnia

Anxiety

#### ABSTRACT

Insomnia is a disorder characterized by a personal incapability to falling or staying asleep for a desirable period of time, therefore disturb in quality of life. The main flaws of current insomnia medications are significant side effects. A suitable substitute can be herbal products. The present study was carried out to investigate the anti-anxiety and sleep-prolonging effect of *Lawsonia inermis* extract and fractions in mice. Male albino mice were pretreated with *L. inermis* extract or n-butanol fraction (NBF), ethyl acetate fraction (EAF), and water fraction (WF), 30 minutes before injection of pentobarbital. Sleep latency and duration of sleep were recorded. For anxiolytic activity, elevated plus-maze (EPM) tests were used. Moreover, the toxicity of the extract was determined in both *in vivo* and *in vitro* experiments. *L. inermis* extract significantly reduced sleep latency and increased sleep duration. EAF decreased sleep latency and increased sleep duration. Flumazenil reversed the hypnotic effect of *L. inermis* extract. *L. inermis* extract increased the time spent and the number of entries in the open arms of EPM. The extract did not induce any cytotoxic effects in PC12 cell. The present data indicated that *L. inermis* exhibit anxiolytic and hypnotic effects without major toxic effect.





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Poster Presentation ID: 70

### Histopathological and histomorphological investigation of the effect of hydroalcoholic extract of Galium Verum plant on skin wound healing in male rats

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#### ARTICLE INFO

##### Keywords:

Gallium verum  
wound healing  
hydroalcoholic extract

#### ABSTRACT

Galium verum (milk cheese) is a herbaceous plant from the Rubiaceae family and contains compounds such as galitanic acid, citric acid, flavonoid alkaloids, phenolic compounds, iridoid glycosides, carbohydrates, amino acids, and red alizarine. Galen in the 1st century mentioned healing and blood coagulant effects and recent research approved mild sedative, diuretic, anticonvulsant, anti-cancer, antioxidant, antimicrobial anti-inflammatory, and cell proliferation effects. Plant extraction was done through maceration. Extracts were used to make ointments, with 1%, 2.5%, and 5% concentrations. Eucerin was used as a base, with sodium benzoate and potassium sorbate added as preservatives. Fifty-four male Wistar rats were used in an experiment. A 2x2 cm template was used to create a full-thickness skin wound, including the dermis layer, on the posterior region of the neck of each rat. The rats were then divided into three equal groups. The first group was given a placebo (Eucerin), the second group was given gallium verum extract ointment, and the third group was given phenytoin (commercial ointment 1%). The histopathological and histomorphological data were analyzed using SPSS25 software, with one-way ANOVA and Tukey's supplementary test, and a significance level of  $P < 0.05$ . During the examination of skin wounds, it was observed that rats who received 2.5% and 5% extract had a significant reduction in the size of the wounds. Histopathological evaluation showed that the wound tissue in rats treated with 2.5% and 5% extract had higher levels of epithelialization, fibroblasts, and blood vessels, and lower levels of inflammation compared to the control group.

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Poster Presentation ID: 71

### Investigating the effect of gamma radiation on the physical and chemical properties of Psyllium husk powder

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#### ABSTRACT

*Keywords:*

Psyllium husk powder  
gamma ray  
Irradiation

The use of standard raw materials is one of the requirements for the production of medicines and foods. After taking samples of 5 batches of Psyllium husk powder, it was observed that the microbial load of the samples is outside the range determined by international pharmacopoeias. In order to reduce the microbial load, gamma ray irradiation is used; on the other hand, the possibility of structural changes in the compounds Chemicals of plants due to gamma radiation. To determine the effect of gamma radiation on physico-chemical and microbial characteristics, samples were exposed to gamma radiation at doses of 6, 8, 10, 12, and 15 kGy. After irradiation, the pH was evaluated, color, amount of mucilage compounds and compared with the control sample (not exposed to radiation). The results showed that gamma radiation up to a dose of 15 kGy does not cause a significant change in pH, while gamma irradiation of more than 10 kGy has an effect. There was a significant decrease in the amount of mucilage compounds. The microbial load did not decrease significantly with the increase of the radiation dose, and the total number of microorganisms reached zero at the dose of 8 kGy.

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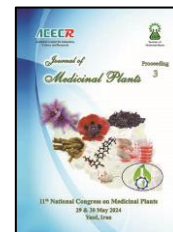
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Poster Presentation ID: 72

### A novel strategy for enhance potentiation of biogenic *Berberine Chloride* Nanoparticles against *Leishmania major*

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#### ARTICLE INFO

##### Keywords:

Leishmania major  
Berberine Chloride  
Nanoparticles  
Cutaneous  
Leishmaniasis

#### ABSTRACT

Leishmaniasis is a group of diseases induced by an obligate intracellular parasite from the genus *Leishmania* is one of the main infectious diseases that infected populations in developing countries. There is still no drug and vaccine against any form of Leishmaniasis. Berberine chloride, the vehicles in the Nano-scale such as liposome is applied as innovative drug delivery systems instead of the traditional systems [1-2]. We assessed the effectiveness of berberine chloride Nano liposomes (BcNLs) against *Leishmania major* promastigotes in vitro. Nanoliposomal berberine chloride was prepared using thin film hydration method and characterized based on encapsulation efficiency, size and zeta potential. Anti- *Leishmania* effect of different concentrations (0.05–60 µg/ml) of BcNLs as studied in *Leishmania major* (MRHO/IR/75/ER) at 24, 48 and 72 h using the hemocytometer technique [3]. Berberine chloride was successfully loaded into Nano liposomes with encapsulation efficiency of 85.54%. The surface charge of nanoparticle is neutral and the morphology of nanoliposomal berberine chloride is spherical without any agglomeration. Cell viability assay was performed on HFF cell line to show biocompatibility of liposome nanoparticles. IC<sub>50</sub> of BcNLs at 24, 48 and 72 h against *Leishmania major* were found to be 7.6, 5.96 and 3.19 µg/ml, BcNLs showed a significant anti-*Leishmania* effect and induced a better and more tangible effect on the survival of *Leishmania major* promastigotes and could be suitable candidates for further investigation. The results showed that the BcNLs agent is effective against *Leishmania major* promastigotes and may be a promising alternative to current treatments.

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Poster Presentation ID: 73

### Influence of arbuscular mycorrhizal fungi and phosphorus concentration on growth and antioxidant activity of basil (*Ocimum basilicum* L.) in hydroponic culture

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#### ARTICLE INFO

Keywords:

Growth

Hydroponic

AMF

Symbiosis

Phosphorus Uptake

#### ABSTRACT

The use of plant growth-promoting microorganisms (PGPM) like arbuscular mycorrhizal fungi (AMF) as a substitute for detrimental chemicals in sustainable farming practices is viewed as a beneficial eco-friendly biotechnological strategy. AMFs are symbiotic microorganisms that influence plants primary and secondary metabolic process, stimulate the plant growth, water and nutrient uptake, and increase their resistance to environmental stresses [1]. Despite numerous studies conducted to date, a substantial knowledge gap persists, necessitating the need to focus on application of PGPMs for sustainable soilless agriculture [2]. The utilization of PGPMs in soilless agriculture holds great promise for boosting plant growth and minimizing the need for chemical fertilizers. Therefore, the purpose of this study was to examine the effects of two AMFs (*Funneliformis mosseae* and *Serendipita indica*) and different concentrations of phosphorus (10, 20 and 40 mg/l) on the growth and antioxidant activity of *Ocimum basilicum* L. in a hydroponic system. The results showed that reducing the level of phosphorus led to a decrease in plant growth while inoculation with AMFs increased growth of the plants compared to the control. The plants treated with *F. mosseae* and 40 mg/l of phosphorus had the highest shoot fresh and dry weights, as well as leaf area. Additionally, inoculation with *F. mosseae* and *S. indica* increased total phenolic and flavonoid content, respectively. The highest content of total anthocyanin and antioxidant activity were observed in the plants treated by *F. mosseae* and *S. indica* at 20 mg/l of phosphorus, respectively. Furthermore, Antioxidant enzymes activity was significantly increased in induced plants compared to control. The highest catalase and ascorbate peroxidase activity was detected in plants inoculated with *S. indica* and 20 and 10 mg/l of phosphorus, respectively.

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### A comparative study of four optimization methods in the extraction of silymarin from *Silybum marianum* L.

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Optimization Silymarin Extraction <i>Silybum marianum</i> L. Iran</p>	<p>Medicinal plants have been used for various diseases since ancient times. One of the diseases that can be seen in different societies today is related to liver problems in different forms and the best herbal treatment that has been introduced is the use of milk thistle. <i>Silybum marianum</i> L., commonly known as milk thistle, belong to Asteraceae family and has been recognized for its medicinal properties for over 2,000 years. [1] It mainly used to treat a variety of diseases such as liver, kidney and gallbladder disorders due to its high antioxidant content and free radical scavenging properties [2]. It is an annual or biennial plant, native to the Mediterranean region. Silymarin is a standardized extract from milk thistle seeds and contains mainly several flavonolignans [silybin A and B (the primary and most active component) isosilybin A and B, silydianin, and silychristin] [3]. Many researches have been done to extract more silymarin from the seeds of this plant. In this research, 4 different methods (without using chemical solutions for defatting) [4] were performed, and the most silymarin was obtained compared to the usual method. The studied species had 43.79 mg/g of silymarin, while the amount of silymarin in the four different methods of the same species was 57.81, 87.04, 97.98, and 126.55 mg/g, respectively.</p>

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Poster Presentation ID: 75

### Factors influencing the distribution of Cumin: insights for cultivation and management strategies

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#### ARTICLE INFO

##### Keywords:

Cumin

*Cuminum cyminum* L

Medicinal plants

#### ABSTRACT

Understanding the key factors and their influence on the distribution of plant species is crucial for determining the ecological niche of a particular plant. Species distribution modeling serves as a valuable tool in achieving this objective. *Cuminum cyminum* L., a valuable medicinal plant, holds significant economic importance in the agricultural sector and is considered a prominent export commodity [1]. Therefore, this study aims to identify the primary variables that impact the distribution of cumin and assess their relative importance using the Maxent modeling method [2]. The findings reveal that several factors significantly influence the farm suitability for cumin cultivation. These factors include soil depth, soil size particle, silt content, average annual temperature, minimum temperature during the coldest month, slope, altitude, and annual rainfall. By considering these factors, it is recommended that cumin cultivation be focused on areas with an altitude below 1500 meters, soil characterized by high silt content, an annual temperature ranging from 12 to 18 degrees Celsius, a minimum winter temperature between -7 to -2 degrees Celsius, and an annual precipitation between 150 and 350 mm. Moreover, it is worth noting that other research has highlighted the role of biological factors, such as pathogenic fungi (e.g., *Alternaria burnsii*), in limiting the growth and distribution of cumin. Therefore, when planning cumin cultivation, it is essential to account for both environmental and climatic factors as well as potential biological constraints. Overall, this study underscores the significance of comprehensively assessing the factors influencing the distribution of cumin, providing valuable insights for effective cultivation and management strategies.

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Poster Presentation ID: 77

### Identifying Key Genetic Regulators of Theacrine Biosynthesis in Kucha Tea Using Feature Selection Algorithms

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#### ARTICLE INFO

##### Keywords:

KEGG analysis  
Theacrine  
Weighting algorithms

#### ABSTRACT

Theacrine, a purine alkaloid, exhibits a range of pharmacological effects including anti-inflammatory, analgesic, sedative, lipid-regulating, and anti-cancer properties, with a relatively high safety profile compared to caffeine [1]. Unlike most other tea plants, where caffeine is the predominant purine alkaloid, theacrine is uniquely synthesized from caffeine in the Kucha tea plant [2]. However, the exact molecular mechanisms governing theacrine biosynthesis have not been fully understood. To elucidate the genetic basis of theacrine production, the PRKM dataset (accession number SRP271859) of two low-content and two high-content theacrine cultivars of the Kucha plant was retrieved from the Sequence Read Archive (SRA) and used as input in the RapidMiner software. Using ten weighting algorithms, including chi-squared statistic, correlation, deviation, Gini index, relief, rule, SVM, uncertainty, information gain, and information gain ratio, with a cut-off threshold of  $\geq 0.7$ , we identified 87 different genes as key regulators of theacrine content variation. According to KEGG analysis, the "Biosynthesis of secondary metabolites" pathway was significantly enriched among the identified genes. The identified genes associated with this pathway including TEA009099.1 (cytochrome P450, family 82, subfamily C, polypeptide 4), TEA009290.1 (UDP-glucosyltransferase 85A3), TEA023781.1 (pyruvate kinase family protein), TEA003227.1 (L-aspartase-like family protein), TEA001883.1 (phosphoribosylaminoimidazole carboxylase, putative/AIR carboxylase) and TEA007843.1 (aldehyde dehydrogenase 2C4) may play a role in the biosynthesis of theacrine. Our study sheds light on the key genes involved in theacrine biosynthesis. This knowledge can then be used to improve theacrine production in tea plants through targeted breeding approaches, leading to improved agricultural and pharmaceutical applications of this valuable compound.

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Poster Presentation ID: 79

### Exploring the habitat suitability condition for *Carum copticum* farming in Iran

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#### ARTICLE INFO

Keywords:

*Carum copticum*  
Medicinal plants  
Important crops

#### ABSTRACT

The distribution and habitat suitability of plant species are greatly influenced by climatic variables. Understanding these factors and their proportional contribution is valuable as it enables us to identify new habitats and farms for the cultivation and transfer of plant species, leading to increased production of important crops. Species distribution modeling (SDM,s) play a crucial role in predicting and comprehending the range of plant communities [1]. Among these them, the MaxEnt model has gained substantial popularity and is extensively utilized to assess the ecological needs, environmental responses, and habitat suitability of species. *Carum copticum* L., commonly known as "Ajwain," is cultivated in many regions of the world. Traditionally, *C. copticum* has been used in the past for various therapeutic effects, including bloating, fatigue, diarrhea, abdominal tumors, abdominal pain, respiratory distress, and loss of appetite [2]. Understanding the key influencing factors in the spread of this species is essential for identifying suitable areas to establish new farms and expand their cultivation. So, the current study aimed to identify the effective climatic factors that significantly impact the distribution of *C. copticum* in Iran, utilizing the MaxEnt model. The study findings revealed that the distribution of Ajwain is influenced by several key factors, namely bio17 = precipitation of driest quarter, bio9 = mean temperature of driest quarter, bio15 = precipitation seasonality (Coefficient of Variation), bio7= Temperature Annual Range, bio = 1 Annual Mean temperature, and bio13 = Precipitation of the wettest month. The research indicated that Ajwain thrives in areas with bio17 less than 5 mm, bio9 between 15-32 °C, a bio15 range between 60-90mm, bio7 range between 35-42 °C, bio exceeding 25 °C and bio13 more than 100mm. By considering these factors, suitable areas for *C. copticum* cultivation can be identified, helping establish new farms and expand the cultivation of this valuable medicinal plant in Iran.

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Poster Presentation ID: 80

### Co-expression Network Analysis Reveals Biomarker Potential for Theacrine Biosynthesis in Kucha Tea

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#### ARTICLE INFO

Keywords:

Hub genes

Theacrine content

Transcriptome

#### ABSTRACT

Theacrine, an active compound naturally present in Kucha tea, has received considerable attention for its potential health benefits and physiological effects [1]. This study aimed to investigate theacrine biosynthesis in Kucha tea by analyzing the RPKM data of the transcriptomes of four different varieties with contrasting levels of theacrine. The data, obtained from the SRA database, included three biological replicates for each variety. Ten feature selection algorithms were used to identify unique genes associated with high and low levels of theacrine. Eight of these algorithms collectively identified 331 genes as significant differentiators. Co-expression network analysis was used to understand the functional relationships and regulatory dynamics between these genes. Co-expression networks were constructed for 331 genes using available resources in the TPAI database (<http://tpia.teaplant.org>). In addition, the Maximal Clique Centrality (MCC) algorithm in the Cytohubba plugin in Cytoscape was used to identify hub genes, including TEA028019.1 (phloem protein 2-A1), TEA022559.1 (S-adenosyl-L-methionine-dependent methyltransferases superfamily protein), TEA021465.1 (cytochrome P450, family 71, subfamily A, polypeptide 26), TEA023845.1 (ankyrin repeat family protein) and TEA010234.1 (putative clathrin assembly protein). These hub genes have the potential to serve as biomarkers for theacrine content. By incorporating co-expression network analysis, this research provides insights into the complex interactions and regulatory mechanisms underlying theacrine biosynthesis. It provides a systems-level perspective that goes beyond individual genes, enabling a better understanding of the coordinated activities and functional modules involved in theacrine production. This information can guide further investigations and facilitate the development of targeted strategies to increase theacrine levels in Kucha tea.

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Poster Presentation ID: 82

### Total Phenolic Content of Hydro-alcoholic Extract of *Medicago sativa*

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#### ARTICLE INFO

Keywords:

*Medicago sativa*

Total Phenolic Content;

Gallic acid.

#### ABSTRACT

From ancient times, many herbal medicines have been used to treat and control various diseases. Alfalfa with scientific name of *Medicago sativa* is a plant native to temperate regions comprises about 83 varieties.(1) This plant is a source of many valuable secondary metabolites. The plant is rich in alkaloids, flavonoids, estrogens, and isoflavonoids. In traditional medicine, *Medicago sativa* herb is used to improve memory, treat kidney pain, cough and muscle pain, as rejuvenating, anti-diabetic, antioxidant, anti-inflammatory, anti-fungal, antiasthmatic, anti-microbial, diuretic, lactatin.(2). *Medicago sativa* was extracted by maceration in 70% ethanol solvent for 72 h at room temperature. After vaporization, the total phenolic content (TPC) of the extract in different concentration (250, 500, 1000 ppm) was determined by (FCR) method and its amount was expressed as mg of gallic acid per gram of dry extract (GAE/g extract). The absorbance of the samples was measured at 765 nm wavelength.(3), the maximum amount of phenolic content in alfalfa extract was obtained for 1000 ppm. The highest TPC was  $37.58 \pm 3.10$ . GAE/g extract. The results show a concentration depending for the TPC of the plant extract. The results of this study show an acceptable TPC for *Medicago sativa*, Due to the liner correlation of antioxidant activity to TPC, *Medicago sativa* may be considered as a potent antioxidant agent to prevent oxidative stress.

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Poster Presentation ID: 83

### The effect of aromatherapy with Jasmine (*Jasminum*) and Clary Sage (*Salvia officinalis*) on sexual dysfunction in women of reproductive age

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#### ARTICLE INFO

Keywords:

Aromatherapy

Sexual dysfunction

*Jasminum*

*Salvia officinalis*

Sweet almond

#### ABSTRACT

Sexual dysfunction affects various aspects of life [1]. Aromatherapy is easier and less risky than other methods of taking herbal medicines [2]. This study aims to compare the effect of aromatherapy with *Jasminum* and *Salvia officinalis* on sexual dysfunction in women of reproductive age. This triple-blind randomized clinical trial study was conducted on 168 women of reproductive age using systematic sampling. Individuals with an FSFI score of less than 28 were randomly assigned to 4 groups of *Jasminum*, *Salvia officinalis*, sweet almond (placebo) and control. The aromatherapy groups used the relevant aroma twice a day on the back of the lips for 6 weeks, the control group received no intervention. After the completion of the intervention, the FSFI questionnaire was filled in once again by the all participants. The median (Iqr) score of sexual function before the intervention in *Jasminum*, *Salvia officinalis*, sweet almond, and control groups was 25.50 (21.27-82.25), 25.80 (20.27-57.50), 25.00 (23.27-10.10), and 25.90 (23.26-92.42), respectively. After the intervention, the score was 28.30 (25.30-60.45), 28.45 (25.31-90.12), 29.00 (27.30-10.80), and 25.35 (23.26-27.32) in the abovementioned groups, respectively. The comparison of the median score of sexual function in the four groups after the intervention, showed a statistically significant difference between *Jasminum*, *Salvia officinalis*, and sweet almond groups with the control group ( $p < 0.001$ ). Both aromas, i.e. *Jasminum* and *Salvia officinalis*, were effective in improving sexual dysfunction in women of reproductive age. The effect of *Salvia officinalis* was better than *Jasminum* in the domains of mental arousal, lubrication, and sexual pain.

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### Investigation of salinity stress on some physicochemical characteristics and secondary metabolites of brown algae *Sargassum boviaenum* in Bushehr coasts

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#### ARTICLE INFO

##### Keywords:

*Sargassum boviaenum*  
Secondary metabolite  
Macroalgae  
Food-drug compounds  
Terpenoid

#### ABSTRACT

Seaweeds have gained great importance in various fields of food, medicine and cosmetics due to their unique functional and food-pharmaceutical properties and fatty acid content. *Sargassum boviaenum* macroalgae, which is a brown algae with considerable abundance in the shores of Bushehr, and according to sources, are rich in amazing bioactive and neurocytic compounds. One of the objectives of this study was to investigate salinity stress on some physicochemical characteristics and secondary metabolites of brown algae *Sargassum boviaenum* obtained from Bushehr beaches in two control and treatment groups (one gram per liter). Chemical compounds were identified and quantified by GC-MS (Kishimoto et al., 2005). Mass spectrometry results of 17 and 49 types of chemical compounds with different functional groups and structures such as alkaloids, steroids, amino acids, fatty acid esters, alcohols, dioxalan, terpenoids, alcohol and furan and other simple organic groups such as alkane and alkene, aldehyde and lactam in the control groups and the treatment (one gram per liter) of this macroalgae was identified. Changes in salinity stress showed a significant quantitative and qualitative effect on the type and amount of chemical compounds in this algae in the treatment group (one gram per liter) compared to the control group. Fatty acid ester and terpenoids had the highest abundance in the control and treatment groups, respectively (one gram per liter). Considering the richness of this marine organism in terms of bioactive and nutritional compounds, it can be proposed as a potential functional food and a complete food-medicine package (Hwang et al., 2010).

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Poster Presentation ID: 85

### Application of different doses of eucalyptus extract on saffron corm mite

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Eucalyptus Pesticides Saffron Tick</p>	<p>Medicinal plant extracts are widely used in plant pest control. The mite <i>Rhizoglyphus robini</i> attacks the saffron corm and causes the transmission of pathogens, especially fungi and rot-producing bacteria. The spread of this mite by infected corms during planting is from infected areas to other areas. Disinfection of seeds is one of the important principles in sustainable agriculture, which limits the damage of some pests, including the damage of this mite, with the least cost and least pollution in the environment. In order to investigate the effectiveness of this extract on Corm mite, a statistical test was conducted with different doses (without consumption, one per thousand, two per thousand, three per thousand and four per thousand) in four repetitions and in laboratory conditions. Each replicate contained 10 ticks. The results showed that the death rate of the pest at a dose of one in a thousand was able to control these mites well. According to these results, it can be said that the mite can be controlled in the saffron corm with the lowest amount of eucalyptus extract.</p>

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Poster Presentation ID: 86

### Quantitative Analysis of Gold Nanoparticle Synthesis Using Natural Plant Extract

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#### ARTICLE INFO

##### Keywords:

Biosynthesis  
Gold Nanoparticles  
Green catalyst  
Catalysis Reduction

#### ABSTRACT

The green synthesis of gold nanoparticles (AuNPs) using plant extracts has garnered significant attention due to its eco-friendly approach and the potential applications of the resulting nanoparticles. The findings from this study align with previous research highlighting the role of phytochemicals in mediating the reduction of metal salts and the subsequent formation of stable AuNPs [1]. The average sizes of the synthesized AuNPs, ranging from 10 to 50 nanometers, are within the desired range for various applications such as catalysis and drug delivery [2]. The use of UV-Vis spectroscopy to monitor the synthesis process is a well-established technique, with the characteristic absorbance peak around 520 nm confirming the presence of AuNPs [3]. Additionally, the FTIR analysis provides valuable insights into the interactions between biomolecules from the plant extracts and the AuNPs, elucidating the mechanism of capping and stabilization. The biocompatibility assessments indicating low cytotoxicity and high stability of the AuNPs in biological environments are crucial for their potential biomedical applications. These results are promising and support the idea of using green-synthesized AuNPs as non-toxic alternatives in drug delivery systems, imaging techniques, and therapeutic interventions in the medical field. In conclusion, the comprehensive quantitative analysis presented in this study underscores the viability and efficacy of utilizing natural plant extracts for the green synthesis of AuNPs. The multifaceted applications of these AuNPs in catalysis, biomedicine, and environmental science highlight the broad impact and versatility of this eco-friendly approach, opening up new avenues for research and innovation in nanotechnology .

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### Phytochemical, pharmacological, and In-silico molecular docking studies of *Salvia sahendica*

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#### ARTICLE INFO

Keywords:

*Salvia sahendica*

Phytochemistry

Biological activities

Molecular Docking

#### ABSTRACT

*Salvia sahendica* is a native and perennial plant of the mint family that grows widely in the northwest of Iran. This study, aims to provide an updated survey of the available information on the phytochemistry, pharmacology, and in silico studies of *Salvia sahendica*. Literature spanning from 1990 to 2023, sourced from scientific journals, books, and electronic databases such as Google Scholar, Web of Science, and Pubmed, was comprehensively reviewed. Phytochemical investigations have identified 29 compounds within *S. sahendica*, including diterpenoids, sesterterpenoids, and flavonoids (1). Both crude extracts and isolated compounds from *S. sahendica* exhibit diverse pharmacological activities, encompassing anticancer, antioxidant, antimicrobial, antihepatitis, and antiprotozoal effects (2). Molecular docking investigations further revealed that among all compounds, hispidulin (-5.461) and loliolide (-5.324) exhibited the most favorable docking scores, suggesting a strong affinity with Src kinase and indicating their potential as Src kinase inhibitors (3). Furthermore, druglikeness properties of all compounds revealed that, none exhibited more than five hydrogen donors, and all demonstrated fewer than ten hydrogen acceptors. Maslinic acid was the only compound with a molecular weight exceeding 500, while five compounds displayed a Log P value greater than 5. Future research efforts should focus on investigating the anticancer potential of hispidulin and loliolide through comprehensive cell-based and cell-free assays against various cancer cell lines.





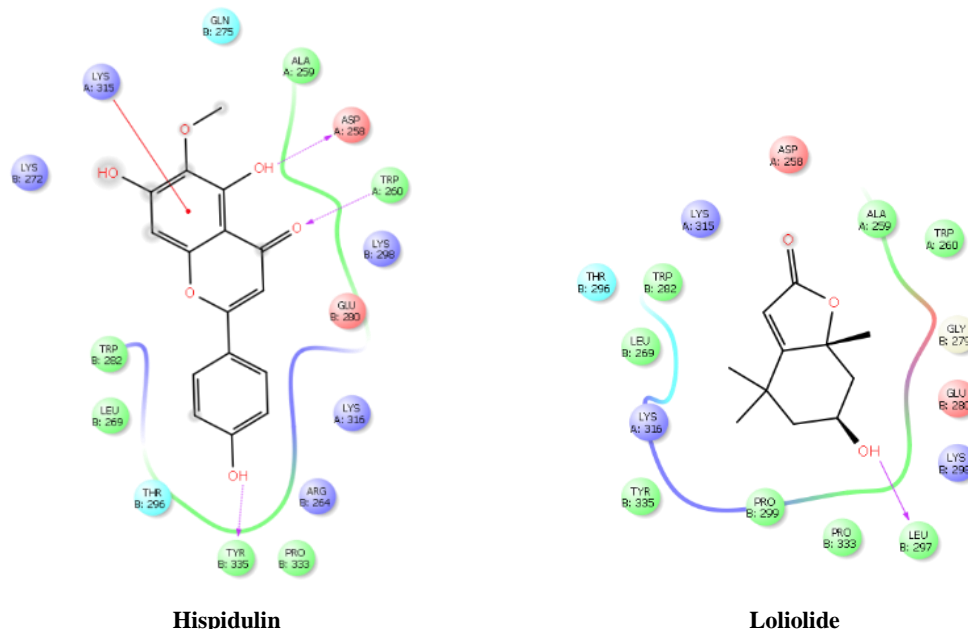
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**Fig. 1.** Docking model structure of Hispidulin (a) and Loliolide (b) into the Src tyrosine kinase protein binding pocket

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### Diabetic Wound Healing by Novel Spirulina-Based Dressing Enriched with Selected Plant Extracts (*Camellia sinensis*, *Cydonia oblonga*, *Artemisia aucheri*)

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#### ARTICLE INFO

Keywords:

*Cydonia oblonga*  
*Camellia sinensis*  
*Artemisia aucheri*  
Diabetic wounds  
Spirulina

#### ABSTRACT

Diabetic wounds are considered to be one of the causes of limb amputation. The use of biomaterials may be beneficial. In this study, a dressing based on Spirulina microalgae loaded with plant extracts of *Camellia sinensis* [1], *Cydonia oblonga* [2] and *Artemisia aucheri* [3] was developed and evaluated. The plant extracts were processed using the Soxhlet method. The processed plant extracts were loaded in the Spirulina microalgae using the mechanical dispersion method and brought into a stable suspension by ultrasonic waves. The final product was then dried by freeze-drying. The finished powder was tested for cell toxicity using normal HFF cells. The resulting powder was formulated into dressings that were applied to the wound. The effectiveness of the dressing on diabetic wounds was tested on mice over a period of 14 days. Angiogenesis, collagen thickness and epidermal tissue thickness were evaluated at day 14 by immunohistochemical staining, Masson's trichrome and hematoxylin-eosin staining. The results of the cell toxicity assessment show that the finished powder is not toxic to normal HFF cells (IC<sub>50</sub> values of 18.11 and 0.78 for three and seven days treatment, respectively). The results showed that the wound healing rate reached about 74% on the 14th day. The results of the staining revealed percentages of 28%, 34% and 72% for the angiogenesis, collagen thickness, and epidermal tissue thickness, respectively. Therefore, the studies conducted show that the efficacy of the dressing containing a combination of Spirulina microalgae with the aforementioned plant extracts is suitable for the diabetic wound healing process.

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Poster Presentation ID: 90

### The Effects of *Trigonella foenum-graecum* on Post-surgical Adhesion Band Formation

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#### ARTICLE INFO

Keywords:

*Trigonella foenum  
graecum* L.

Fenugreek

Intra-abdominal  
adhesion

Inflammation

Fibrosis

#### ABSTRACT

Intra-abdominal adhesions are severe complications which occur after abdominal surgery (1). Currently, no specific anti-adhesive medications can completely prevent Intra-abdominal adhesion formation. Therefore, recent studies are exploring new approaches for preventing this complication. Anti-inflammatory properties of *Trigonella foenum-graecum* L. (Fenugreek) have been reported in various studies (2-4). In this experiment, a murine model was used to evaluate the potential anti-adhesive activity of Fenugreek *in vivo*. This experiment aimed to examine the anti-adhesive activity of Fenugreek in the prevention of postsurgical Intra-abdominal adhesions. We have adhered to the ARRIVE guidelines during these experimental studies. After abdominal surgery, for nine days, Fenugreek (400 mg/kg) was given by gavage to male Wistar rats (n = 6). Following that, all animals were sacrificed to assess the anti-inflammatory and anti-fibrotic effects of Fenugreek using Hematoxylin & eosin staining and Masson's trichrome staining. Our results showed that Fenugreek hydro-alcoholic extract could significantly reduce the adhesion band formation based on Nair and Leach Scoring system (P < 0.01) (5, 6). The histological assessment also represented less inflammatory cell infiltration and less collagen deposition in the treatment group than in the positive control group (P < 0.01). This study showed that Fenugreek extract could attenuate post-surgical adhesion band formation by inhibiting pathological responses (Inflammation and fibrosis) following surgery.

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Poster Presentation ID: 92

### Phytochemical characteristics and biological activities of *Sambucus ebulus* L. (Adoxaceae) at different phenological stages

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#### ARTICLE INFO

##### Keywords:

Phenological stage  
Polyphenols  
Chlorogenic acid  
Antioxidant activity  
Antibacterial activity

#### ABSTRACT

The genus *Sambucus* from the Adoxaceae family includes 20 species that grow in different regions of the world, including Europe, North Africa, West Asia, to the north of Iran and Turkmenistan. This plant contains valuable compounds such as anthocyanins, flavonols, and phenolic compounds, which have antioxidant and antimicrobial properties and have been found to be effective in the treatment of various cardiovascular diseases, asthma, and various infections [1]. Since the growth stages of plants are not reversible, the biochemical changes during different growth periods are different. In the present study, variability in the phytochemical compounds and biological activity of the plant collected at different phenological stages (vegetative, floral budding, full flowering, and fruiting set) between the months of May and September in 2021. The samples were collected consistently from a fixed area in Guilan province. The plant materials were then dried in the shade at ambient temperature. Based on the obtained results, the highest total phenol (12.3 mg g<sup>-1</sup> DW), total flavonoid (8.3 mg g<sup>-1</sup> DW), chlorogenic acid (4.55 mg g<sup>-1</sup> DW), and rutin (0.331 mg g<sup>-1</sup> DW) content were measured at the vegetative stage. The highest inhibition of DPPH free radical (80.3 μg m<sup>-1</sup>), antioxidant property by FRAP method (870 μM), and antibacterial activity against Gram-positive bacteria (MIC = 2 mg m<sup>-1</sup>) and Gram-negative bacteria (16 mg ml<sup>-1</sup>) was also observed at the vegetative stage. Based on these findings, it can be concluded that the plant should be collected at the vegetative stage to obtain the highest phytochemical compounds and biological activity.

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Poster Presentation ID: 93

### Variations in phenolics, flavonoids, anthocyanins, and biological activity of Iranian populations of *Sambucus ebulus* L. (Adoxaceae)

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#### ARTICLE INFO

##### Keywords:

Antioxidant activity  
Biological activity  
Diversity  
Elderberry  
Polyphenols

#### ABSTRACT

In the present study, twenty-one *Sambucus. ebulus* L. populations (SEP1-SEP21) from family Adoxaceae growing in the north of Iran were explored based on total phenol (TPC), total flavonoid (TFC), total anthocyanin (TAC), chlorogenic acid, rutin, and catechin contents, antioxidant, and antibacterial activity to introduce adequate populations for further use in pharmaceutical and food industry. A significant difference ( $p < 0.05$ ) among the studied populations in terms of TPC, TFC, and TAC was observed. The highest and lowest TPC measured in the aerial parts of the studied populations belonged to SEP19 ( $17.56 \pm 0.32$  mg GAE  $g^{-1}$  DW) and SEP2 ( $3.54 \pm 0.05$  mg GAE  $g^{-1}$  DW), respectively. In fruits, the highest TPC was in SEP19 ( $2.8 \pm 0.02$  mg GAE  $g^{-1}$  DW). The aerial parts and fruits contained  $1.2 \pm 0.02$  -  $25.71 \pm 0.28$  mg RUE  $g^{-1}$  DW and  $1.7 \pm 0.5$  to  $3.98 \pm 0.5$  mg RUE  $g^{-1}$  DW total flavonoid. The range of anthocyanin (mg  $g^{-1}$  DW) was from ranging from  $1.99 \pm 0.06$  in SEP<sub>11</sub> to  $7.02 \pm 0.40$  in SEP<sub>21</sub>. The highest chlorogenic acid content was found in the aerial parts of SEP19 ( $12.07 \pm 0.04$  mg  $g^{-1}$  DW). The highest DPPH free radical inhibition of the aerial parts was related to SEP19 ( $20.25 \pm 0.3$   $\mu g$   $m$   $L^{-1}$ ). Aerial parts of SEP19, SEP15, and SEP16 showed the highest MIC (1 mg  $L^{-1}$ ) against Gram-positive bacteria. In conclusion, SEP19 (Kajan) and SEP21 (Asiabar) could be selected as adequate populations for further use in food, pharmaceutical, cosmetic, and industries.

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Poster Presentation ID: 94

### Chemical constituents of the essential oils of *Dracocephalum* species from Iran

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> <i>Dracocephalum moldavica</i> L. <i>Dracocephalum kotschy</i> Boiss. Chemical components</p>	<p>The genus <i>Dracocephalum</i> (Lamiaceae), currently consists of 45 species of flowering plants and there is 8 species of annual and perennial fragrant herb in Iran, from which three are endemic to Iran [1]. <i>D. moldavica</i> known as Moldavian balm or Moldavian dragonhead is an annual herb and it is native to central Asia and is naturalized in eastern and central Europe. <i>D. kotschy</i> is an herbaceous plant endemic in Iran and known as Badrandjboie-Dennaie and Zarrin-Giah [2,3]. The aim of this study was to identify of the chemical components of <i>D. kotschy</i> and <i>D. moldavica</i> from Iran. The composition of essential oils from two <i>Dracocephalum</i> species <i>D. kotschy</i> and <i>D. moldavica</i> collected from Isfahan province. The essential oil was extracted by a Clevenger approach and analyzed using GC/MS. In total, 30 and 26 compounds were identified in the essential oil from the aerial parts <i>D. kotschy</i> and <i>D. moldavica</i>, respectively. The results obtained in our study indicated that the major components in the oil <i>D. kotschy</i> were limonene (21.29%), carvacrol (13.87%), <math>\gamma</math>-terpinene (11.78%), <math>\alpha</math>-pinene (11.07%), 2-methyl-1-octen-3-yne (8.79%) and camphene (3.28%). The major constituents of the oil <i>D. moldavica</i> were geranyl acetate (35.76%), geraniol (23.91%), neral (15.41%) and geranial (10.27%). <i>D. kotschy</i> is one of the important sources of limonene and <i>D. moldavica</i> is one of the important sources of geranyl acetate.</p>

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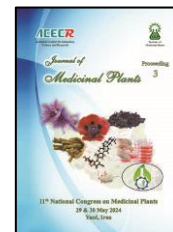
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Poster Presentation ID: 95

### Chemical composition of the essential oils of *Marrubium vulgare* L. and *Stachys lavandulifolia* Vahl.

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> <i>Stachys lavandulifolia</i> <i>Marrubium vulgare</i> Essential oil</p>	<p><i>Stachys lavandulifolia</i> Vahl. and <i>Marrubium vulgare</i> L. are perennial shrub and aromatic plant belongs to Lamiaceae family. It is a major constituent of many species of the genus <i>Marrubium</i> and includes about 97 species found along the Mediterranean, Asia, America, Australia and also in temperate regions. Which nine of them are endemic to Iran [1]. The genus <i>Stachys</i> consists of about 300 species, and is justifiably considered as one of the largest genera of Lamiaceae that widespread throughout the world. In Iran, 34 species of this genus are present, among which, 13 are endemic. <i>S. lavandulifolia</i> is a native plant, which is known as Chay-e-kohi in Persian and Betony in English [2]. The aim of this study was to identify of the chemical components of <i>S. lavandulifolia</i> and <i>S. spinosa</i> in Isfahan climatic conditions. The essential oil was extracted by a Clevenger approach and analyzed using GC/MS. In total, 16 and 43 compounds were identified in the essential oil from the aerial parts <i>S. lavandulifolia</i> and <i>M. vulgare</i>, respectively. The results obtained in our study indicated that the major components in the oil <i>S. lavandulifolia</i> were <math>\alpha</math>-pinene (48.85%), <math>\beta</math>-pinene (21.74%), <math>\beta</math>-phellandrene (10.35%), <math>\alpha</math>-copaene (5.48%) and <math>\beta</math>-myrcene (2.52%). The major components in the oil <i>M. vulgare</i> were <math>\beta</math>-caryophyllene (31.68%), (E)-<math>\beta</math>-farnesene (10.65%), 1,8-cineole (7.62%) and <math>\alpha</math>-pinene (5.41%).</p>

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Poster Presentation ID: 96

### Chemical composition of the essential oil from four species of *Mentha* in Iran

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> <i>Mentha longifolia</i> L. <i>Mentha spicata</i> L. <i>Mentha pipertia</i> L. <i>Mentha canadensis</i></p>	<p>The genus <i>Mentha</i>, which belongs to the mint family (Lamiaceae), subfamily Nepetoideae is one of genus of aromatic and medicinal perennial herbs [1]. <i>Mentha</i> genus is composed of 19 geographically widespread species and 13 hybrids. This plant is one of the most important medicinal and aromatic plants used in pharmaceutical and food industrials in the world [2,3]. The aerial parts of <i>Mentha longifolia</i> L., <i>M. spicata</i> L., <i>M. pipertia</i> L. and <i>M. canadensis</i> were collected from Isfahan province in center Iran, during 2020. The essential oil was extracted by a Clevenger approach and analyzed using GC/MS. In total, 31, 34, 23 and 29 compounds were identified of <i>M. longifolia</i>, <i>M. spicata</i>, <i>M. pipertia</i> and <i>M. canadensis</i>, respectively. The major constituents of the oil <i>M. longifolia</i> were; 1,8-cineole (32.26%), pulegone (24.65%), sabinene (5.42%). The major constituents of the oil <i>M. spicata</i> were; carvone (42.38%), 1,8-cineole (24.45%) and pulegone (10.74%). The major constituents of the oil <i>M. pipertia</i> were; menthol (41.42%), menthone (15.25%), menthofuran (10.85%), 1,8-cineole (8.38%) and the major constituents of the oil <i>M. canadensis</i> were; menthol (37.65%), menthone (26.38%) and menthofuran (6.71%).</p>

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### Chemical composition of the essential oils of *Salvia* species from Iran

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> <i>Salvia officinalis</i> L. <i>Salvia virgata</i> Jacq. <i>Salvia spinosa</i> L. Chemical constituents</p>	<p>The genus <i>Salvia</i> the largest genus (Lamiaceae: subfamily Nepetoideae, tribe Menthaeae) represents a cosmopolitan assemblage of nearly 1000 species worldwide, there are 58 <i>Salvia</i> species growing naturally in Iran, 17 species endemic. <i>Salvia officinalis</i> L., <i>S. virgata</i> Jacq. and <i>S. spinosa</i> L. are perennial shrub and aromatic plant belongs to Lamiaceae family. <i>S. virgata</i> and <i>S. spinosa</i> are perennial plant growing wild in the Iran area [1]. Several species of <i>Salvia</i> are cultivated for their aromatic characteristics and are used as flavorings, food condiments, cosmetics and perfume additives. Additionally, <i>Salvia</i> species have commonly been widely used as folk medicines as antibacterial, antiviral, antitumor, spasmolytic, antioxidant and anti-inflammatory treatments and have further been used in the treatment of mental, nervous and gastrointestinal conditions [2,3]. The aerial parts of <i>S. officinalis</i>, <i>S. virgata</i> and <i>S. spinosa</i> were collected from Isfahan province in center Iran, during 2020. The essential oil was extracted by a Clevenger approach and analyzed using GC/MS. In total, 32, 34 and 23 compounds were identified of <i>S. officinalis</i>, <i>S. virgata</i> and <i>S. spinosa</i>, respectively. The major constituents of the oil <i>S. officinalis</i> were; <math>\alpha</math>-thujone (29.43%), camphore (13.51%), <math>\beta</math>-thujone (10.34%), 1,8-cineole (7.29%), <math>\alpha</math>-pinene (6.13%) and <math>\beta</math>-pinene (2.67%). The major constituents of the oil <i>S. virgata</i> were; <math>\beta</math>-caryophyllene (32.27%), caryophyllene oxide (24.39%), <math>\alpha</math>-terpinene (5.67%), 1,8-cineole (3.58%) and terpinene-4-ol (3.21%). The major components in the oil <i>S. spinosa</i> were <math>\alpha</math>-terpinolene (30.46%), <math>\beta</math>-ocimene (29.64%), <math>\beta</math>-patchoulene (11.41%), <math>\beta</math>-bourbonene (5.32%) and 1,8-cineol (3.48%).</p>

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### Chemical composition of the essential oils of four species of *Thymus* in Iran

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> <i>Thymus vulgaris</i> <i>Thymus daenensis</i> <i>Thymus kotschyanus</i> <i>Thymus caramanicus</i></p>	<p>The genus <i>Thymus</i> from the Lamiaceae family has more than 300 species distributed worldwide. 18 <i>Thymus</i> species have been identified in Iran's flora, of which 4 are endemic to Iran. <i>Thymus</i> species are known as medicinal plants due to their biological and medicinal properties. Thyme has many biological activities, including antimicrobial, antioxidant and anti-inflammatory effects. Therefore, <i>Thymus</i> species interest many pharmaceutical, food and cosmetic industries [1,2,3]. The aim of this study was to identify of the chemical components of four species of <i>Thymus</i> cultivated from Iran. The aerial parts of <i>Thymus vulgaris</i>, <i>T. daenensis</i>, <i>T. kotschyanus</i> and <i>T. caramanicus</i> were cultivated from Shahrekord (Chaharmahal va Bakhtiari Province) in Iran. The essential oil was extracted by a Clevenger approach and analyzed using GC/MS. In total, 32, 34, 30 and 28 compounds were identified of <i>T. vulgaris</i>, <i>T. daenensis</i>, <i>T. kotschyanus</i> and <i>T. serpyllum</i>, respectively. The major constituents of the oil <i>T. vulgaris</i> were; thymol (62.28%), <i>p</i>-cymene (10.41%), <math>\gamma</math>-terpinene (7.36%) and carvacrol (4.17%). The major constituents of the oil <i>T. daenensis</i> were; thymol (72.32%), <math>\gamma</math>-terpinene (7.81%), <i>p</i>-cymene (4.26%), and carvacrol (3.41%). The major constituents of the oil <i>T. kotschyanus</i> were; thymol (38.32%), <math>\gamma</math>-terpinene (11.81%), carvacrol (8.41%) and the major constituents of the oil <i>T. caramanicus</i> were; carvacrol (61.26%), thymol (16.35%) and <i>p</i>-cymene (8.74%). Differences observed may be due to the different environmental and genetic factors, different chemotypes and the nutritional status of the plants or any other factors that can influence the oil composition.</p>

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Poster Presentation ID: 99

### The chemical composition of essential oils from three *Satureja* species in Iran

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> <i>Satureja hortensis</i> <i>Satureja bachtiarica</i> <i>Satureja khuzestanica</i> Chemical constituents</p>	<p>The genus <i>Satureja</i> belonging to the mint family (Lamiaceae), subfamily Nepetoideae, tribe Menthae, consists of more than 200 species of herbaceous perennials worldwide [1]. The genus of <i>Satureja</i> with the Persian name of "Marze" consists of fourteen species has been reported in Flora Iranica, nine of them are endemic, two of which, <i>S. bachtiarica</i> Bunge is distributed in Chaharmahal va Bakhtiari province, Southwest Iran and <i>S. khuzestanica</i> Jamzad is distributed in Khuzestan and Lorestan province, Southern and Western Iran [2]. The composition of essential oils from three <i>Satureja</i> species <i>S. bachtiarica</i> Bunge., <i>S. khuzestanica</i> Jamzad. and <i>S. hortensis</i> L. cultivated from Estahban (Fars province) in South Iran were determined. The essential oils of samples were obtained by hydro-distillation, and analyzed using gas chromatography–mass spectrometry (GC–MS). In total, 25, 27 and 23 compounds were identified in the essential oil from the aerial parts <i>S. khuzistanica</i>, <i>S. bachtiarica</i> and <i>S. hortensis</i> respectively. The yellow essential oils yield of studied from the aerial parts <i>S. khuzistanica</i> and <i>S. bachtiarica</i> ranged, 1.36%, 1.78% and 2.09% (v/w) were identified, respectively. The results obtained in our study indicated that the major components in the oil <i>S. khuzestanica</i> were carvacrol (85.26%), p-cymene (3.48%), the major components in the oil <i>S. bachtiarica</i> were carvacrol (38.46%), p-cymene (15.65%), thymol (11.34%), <math>\gamma</math>-terpinene (10.64%) and the major components in the oil <i>S. hortensis</i> were carvacrol (51.29%) and <math>\gamma</math>-terpinene (22.61%).</p>

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Poster Presentation ID: 100

### Exploring the Relationships Between Fatty Acid Synthesis, Yield, and physiological attributes in Sesame (*Sesamum indicum* L.) Under Drought Stress

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#### ARTICLE INFO

##### Keywords:

Oleic acid  
Palmitic acid  
Seed oil content  
Water stress

#### ABSTRACT

Understanding the links between yield, physiological parameters, and fatty acid content in sesame plants aids variety development and enhances comprehension of plant physiology under stress. In this context, a study was conducted to investigate the relationships between fatty acid synthesis and seed yield, seed oil content, and leaf chlorophyll content in sesame under varying levels of drought stress (full irrigation, irrigation cutoff at BBCH70 and BBCH60 corresponding to moderate and severe stress, respectively) using a randomized complete block design with three replications during 2020 at the Semnan Province, Iran. The results indicated that with increasing intensity of drought stress, seed yield, oil content, and chlorophyll content decreased by 45.25%, 20.89%, and 24.7%, respectively, compared to the control. Drought stress resulted in a decrease in total unsaturated fatty acids (USFA: oleic, linoleic, and linolenic acids) and, conversely, an increase in total saturated fatty acids (SFA: palmitic, stearic, and arachidic acids) compared to the control. The highest of USFA (76.60%) and SFA (21.68%) were observed under non-stress and moderate stress conditions, respectively. Simple correlation analysis revealed significant positive correlations between the USFA and seed yield, oil content, and chlorophyll content. In contrast, SFA exhibited significant negative correlations. The highest regression coefficients were associated with total chlorophyll content with the SFA and USFA. Overall, the results suggest that the SFA and USFA content under drought stress and their association with yield and physiological parameters vary. Enhancing yield and physiological traits leads to an increase in USFA content and a decrease in the SFA.

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Poster Presentation ID: 102

### Angbin vinegar from prevention to treatment of diseases

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ARTICLE INFO	ABSTRACT
<p><i>Keywords:</i> Traditional medicine Angbin vinegar</p>	<p>The use of traditional medicine is of special importance for the health of the society and the treatment and prevention of diseases. Angbin vinegar is a tasty and full-featured traditional drink that is prepared from two main components: pure honey (hot and wet) and natural vinegar (cold and wet). Angbin vinegar had been used in Iranian traditional medicine and marked properties had been mentioned for it. In old references such as Zakhireye Khwarazmshahi, Makhzan al-Adviyeh and Qarabadin mentioned the importance and effects of angbin vinegar [1,2]. In this research, we used two additional components of mint distillate (hot and dry) and chicory distillate (cold and wet) to this medicinal syrup (angbin vinegar). Our statistical studies showed that traditional medicine doctors used angbin vinegar to improve body health (improve temperament) in their prescriptions for patients. This study demonstrated that angbin vinegar is very effective role in reducing triglycerides, cholesterol and LDL as well as increasing good fat (HDL) in addicted patients to high blood fat, and also has a prominence effect on fatty liver, body rashes, fatigue and sleepiness.</p>

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Poster Presentation ID: 103

### Synthesis and <sup>99m</sup>Tc-radiolabeling of Cellulose nanoparticles from *Pyrus boissieriana* seeds for medical applications

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#### ARTICLE INFO

##### Keywords:

Cellulose nanoparticles  
Acid hydrolysis  
*Pyrus boissieriana*

#### ABSTRACT

Cellulose is one of the most important and abundant natural renewable polymers in the world. Nowadays, cellulose nanoparticles have received considerable attention. These nanoparticles are usually produced through acid hydrolysis of cellulosic compounds. The aim of this study is to synthesize, characterize and investigate the cytotoxicity effects of cellulose nanocrystals from a natural and new source called *Pyrus boissieriana* seeds. Morphological studies of prepared cellulose nanocrystals were investigated using atomic force microscope (AFM) and environmental scanning electron microscope (ESEM). Structural studies were analyzed by Fourier transform infrared spectroscopy (FTIR) and crystallinity and particle size were measured using X-ray diffraction (XRD). In general, the obtained spherical crystals with dimensions of 20-40 nm, high purity and crystallinity (79%) with lignin compounds less than 3% and holocellulose more than 87% from *Pyrus boissieriana* seeds. The MTT assay showed the lack of cellular toxicity of nanoparticles against the A549 cells. The stability of radiolabeled cellulose nanoparticles via Tc-99m confirmed at room temperature for different times. The CNCs have been labeled through the utilization of Tc-99m and have confirmed. Also, the labeling efficiency has been observed to be more than 97%. The results implicated that it is possible to convert a low-cost byproduct like fruit seeds into a valuable material such as cellulose nanoparticles, which are known as promising candidates to be applied for bioimaging or a radio pharmacy.

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Poster Presentation ID: 104

### Seed morphology and germination of various *Cannabis sativa* L. genotypes

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#### ARTICLE INFO

##### Keywords:

Germination  
Seedling vigor  
Viability

#### ABSTRACT

Cannabis, known for its multifaceted utility, finds applications in diverse sectors such as pharmaceuticals, food, cosmetics, and fiber industries. The quality of cannabis seeds holds particular significance in enhancing crop production and facilitating plant breeding operations [1]. The morphology, germination, and viability of six cannabis seed genotypes (A, B, E, G, P1, P2) were examined under controlled standard conditions. The lengths of seedlings were measured with a ruler, and seed viability was assessed on intact embryos using 2,3,5-triphenyltetrazolium chloride (1% w/v). Seed size (both length and width) and color were evaluated through examination under a stereomicroscope and image analysis [2]. Seed morphology analysis revealed significant differences among genotypes. Seeds of genotypes E and G exhibited the greatest width, whereas genotypes A, B, and P2 were significantly smaller ( $p < 0.05$ ). Genotype E displayed the brightest seed coloration. Furthermore, the lengths of both shoot and root for genotypes A, B, and G were significantly greater than those of the other genotypes ( $p < 0.05$ ). Germination results indicated genotype A achieved the highest percentage (90%), whereas genotype E, which notably comprised older seeds due to prolonged storage, exhibited the lowest (2%). Except for genotype E, all genotypes demonstrated 100% viability. These findings underscored variations not only in seed morphology but also in germination indices among different genotypes. Moreover, it is evident that the duration of seed storage significantly influences the germination percentage and viability of seeds.

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Poster Presentation ID: 105

### Comparing the effects of cyanobacteria bio-fertilizer and chemical fertilizer on some morphological traits of *Ocimum basilicum* L.

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#### ARTICLE INFO

Keywords:

Acadian

*Ocimum basilicum*

Phormidium

Salinity stress

#### ABSTRACT

Biofertilizers can provide plants with essential elements and enhance their tolerance to various environmental stresses [1, 2]. This study aims to examine the role of cyanobacteria biofertilizer in reducing the impact of salinity stress on *Ocimum basilicum* L. The research was conducted as a factorial experiment, based on a completely randomized design with four replications in the research greenhouse of Yazd University. The study investigates the impact of different types of fertilizer [NPK fertilizer (control), Acadian, isolated algae (Phormidium), and chemical fertilizer plus Phormidium] and salinity stress (urban water, 3 dS/m, 6 dS/m, and 9 dS/m) on the growth of the plants. At salinity of 9 dS/m, the height of plants increased by 27.25%, 56%, and 29.4% in the presence of Phormidium, Acadian, and mixed fertilizers, respectively, compared to chemical fertilizers. As salinity levels increased, basil inflorescence length and aerial dry weight significantly decreased. The highest value for these traits was observed in control, while the lowest was recorded at 9 dS/m salinity. However, the use of biological fertilizers significantly reduced the negative effects of salinity compared to chemical fertilizers. At a salinity of 9, Phormidium, Acadian, and a combination of chemical and Phormidium fertilizers resulted in a 50%, 90%, and 55% increase in dry weight, respectively, compared to chemical fertilizers. In general, the results showed the positive role of biological fertilizers in reducing the negative effect of salinity on basil growth compared to chemical fertilizers.

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Poster Presentation ID: 106

### Protective effects of 3,4-dihydroxybenzoic acid on testicular torsion and detorsion injury in mice

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#### ARTICLE INFO

##### Keywords:

Torsion/detorsion  
Protocatechuic acid  
Testis  
Mice

#### ABSTRACT

Testicular torsion/detorsion (T/D) is a medical condition that may cause testicular injury, altered hormone production, infertility and subfertility in males. [1] Protocatechuic acid (3,4-dihydroxybenzoic acid) is a phenolic compound found in many fruits, such as plums, grapes and nuts. PCA is present in numerous spices such as star anise (*Illicium verum*), melissa (*Melissa officinalis* L.), rosemary (*Rosmarinus officinalis* L.), and cinnamon (*Cinnamomum aromaticum*). This bioactive compound is known for its many biological properties and pharmacological effects, such as antioxidants, antibacterial, anti-inflammatory, anticancer activities, and more. [2] The aim of this study was to evaluate the protective effects of Protocatechuic acid on testicular torsion/detorsion. 20 healthy male mice were divided into four groups: sham-operated, 720° T/D, 720° T/D + 7.5 mg/kg PCA, and 720° T/D + 30 mg/kg PCA. Following 2 hours of inducing 720° clockwise testicular torsion, sperm parameters and oxidative enzymes were assessed. The findings revealed that T/D resulted in elevated testicular malondialdehyde levels, abnormal sperm morphology and DNA damage, along with reduced Total antioxidant capacity (TAC) compared to the other groups. Moreover, T/D negatively impacted sperm total and progressive motilities, viability, and plasma membrane functionality. Conversely, administering PCA to T/D mice led to decreased tissue malondialdehyde levels, abnormal sperm morphology, and DNA damage, while enhancing sperm total and progressive motility, characteristic motility, viability, PMF, and TAC levels. In conclusion, the study suggests that PCA administration after spermatoc cord torsion in mice offers significant protection against acute testicular T/D injury.

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Poster Presentation ID: 107

### Investigation of caffeine extraction from cocoa beans using microwave technique

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ARTICLE INFO	ABSTRACT
<p><i>Keywords:</i> Caffeine Cocoa Microwave Extraction</p>	<p>Caffeine (trimethylxanthine) is an active alkaloid belonging to the methylxanthine family, commonly found in the seeds, leaves, and fruits of plants like cocoa [1]. Widely recognized as the most consumed psychoactive substance, caffeine sees daily use by approximately 90% of individuals. Notably, caffeine holds significant importance in both the food and pharmaceutical sectors for its versatile applications. Cocoa beans are one of the rich sources of caffeine. In 2020, cocoa production reached approximately 4.27 million tons, and its market is projected to grow at a rate of 7.33% by 2025[2]. The delightful taste of cocoa is attributed to aromatic compounds like caffeine and theobromine [2]. Innovative techniques employing microwave-assisted methods and environmentally friendly solvents are recognized as "Green techniques" for extracting bioactive compounds. The utilization of microwave technology for this purpose is increasing due to its practical advantages [2]. Given caffeine's high solubility in water, extraction typically utilizes water as a solvent, facilitating efficient extraction [3]. This study aimed to assess the impact of varying parameters, including solvent volume (0.09, 0.1, 0.11 liters), microwave power (400, 600, 800 watts), and extraction time (3, 5, 7 minutes), on the extraction of caffeine from 0.5 grams of cocoa bean powder. Results indicated the highest caffeine extraction, equivalent to 0.02 g/L, was achieved with 800 watts of power, a solvent volume of 0.11 liters, and an extraction time of 7 minutes</p>

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Poster Presentation ID: 108

### Formulation and evaluation of physicochemical properties and clinical effects of the standardized hydro-alcoholic extract of *Zataria multiflora* Boiss. in mild to moderate Alzheimer's disease: a randomized double-blind placebo controlled trial

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#### ARTICLE INFO

Keywords:

*Zataria multiflora*  
Alzheimer's disease  
Clinical trial  
Capsule dosage form

#### ABSTRACT

Alzheimer's disease (AD) is the most common cause of dementia in late midlife and old age characterized by progressive memory deficits, cognitive impairment. *Zataria multiflora* Boiss. (ZM) has anti-inflammatory, antioxidant and anti-cholinesterase activity in both in vivo and in vitro studies. The aim of this study was to formulate capsules of the dried hydro alcoholic extract of the plant, its physicochemical examination and clinical evaluation in mild to moderate AD, compared with placebo. Dried leaves of *Z. multiflora*, passed through a sieve then extracted by maceration method with ethanol 80%. 600 mg capsule of *Z. multiflora* was formulated as a capsule to evaluate the clinical efficacy of the drug, and after physicochemical examinations in patients with mild to moderate AD, compared to placebo was evaluated by MMSE and CDR tests (three capsules daily for 2 months). The percentage of ZM extraction was 31.8% w/w. Stability and assay tests on formulated capsules, confirmed the acceptable stability of this formulation in appropriate time and temperature, except for gender ( $p < 0.05$ ), there was no significant difference in demographic characteristics such as age, level of education and career in the intervention and placebo groups ( $p > 0.05$ ) after 8 weeks of intervention, the average of MMSE score in the intervention group at 1 and 2 months of intervention was significantly increased compared with the control group at the same time and CDR score in the intervention group significantly decreased compared to control group at 1 and 2 months of intervention at the same time.

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Poster Presentation ID: 109

### Formulation and evaluation of physicochemical properties of topical gel of standardized extract of rhizome of Jadvar (*Curcuma zedoaria* (Christm.) Roscoe.) with the potential of antinociceptive effect.

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ARTICLE INFO	ABSTRACT
<p><i>Keywords:</i> Gel formulation Topical <i>Curcuma zedoaria</i> Antinociceptive effect</p>	<p><i>Curcuma zedoaria</i> Rosc is a perennial herb found in tropical countries. Classic and traditional medicines have both documented antinociceptive effects from roots and rhizomes. The aim of this study is to produce a gel containing a standardized extract of <i>Curcuma zedoaria</i> rhizome with analgesic potential. Carbomer, carboxymethylcellulose and carboxypropyl methylcellulose along with PEG 400 and benzyl alcohol and extract (5% (w/ v)) were used to make the gel. and apparent evaluation and finger testing, centrifugal test, pH, temperature stability, thermal test, dispersibility and drug release in the laboratory with Franz's cell was used. In this study, 14 antinociceptive gel formulations were prepared. After performing apparent assessments, finger testing and reviewing the consistency of the formulations, the formulations F2, F3, F5 and F14 were selected to continue the experiments. The results of the centrifugal test showed that all four formulations have good stability. Temperature stability at high and low temperatures and the results of thermal testing and distributability showed that F2 and F1 formulations are stable at refrigerator and room temperature. The F2 and F14 formulations were shown to be more stable in stability tests. After 24 hours, almost 90% of the extract from ethanolic solution and 31.8 percent and 38.5 percent of the extract from formulations F14 and F2 were released. Conclusion: In this study, the F2 formulation was recognized as the best. This gel's preliminary formulation allows for the development of a suitable formulation for clinical trials.</p>

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Poster Presentation ID: 111

### Relationship between Soil Characteristics and Essential oil Components of *Mentha longifolia*

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#### ARTICLE INFO

##### Keywords:

Essential oil  
Lorestan province  
*Mentha longifolia*  
Soil properties

#### ABSTRACT

*Mentha longifolia* essential oil is used as a food preservative and to treat many diseases, including digestive and respiratory disorders, infectious diseases and inflammatory diseases [1, 2]. Photochemistry of plants is strongly influenced by several factors such as ecological characteristics [3]. Environmental factors will cause changes in the growth of medicinal plants and the quantity and quality of their essential oil. In this research, *Mentha longifolia* was collected from three regions of Lorestan (Khorramabad, Aleshtar, Delfan), and to essential oil analysis along with analysis of soil characteristics was performed. Correlation results between main components of essential oil and soil characteristics showed percentage of soil phosphorus has a positive and significant correlation with 1-8, cineole. A significant and positive correlation was observed between TNV (Cao) percentage and Piperitenone, Piperitenone oxide and Myrcene. On the other, there was positive and significant correlation between soil pH and Piperitenone oxide. These findings indicate percentage of phosphorus, TNV and pH had positive effect on percentage of some main constituents of *Mentha longifolia* essential oil. As a result, the percentage of essential oil compounds is influenced by soil properties.

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29 & 30 May 2024  
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Poster Presentation ID: 112

### Physicochemical effects of progesterone on *Dracocephalum kotschi* Boiss

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#### ARTICLE INFO

##### Keywords:

Badrandjboie-Dennaie  
Bioactive compounds  
Leaf area  
Plant growth  
Zarrin-giah

#### ABSTRACT

*Dracocephalum kotschy* Boiss. (Lamiaceae) is an endangered herbaceous plant endemic to Iran and known as “Badrandjboie-Dennaie” and “Zarrin-giah”. It is believed that *Dracocephalum* species have many pharmaceutical properties such as anticancer, anti-tumor, antihyperlipidemic, analgesic, antioxidant immunomodulatory, anti-viral, antimicrobial and antinociceptive [1]. Foliar application of different chemicals having the main function in enhancing plant growth and yield. Mammalian sex hormones (MSHs) are the lipophilic and low molecular weight composites which belonging to the steroids compounds derived from isoprenoids. They include various types of progesterones, estrones, testosterone, estriols, estradiols, androgens and androsterones, and have several functions such as regulating growth, development and reproduction processes and bioregulatory for several metabolic pathways [2, 3]. In this study, two years well-grown and uniform *D. kotschy* Boiss seedlings foliar sprayed 4 times, 15 days after the first harvesting time with 15-days interval by 0.0, 0.1, 1.0, 10.0 and 50.0 ppm of progesterone. It was found that treated plant with different concentration of progesterone showed better growth and development as compare to untreated plant. It was revealed that the highest leaf area, plant height, plant fresh weight, total phenol content and total flavonoid content. Furthermore, 10.0 and 50.0 ppm of progesterone were the most effective concentrations. Overall, the foliar application of *Dracocephalum kotschy* Boiss plants with progesterone (especially at 10.0 and 50.0 ppm) could be recommended.

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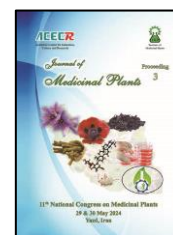
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Poster Presentation ID: 113

### Effect of pyrimidine application on changes of Safranal, Picrocrocin, and Crocin in Saffron under drought stress condition

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#### ARTICLE INFO

##### Keywords:

Abiotic stress

*Crocus sativus*

Pharmacological activities

#### ABSTRACT

Saffron has long been considered a medicinal plant for its therapeutic properties, in recent Multiple preclinical and clinical studies have supported the neuroprotective, anxiolytic, antidepressant, learning, and memory-enhancing effect of saffron and its bioactive constituents (safranal, crocin, and picrocrocin). The objective of this work was to evaluate the effect of pyrimidine application (0, 200, and 400 mg/liter) on changes of safranal, picrocrocin, and crocin in saffron under drought stress conditions (control, mild and severe stress) at three replications. Results showed that severe stress led to a reduction of saffron bioactive constituents but mild stress led to an increase of Saffron's secondary metabolite. According to results, it was found that pyrimidine application led to the increase of safranal, picrocrocin, and crocin under control, mild and drought stress conditions. About the interaction between pyrimidine×drought stresses, the highest mean of safranal, picrocrocin, and crocin were obtained by 400 mg/liter of pyrimidine under mild stress with 3.8, 12.9, and 18.4% values, respectively. It was concluded that pyrimidine could be involved in modulating drought stress on saffron and lead to the production of secondary metabolites of this plant at the highest level.

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Poster Presentation ID: 115

### Educational challenges of spice shops supplying herbal medicines in Iran

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#### ARTICLE INFO

*Keywords:*

Iran

Herbal medicines

Educational challenges

#### ABSTRACT

The use of medicinal plants and traditional medicine has been popular in Iran for a long time, and spice's shops have a long history of supplying raw herbal medicines to treat various diseases. And at the same time as the population increases, the number of spice's shops as well as the volume and variety of herbal medicine supply by them has increased. According to official statistics, 4351 spice's shops are working in the country. Despite the extensive activity of spice's shops in the field of supply of medicinal plants for the treatment of health problems, no study has been done on the problems of spice's shops[1]. Despite the importance of providing medicinal plants in the health of the community, currently no type of certificate or special conditions are required to operate as a spice seller, except for what is necessary to establish a shop or business unit. According to the conducted research, the share of medicinal plant supply by Iranian people includes 67% of spice's shops, 24% of nature, 5% of shops, 3% of pharmacies and 1% of other sources. And the share of each prescription source for the use of medicinal plants in the country includes 69% of tribes and traditions, 10% of books and magazines, 10% of spice's shops, 7% of doctors and 4% of mass media[2]. Also, according to the research conducted in the spice's shops of Shiraz, about 7% of spice sellers have education related to medicinal plants, about 55% of these people have university education, and only 24% have obtained their medicinal information through studying[3]. Spice's shops in other regions of Iran have almost the same situation. Therefore, paying attention to the educational challenges of sellers of herbal medicines in Iran should be paid attention to by the authorities in order to maintain the health of the society.

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Poster Presentation ID: 118

### Study of the Transcriptome in The Petals of Two Extreme Genotypes of *Rosa damascena* Mill.

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#### ARTICLE INFO

*Keywords:*

*Rosa damascena*  
transcriptome  
RNA-Seq transcription  
factors

#### ABSTRACT

In recent years, biotechnology has increased the effectiveness of medicinal plants in the production of drugs by utilizing methods such as transcriptome analysis with the help of sequencing techniques [1]. In the present study, two extreme genotypes of *Rosa damascena* were examined through RNA sequence in terms of quality and quantity of essential oil. For transcriptome analysis, RNA was extracted from fresh petals at the swollen bud stage before blooming at the full flower stage for genotypes 3 (low essential oil) and 7 (High essential oil) [2], each in two replicates using the CTAB method. Qualitative evaluation was done using Nanodrop and Bioanalyzer devices. Followed by sequencing on the Illumina Novaseq 6000 platform based on double-sided reading technology and 150-bp fragments. The findings revealed that the Trinity tool was the most suitable assembler for RNA-Seq data of *R. damascena* petals. The difference in the expression of the key genes in the terpenoid pathway showed that the expression of geranyl diphosphate synthetase, was significantly higher in G7. These results suggest that increasing the expression of this gene is crucial for enhancing and the quantity and quality of essential oil through molecular modification. The analysis of transcription factors identified a total of 3442 transcription factors in *R. damascena*. Genotype 7 (high essential oil percentage) exhibited higher levels of AP2/ERF, MYB, NAC, and C2H2 transcription factors, underscoring the importance of these transcription factors in the molecular modification of *R. damascena*.

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Poster Presentation ID: 119

### Investigating Hip and Seed Traits During the Controlled Cross-breeding of *Rosa damascena* Mill.

Hamid Ahadi<sup>1</sup>, Majid Shokrpour<sup>1,\*</sup>, Mohammad Reza Fattahi Moghadam<sup>1</sup>, Mohammad Hossein Mirjalili<sup>2</sup>, Mohammad Reza Naghavi<sup>3</sup>

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#### ARTICLE INFO

Keywords:

*Rosa damascena*

Cross

Line×tester

Xenia

#### ABSTRACT

Few studies have been done on the cross-breeding of *Rosa damascena*. In this study, which is part of a breeding program, aimed to evaluate the effect of maternal and paternal parent on hip and seed traits. To achieve this, controlled crossings were performed between genotypes 1 and 3 as maternal parents and genotypes 7, 10, 15 and 21 as paternal parents in a line×tester design [1]. First, at the swollen bud stage, petals and anthers were carefully removed with tweezers, and pollination was carried out using stored pollen with a soft brush. The pollinated flowers were then covered with fabric bags to prevent the entry of unwanted pollen. After 24 hours, the pollination was repeated and labelled. Two weeks later, the bags were removed, and after 5 months of pollination, the hip was harvested. Various attributes including length, width and weight of the hip, the number of seeds and seed weight were measured. The results showed a significant difference ( $p < 0.01$ ) among different crosses in terms of hip length and weight, seed number and seed weight. The crossing of G3×G7 genotypes resulted in the highest hip length and width (20.46 and 15.07 mg), while the crossing of G3×G10 genotypes yielded the highest hip weight. Also, the paternal parent was found to have a significant effect ( $p < 0.01$ ) on seed number and seed weight. This suggests that the source of pollen grains on the *R. damascena* seeds has a xenia effect.

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Poster Presentation ID: 120

### Identification the potential of protein targets of the chemical compounds of Carvacrol and Thymol in *Zataria multiflora* plant using reverse screening Approach

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ARTICLE INFO	ABSTRACT
<p><i>Keywords:</i> Medicinal plants Anticancer In silico PharmMapper Molecular docking</p>	<p><i>Zataria multiflora</i> is a perennial plant with a wide range of biological and pharmaceutical activities, including anti-diabetic, analgesic, anti-asthmatic, antipyretic, antispasmodic, Anti-oxidative, anti-inflammatory, and anti-microbial properties (1). Carvacrol and Thymol have been identified as the most abundant compounds in <i>Zataria multiflora</i> (2). Many herbal chemical compounds have been used in traditional medicine for various diseases without precise knowledge of their mechanisms of action by physicians. Identification molecular targets for plant-derived chemical compounds may help understand the therapeutic potential of many unknown plant chemicals (3). The aim of this research was to identify the most probable protein targets involved in cancer for Carvacrol and Thymol. Several approaches for finding Possible beneficial effects of chemical compounds exist, including various in silico tools. For this purpose, online servers such as SuperPred, Swiss Target Prediction, and PharmMapper were utilized. The results obtained from these web servers, considering the proposed targets, predicted anticancer, anti-inflammatory, anti-diabetic, hormonal, and neural effects for these compounds, with their anticancer effects being further studied. As a result, using the reverse screening approach, potential protein targets of Carvacrol and Thymol were identified from 3 online web servers. The accuracy of the predictions was determined using molecular docking and molecular dynamics simulations. Finally, the most important protein targets involved in the anticancer effects of the compounds were identified based on the obtained results.</p>

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Poster Presentation ID: 121

### Extraction, Isolation and Identification of Saponins from *Astragalus cyclophyllon*

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#### ARTICLE INFO

Keywords:

*Astragalus*  
*cyclophyllon*

Saponin

Phytochemistry

#### ABSTRACT

*Astragalus* genus belongs to the family Fabaceae. Saponins, terpenes, flavonoids, polysaccharides, nitro compounds and alkaloids, as the most important metabolites with great pharmacological potential, have been reported in all parts of *Astragalus* species. (1) Modern pharmacological studies have shown that Huangqi has a wide range of immunological activities and is widely used as an immunostimulant and Anti-oxidant. Also it has been used because of its Anti-inflammatory, Anti-tumor and anti-diabetic effects (2). 3 kg of *Astragalus cyclophyllon* seeds were purchased and ground. For extraction, powdered seeds was macerated in n-hexan, ethyl acetate and methanol respectively. Then methanolic extract was isolated by VLC to obtain 50, 70 and 100% methanolic fractions. For more separation, 70 and 100% methanolic fractions was separated into some subfractions by MPLC method. For final purification, subfractions rich in saponin was purified by HPLC method. Structure of the obtained pure compounds was elucidated by 1D and 2D NMR spectroscopy. After final purification 17 pure compounds were obtained. Until now, Three oleanane saponins were isolated from the seeds of *A. cyclophyllon*; using spectroscopic methods, their chemical structures were determined as 3,28-dihydroxy-D:A-friedo-olean-8-en-2,21-one(1), 3-hydroxy-olean-11,13(18)-en-28-oic acid(2) and 3,16,23-trihydroxy-olean-12-end(3). oleanane saponins are pharmacologically active compounds, which have been isolated from different *Astragalus* species. Isolation of these compounds from *A. cyclophyllon* is reported for the first time in this study.

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Poster Presentation ID: 123

### Preparation of herbal and organic anti-eczema ointment

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#### ARTICLE INFO

##### Keywords:

Eczema, chamomile,  
herbal oil, marigold,  
sweet almond

#### ABSTRACT

Eczema or dermatitis is one of the common inflammatory skin diseases that are accompanied by symptoms such as dryness, itching and redness of the skin. The purpose of this research was to make herbal anti-eczema ointment along with investigating its anti-inflammatory effects on eczema. The best cream for hand eczema is a cream that contains emollients and moisturizers and does not contain fragrances or irritants. Also, this cream should be light and non-greasy so that it can be quickly absorbed by the skin. In making this ointment, chamomile oil (*Matricaria chamomilla*), sweet almond oil (*Prunus dulcis*) and marigold oil (*Calendula officinalis*), natural vaseline or petroleum gel (C25 H52) and beeswax (*Cera alba*) with proportions This ointment was tested on several people suffering from eczema three times during the day and could be used for up to 6 months The owner pointed out that it finally the innovation of thi plan can be the preparation of 100 % natural ointment without improves the patient's skin condition and then causes physical and mental.



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Poster Presentation ID: 124

### Thymoquinone attenuated paw incision-induced spontaneous and evoked pain through anti-oxidative and anti-inflammatory mechanisms in rats

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Thymoquinone Celecoxib Evoked pain Incision Spontaneous pain</p>	<p>Surgery causes commonly post-operative pain that should be alleviated to prevent complications. In addition to the use of synthetic drugs, there has been a widespread desire to use medicinal plants for surgical pain management [1]. Thymoquinone (TQ), a constituent of <i>Nigella sativa</i> black seeds, exhibits a potent anti-oxidant property [2]. Celecoxib (CLX), as a potent nonsteroidal anti-inflammatory drug (NSAID), is widely used in pain management [3]. In the present study, the effects of TQ and CLX on pain caused by hind paw surgical incision were compared. Fifty six rats were divided into four groups of 14 rats as intact, vehicle, TQ and CLX groups. In each group, 6 rats were planned to record pain-related behaviors on days 1 - 10 and 8 rats were designed for determination of serum biochemical alterations on days 1 (4 rats) and 3 (4 rats) after surgery. Oral administration of TQ and CLX at a same dose of 10 mg kg<sup>-1</sup> alleviated paw lifting number (spontaneous pain) and paw withdrawal threshold evoked by von Frey filaments on metal mesh floor, improved the decreased contents of serum total antioxidant capacity (TAC) and superoxide dismutase (SOD) and restored the increased levels of serum malondialdehyde (MDA) and tumor necrosis factor-alpha (TNF-<math>\alpha</math>). The results suggested that TQ by employing anti-oxidant and anti-inflammatory mechanisms, might relieve the pain induced by hind paw plantar incision, which is comparable with CLX.</p>

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Poster Presentation ID: 125

### Effects of three types of plant growth stimulants on performance, carcass characteristics and immune responses of broiler chickens

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#### ARTICLE INFO

##### Keywords:

Plant growth stimulant  
Feed conversion ratio  
broiler  
Antibody titer

#### ABSTRACT

This experiment was conducted to investigate the effects of three commercial plant growth stimulants on performance, carcass characteristics and immune responses of broiler chickens. Six hundred one-day-old broilers of Ross 308 strain (a mixture of two sexes with equal ratio) were used in a completely randomized design with five treatments and four replications of 30 birds. Experimental treatments included: 1) control diet (no additive), 2) diet containing Virginiamycin (100 g per ton of feed) as a positive control and 3 to 5) diets containing Novi-Herb®, Novi-Grow® and Novi-Herb+® (each was at the rate of 100 grams per ton of feed). At the age of 42 days, blood sampling was performed from three birds per each replication in order to differentially count white blood cells and also to evaluate the antibody titer in response to Newcastle and Influenza vaccine injection. Addition of evaluated plant growth stimulants to the diet resulted in a significant improvement in live weight and feed conversion ratio at the age of 42 days compared to the control group ( $P < 0.05$ ). The use of plant growth stimulants had no significant effect on the number of white blood cells and antibody titer in response to the injection of Newcastle and Influenza vaccines. Similar to previous reports [1,2], the evaluated plant growth stimulants in the present study were able to be a suitable alternative to antibiotic growth stimulants by improving the performance of broiler chickens while reducing the cost of feed consumed per kilogram of live body weight of broiler chickens.

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Poster Presentation ID: 126

### In Vitro Study: Moringa Oleifera Extract Accelerates Proliferation and Differentiation of PC12 and B65 Cell Lines

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#### ARTICLE INFO

##### Keywords:

Moringa  
Proliferation  
Neural differentiation  
B65 cells  
PC12 cells

#### ABSTRACT

Neurodegenerative diseases, marked by numerous infections and progressive symptoms, lack an effective treatment devoid of side effects. Thus, ongoing research strives to find a suitable remedy. Moringa oleifera extract (MOE), abundant in phytochemicals like flavonoids, carotenoids, and vitamins [1], has shown promising effects on the nervous system. Previous investigations have revealed MOE's anti-inflammatory effects and antioxidant properties [2]. This study explored MOE's impact on the proliferation and neural differentiation of PC12 and B65 cells. MOE was extracted from plant leaves through the Soxhlet method, and its extraction and antioxidant abilities were confirmed using the Ferric Reducing Antioxidant Power assay. An MTT assay was employed to evaluate MOE's effect on proliferation of PC12 and B65 cells, revealing a significant increase in cell proliferation in a dose-dependent manner. Real-time PCR analysis demonstrated that MOE accelerates the expression of gap-43 and nf200 genes, indicating neural differentiation enhancement. Immunocytochemistry (ICC) results further supported this, showing a rise in nF200 protein levels with increased MOE dosage in both cell lines. In summary, our findings suggest that MOE, by promoting cell proliferation and neuronal differentiation in neural cells, shows promise as a potential therapeutic agent for neural disorders, particularly given its high antioxidant content.

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Poster Presentation ID: 128

### Potential Target Protein Prediction for Isoflavonoids; an *In-silico* Study

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#### ARTICLE INFO

##### Keywords:

Isoflavonoid  
Target protein  
Estrogenic activity  
Anti-cancer

#### ABSTRACT

Identifying the target proteins remains a significant obstacle in the realm of natural products biology. Often, the limited quantity of extracted and purified natural compounds makes it impractical to conduct multiple biological assessments. To address this, a preliminary approach involves employing *in silico* investigations to gather insights into potential target proteins. The aim of this study was to evaluate the performance of two online servers, “PharmMapper” and “Swiss Target Prediction” in predicting target proteins for selected isoflavonoids including Genistein, Diadzein, Formonentin and Biochanin A [1, 2]. The estrogenic activity of isoflavonoids has been extensively studied [3]. However, screening the results from the two mentioned servers reveals that isoflavonoids are also able to interact with several proteins that play a crucial role in the cancer pathway, such as DNA polymerase and type II DNA topoisomerase. Due to the lack of commonalities between the proposed proteins of these servers, it is necessary to conduct a comprehensive assessment on all proteins in order to obtain the most reliable results.

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Poster Presentation ID: 129

### Investigation of metabolic profile and anticancer properties of the essential oils of *Cuminum cyminum* L.

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#### ARTICLE INFO

##### Keywords:

Breast cancer  
Cumin aldehyde  
MCF-7  
*Cuminum cyminum*  
Essential oil

#### ABSTRACT

The medicinal plant of *Cuminum cyminum*, known for its medicinal properties and the presence of essential oils with antioxidant, anticancer, antibacterial, antifungal, and analgesic activities, holds promise as a potential treatment for breast cancer, the second leading cause of death among women [1, 2]. The purpose of this study was to extract essential oils from the seeds of one cumin ecotype using the Clevenger apparatus and analyze the active ingredients through Gas Chromatography-Mass Spectrometry (GC-MS) technique. Furthermore, the potential anticancer properties of these essential oils were evaluated. The study utilized MCF-7 cells (as a model for estrogen-dependent breast cancers) and normal fibroblast cells cultured in DMEM medium containing fetal bovine serum and antibiotics. These cells were treated with various concentrations of cumin essential oils (ranging from 0.01 to 5 mg/ml) for 24, 48, and 72 hours, and their viability was assessed through the MTT assay method. A total of thirty components were identified in the extracted essential oils, with the prominent constituents being  $\alpha$ -terpinen-7-al (23.90%), cumin aldehyde (21.21%),  $\alpha$ -terpinen (14.48%), and  $\alpha$ -pinen (10.86%). Results from the MTT assay after 24 hours indicated cell death at concentrations of 0.01 and 0.1 mg/ml, while the fibroblast cells remained morphologically healthy and viable even after 72 hours. These findings suggested that cumin, at non-toxic levels for normal cells, may potentially inhibit the proliferation of cancer cells.

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Poster Presentation ID: 130

### Investigation of fatty acid profile and phytochemical properties of *Nigella sativa* L.

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#### ARTICLE INFO

**Keywords:**

Black seed  
Gas chromatography  
Total sugar content  
Total phenol

#### ABSTRACT

*Nigella sativa* L., commonly known as black cumin, is a highly versatile medicinal plant that has been utilized for centuries in traditional medicine for its potent therapeutic properties. This plant has been found to be particularly effective in treating a wide range of ailments, including respiratory, gastrointestinal, rheumatic, and inflammatory disorders, as well as cancer [1]. In order to further explore the potential of black cumin as a medicinal plant, a study was conducted to extract its active ingredients and evaluate their phytochemical properties. The black cumin seeds used in this study were carefully collected from the research farm of the Faculty of Agriculture and Natural Resources at Razi University in Kermanshah and subjected to a cold pressing method for oil extraction. The results of this study revealed a substantial oil content of 43.01%, with linoleic acid and oleic acid being the major unsaturated fatty acids and palmitic acid, linolenic acid, stearic acid, and eicosadienoic acid as the main saturated fatty acids. Furthermore, phytochemical analyses of the extracted crude oils displayed significant levels of total soluble sugar, total phenol, and total flavonoids at 870.58 mg/l, 0.341 mg/l, and 1.593 mg/l respectively, indicating the potential of black cumin as a source of valuable phytochemicals. Overall, this study provides valuable insights into the biological potential of black cumin and highlights its potential for further medicinal applications.

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Poster Presentation ID: 131

### Seed priming to improve germination metrics in the medicinal plant of *Ferula assa-foetida* using cold plasma

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#### ARTICLE INFO

##### Keywords:

Argon cold plasma  
*Ferula assa-foetida*  
Germination  
Medicinal plant

#### ABSTRACT

The *Ferula assa-foetida* is a perennial herbaceous plant that has been used for centuries in traditional medicine for its diverse therapeutic properties [1], but with limited seed dispersal and germination due to short growing season [2]. Here, the potential benefit of argon cold plasma (ACP; exposure time of 90s), as a non-invasive, environmentally friendly, and powerful approach to seed priming technology [3], was assessed in the seed germination process of *F. assa-foetida* at 5 °C based on a completely randomized design (CRD) with three replications (i.e., three petri dishes containing 30 seeds). There was a significant difference ( $p < 0.05$ ) between the ACP-treated and non-treated (control) seeds in terms of Final Germination Percentage (FGP), Timson's Index (TI), Germination Index (GI), and Mean Germination Time (MGT). The values of FGP, TI, and GI recorded for the ACP-treated seeds (i.e., 82.22%, 54.44, and 2.36, respectively) were greater than the intact/control seeds (i.e., 63.32%, 34.44, and 1.41, respectively). Comparing to the control, such a higher value recorded for each of three germination metrics of FGP, TI, and GI could imply the superiority of ACP to improve seed germination in *F. assa-foetida*. Instead, the calculated MGT for the ACP-treated seeds was lower (6.13 weeks) than control (6.77 weeks). Since the lower the MGT, the faster a collection of seeds reaches germination, so, it could be overall concluded that ACP could be possibly considered as a promising priming method to improve germination process of *F. assa-foetida*, and possibly other medicinal plant species.

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Poster Presentation ID: 133

### Henna effect on cutaneous surgical wound healing

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#### ARTICLE INFO

##### Keywords:

Henna  
Surgical  
Cutaneous  
Wound  
Rabbit

#### ABSTRACT

Henna is reported to contain a naphthaquinone, lawsone, which is a natural dye and mainly responsible for colouring [1]. Lawsone has also been reported to be an immunostimulant [2]. After induction of anesthesia, the animals (Four new zeland white rabbits) restrained in sternal recumbency and standard surgical preparation on dorsal surface of chest was performed. Skin wounds were created on the dorsum of rabbits using a 6 mm diameter metal punch [3]. Right wounds were considered as a control group and left wounds as a treatment group. The right wounds were lavaged with normal saline and the left ones were covered with an ointment containing henna extract, once a day. 15 and 30 days after creation of cutaneous wound, a full-thickness skin samples were taken from wound edge. The samples were stained using hematoxilline-eosine (H&E) routine method and prepared for histopathologic evaluations between control and treatment groups. At day 15, in control group necrosis and severe wound inflammation with minimal re-epithelization and granulation tissue formation was observed, but in treatment group, degree of necrosis and inflammation substantially was reduced and process of re-epithelization and granulation tissue formation was more obvious. At day 30, wound bed remarkably was filled with healthy granulation tissue and new epithelialization covered the wound surface, in treatment group. While, in control group, despite of new epithelialization and granulation tissue formation, inflammatory reaction with presence of neutrophils was observed in the wound. Results of this study showed that henna extract considerably causes acceleration of cutaneous surgical wounds healing.

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Poster Presentation ID: 134

### Protective effects of Fenugreek seed extract on cutaneous burn wound healing in Rabbit

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#### ARTICLE INFO

##### Keywords:

Fenugreek  
Seed  
Cutaneous  
Burn  
Rabbit

#### ABSTRACT

Fenugreek is known to have several pharmacological effects such as anti-oxidant and anti-inflammatory that is used traditionally in treatment of various kinds of disorders [1,2]. After induction of anesthesia, the animals (Four new zeland rabbits) restrained and surgical preparation on dorsal surface of chest was performed [3]. Then a cotton band was dipped in sulfuric acid 50% and placed on the skin for 5 min. Right wounds were considered as a control group and left wounds as a treatment group. The right wounds were lavaged with normal saline and the left ones were lavaged with sterile solution of Fenugreek seed extract, once a day. 14 and 28 days after creation of cutaneous burn wound, a full-thickness skin samples were taken from wound edge. The samples were stained using hematoxilline-eosine (H&E) routine method and prepared for histopathologic evaluations between control and treatment groups. At day 14, in control group necrosis and severe wound inflammation with minimal re-epithelization and granulation tissue formation was observed, but in treatment group, degree of necrosis and inflammation substantially was reduced and process of re-epithelization and granulation tissue formation was more obvious. At day 28, wound bed remarkably was filled with healthy granulation tissue and new epithelialization covered the wound surface, in treatment group. While, in control group, despite of new epithelialization and granulation tissue formation, inflammatory reaction with presence of neutrophils was observed in the wound. Results of this study showed that Fenugreek seed extract considerably causes acceleration of cutaneous burn wounds healing.

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Poster Presentation ID: 135

### Protective effect of liquorice leaf extract on Experimental Hepatic Ischemia-Reperfusion Injury in Rats

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#### ARTICLE INFO

##### Keywords:

Thymoquinone  
Celecoxib  
Evoked pain  
Incision  
Spontaneous pain

#### ABSTRACT

Protective effect of liquorice on Hepatic ischemia and reperfusion (I/R) injuries was studied to assess the ability to diminish injuries [1,2]. The animals (30 wistar male rats, weighing 250-330 gr) were randomly divided into three equal groups. In group control, the animals received normal saline and underwent I/R injury (45 min of ischemia followed by 1 h of reperfusion) [3]. In Sham group, the animal received liquorice extract without I/R injury. In treatment group, the animal received liquorice extract and underwent I/R injury. Normal saline and liquorice extract were gavaged for two week before operation in the related groups. Ischemia was induced by clamping of hepatic branch of abdominal aorta. After the experiments, the hepatic samples were taken and the tissues were processed for histopathologic examination. hepatic histology was semi-quantitatively assessed. I/R in control group was resulted in severe hepatocytes damage, congestion and hemorrhage. Histological scores indicating hepatocytes injury significantly increased in group control compared to the group sham. The severity of injuries in treatment group was significantly subsided in comparison with in the group control, but there is still significant differences compared to the sham group. Based on the results, it can be concluded that the aqueous extract of liquorice leaf diminished hepatic I/R injuries considerably.

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Poster Presentation ID: 136

### The Effect of Lavender (*Lavandula angustifolia*) Inhalation Aromatherapy on Pain and Anxiety of Patients after Orthopedic Surgery; a Randomized Clinical Trial

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#### ARTICLE INFO

Keywords:

Inhalation  
aromatherapy  
Lavender  
Pain  
Anxiety  
Orthopedic surgery

#### ABSTRACT

Pain and anxiety after orthopedic surgery are common and lead to more physical complications with high costs for patients [1-2]. The increasing tendency to use non-pharmacological methods such as aromatherapy [3], led to researchers designing and implementing a study to investigate the effectiveness of lavender (*Lavandula angustifolia*) inhalation aromatherapy on pain and anxiety of patients after orthopedic surgeries in Ayatollah Kashani Hospital, Isfahan, IRAN. This clinical trial study was conducted on 80 patients in 2022 with ethical Code Number IR.MUI.RESEARCH.REC.1399.628 which has been registered in Iran's Clinical Trials Registry (IRCT20111002007692N3). Eligible patients who met inclusion criteria were recruited by convenience sampling and then were allocated randomly with the random sequence generation software, to intervention (n=40) and control groups (n=40). The intervention included aromatherapy with lavender essential oil with 100% purity for 3 days (twice a day in 6 sessions). Spielberger anxiety questionnaire and Visual Analog Scale were used. Data were analyzed using SPSS version 26 statistical software with the application of Statistical tests (Paired t-test, Independent t-test, Chi-square, and Two-way repeated measures ANOVA). The average scores of anxiety and pain between the intervention and control groups had a statistically significant difference after the end of the aromatherapy (p<0.001). According to our findings, lavender aromatherapy has a significant effect on reducing pain and anxiety. Due to these positive effects, it is recommended to use lavender inhalation aromatherapy as a cost-effective strategy with easy access and use, along with other methods as a complementary treatment for pain and anxiety management in orthopedic surgery wards.

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Poster Presentation ID: 137

### Lavender Inhalation Aromatherapy and Sleep Quality Post Orthopedic Surgery: A Randomized Clinical Trial

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#### ARTICLE INFO

Keywords:

Inhalation  
aromatherapy  
Lavender  
Sleep quality  
Orthopedic surgery

#### ABSTRACT

Patients admitted to hospitals surgical wards, experience poor sleep quality. Sleep is essential for restoring and protecting the body, and any disturbances in the sleep-wake cycle can hinder the recovery process [1]. Since the impact of lavender (*Lavandula angustifolia*) aromatherapy on the sleep quality of surgical patients remains contradictory [2-3], prompting researchers to conduct a study on the effectiveness of lavender inhalation aromatherapy (L.I.A) for improving sleep quality in patients undergoing orthopedic surgeries. Given the potential benefits of aromatherapy, this investigation aims to shed light on its therapeutic value. In 2022, a clinical trial was conducted in a Trauma treatment center in Isfahan, on 80 patients using convenience sampling to recruit eligible participants who met inclusion criteria. This research has been registered in Iran's Clinical Trials Registry (IRCT20111002007692N3). The patients were then randomly allocated into two groups. The intervention involved aromatherapy with 100% pure lavender essential oil (product of Barij Essence CO) administered twice a day for three days. The St. Marry's Hospital Sleep Questionnaire (SMHSQ) was used to collect data, which was analyzed through SPSS software. Findings indicated that there was a significant difference in sleep quality disorder between the two groups ( $p < 0.001$ ). So after using L.I.A, the average sleep quality disorder score of the intervention group decreased from 27.60 (6.20) to 13.12 (2.76). Our findings suggest that the use of L.I.A can have a considerable impact on sleep quality improvement. In light of these positive results, we recommend the use of L.I.A is an affordable and easily accessible method.

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Poster Presentation ID: 138

### Lavender Inhalation Aromatherapy and Exam Anxiety of Nursing Students in Objective Structured Clinical Examination: a Randomized Clinical Trial

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#### ARTICLE INFO

Keywords:

Aromatherapy  
Lavender  
Exam anxiety  
Objective Structured  
Clinical Examination  
Nursing Student

#### ABSTRACT

The results of some research have shown the destructive effects of high levels of exam anxiety on students' learning and performance [1]. This is the fact that aromatherapy, unlike drug treatments, despite being economical, almost in all cases does not have any serious complications and drug interactions [2]. Despite the existence of studies supporting the effects of aromatherapy on the level of students' exam anxiety, the paradoxical findings have caused ambiguity regarding the effect of such interventions on students' exam anxiety [3]. The objective of this study is to investigate the impact of lavender aromatherapy on exam anxiety among nursing students during the Objective Structured Clinical Examination. The study has been registered with Iran's Clinical Trials Registry (IRCT20111002007692N5) and approved by the ethical committee at Isfahan University of Medical Sciences (IUMS) with ethical Code Number IR.MUI.NUREMA.REC.1401.045. A total of 60 eligible students who fulfilled the inclusion criteria were selected using convenience sampling and then randomly assigned to two groups. The researcher dripped 2 drops of lavender (*Lavandula angustifolia*) essential oil with 100% purity (product of Barij Essence CO, Kashan, IRAN) with a dropper on a 10x10 gas and attached it to the clothes of the research unit at a distance of 20 cm from the nose for 10 minutes. Sarason's test anxiety was used. The results indicated a significant decrease in the average exam anxiety score with  $P=0.03$  after aromatherapy in the intervention group. Lavender aromatherapy is a low-cost and easily accessible method that has shown positive effects on exam anxiety. It is recommended for use.

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Poster Presentation ID: 139

### The effects of regions on phosphorus and potassium contents of *Rosa foetida* Herrm.

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#### ARTICLE INFO

*Keywords:*

*Rosa foetida* Herrm.

Potassium

Phosphorus

Elements

#### ABSTRACT

Rosehip is consumed for its medicinal properties and as a good source of vitamin C. However, it also contains a variety of minerals other than phytochemicals which help human health [1, 2]. The experiment was performed to investigate the amount of potassium and phosphorus elements in *R. foetida* fruits. Therefore, the fruits of 29 genotypes of Persian yellow rose were collected at ripening stage from five regions of Iran including: Takab-West Azarbaijan (7 genotypes), Shekranab-Qazvin (6 genotypes), Shah Bolaghi-Zanjan (8 genotypes), Malayer-Hamadan (1 genotype) and Shahrestanak-Alborz (7 genotypes). The amounts of potassium and phosphorus were measured, as gram per kg of dry matter, by Flame Photometer and spectrophotometer respectively. The results showed that the phosphorus content ranged from 12.93 g/kg (RfASH7 genotype from Shahrestanak) to 21.42 g/kg (RfGSK2 genotype from Shakranab). In general, the genotypes of Shekarnab region contained the highest amount of phosphorus among the samples. The potassium content varied from 12.62 g/kg (RfZSB3 and RfZSB8 genotypes from Shah Bolaghi) to 16 g/kg (RfAGT6 genotype from Takab and RfGSK1 genotype from Shakranab). In conclusion Generally, the genotypes of Shekarnab and Shahrestanak regions have higher amount of potassium than the others. As a result, the fruits of the *R. foetida* species are considered a rich source of phosphorus and potassium elements.

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### Molecular docking studies and molecular dynamics simulations for the prediction of the mechanism of 12-deoxysalvipisone as a potential anticancer agent

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> 12-deoxysalvipisone Salvia Cancer Molecular docking Molecular dynamic CDK-2</p>	<p>The compound 12-deoxysalvipisone isolated from the CH<sub>2</sub>Cl<sub>2</sub> extract of roots of <i>Salvia ceratophylla</i> has shown around two and nine times more toxicity against MOLT-4 and MCF-7 cancerous cell lines (IC<sub>50</sub>: 1.6 and 3.4 μM, respectively) than cisplatin as the cytotoxic reference (IC<sub>50</sub>: 2.7 and 31.2 μM, respectively) [1]. Due to the obtained results, an <i>in-silico</i> investigation was conducted to predict the mode of action of 12-deoxysalvipisone by molecular docking and dynamic simulation approaches. First, of all, the above-mentioned compound was docked against five selected target proteins that regulate cell proliferation and apoptosis including cyclin-dependent protein kinase 2 (CDK-2), CDK-6, DNA topoisomerases I (topo I), topo II and B-cell lymphoma-2 (Bcl-2) using autodock 4.2 software. Then, the molecular dynamics simulation was performed to assess the stability of the best-docked complex using the GROMACS 5.1.4 software package. Results indicated that 12-deoxysalvipisone had a remarkable binding affinity to CDK-2 than the known CDK-2 inhibitor (-8.10 and -7.82 kcal/mol, respectively). The molecular dynamics simulation indicated that the protein-ligand complex was stable in the period of 20 ns. These <i>in-silico</i> structural studies prove the effective inhibition of CDK-2 activity by 12-deoxysalvipisone and further biological experiments should be performed to confirm its use as an efficient option for treating cancer disease.</p>

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Poster Presentation ID: 141

### Gas Chromatography-mass spectrometry analysis and antimicrobial activity of Two Iranian traditional medicinal smokes

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#### ARTICLE INFO

##### Keywords:

Medicinal smoke

*Peganum harmala* L.

*Heracleum persicum*

GC-MS analysis

#### ABSTRACT

*Peganum harmala* L. seeds (Phs) have anti-rheumatism, anti-parasitic, hypnotic, diaphoretic, anti-cancer, and analgesic properties. The fruits of *Heracleum persicum* (fHp) with anti-infection, anti-inflammatory, and analgesic properties are employed in the food industry. In Iranian culture, a mixture of Phs (Espand) and fHp (Golpar) smoke is widely used in traditional medicine. This study aimed at performing gas chromatography-mass spectrometry (GC-MS) analysis and evaluating the antimicrobial activity of smoke from burning Phs and fHp on eight standard strains and four strains isolated from patients. Smoke from burning Phs and fHp was collected in a 50% ethanol solution. Ethanol was evaporated at 50°C, and the remaining composition was dissolved in dimethyl sulfoxide. Various concentrations (6.2-100 mg/ml) of this composition were prepared, and then the antimicrobial effect of various concentrations of smoke from burning Phs and fHp was evaluated on 12 different microbial strains using the agar well-diffusion method. Finally, GC-MS was performed to identify the compounds in each strain. Smokes obtained from Phs and fHp demonstrated antimicrobial activities at 6.2-100 mg/ml in more Gram-positive and Gram-negative bacteria. The GC-MS analysis of Phs and fHp smokes represented 15 and 11 main peak areas, respectively. In Phs smoke, 44.9 % of all components were related to Octadecenoic acid isomers. In addition, Pimpinellin (48.5 %) was the most identified compound in fHp smoke, and 35 % of compounds belonged to benzopyran isomers. The findings of this study confirmed the antimicrobial activity of Phs and fHp smokes, thus it is logical to use these smokes to disinfect the environment in traditional medicine.

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Poster Presentation ID: 142

### Comparing Grape Seed Extract protective effect on Endometriosis versus Atorvastatin in rat model

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ARTICLE INFO	ABSTRACT
<p><i>Keywords:</i> Atorvastatin Angiogenesis Endometriosis Estradiol Grape seed extract</p>	<p>Endometriosis is a disease, defined by the presence of both endometrial stroma and glandular tissue outside the uterus. This impairment predominantly found in women of reproductive age and suspected as estrogen depend disease [2]. Endometriotic implants initiate angiogenesis in order to survive. Atorvastatin and grape seed extract were considered to evaluate the protective effects of these compounds on endometriotic lesions in a rat model. Eighteen rats were randomly divided into 3 groups. Endometriosis-alone group (EMS, N=6), grape seed extract-administrated group (GSE, N=6, 300 mg/kg<sup>-1</sup> day<sup>-1</sup>) and atorvastatin-dosed group (ATR, N=6, 5mg/kg<sup>-1</sup> day<sup>-1</sup> by gavages). All animals received the treatment for 21 days. After the period, the implanted tissues were dissected out to assess the estrogen receptor positive cells (ER+), micro and macro-vessels distributions, glands activity and expansion per one mm<sup>2</sup> of the specimens [1]. The estrogen level and total antioxidant capacity (TAC) evaluated. GSE and ATR administration significantly lowered ER+ cells distribution in implanted lesions. The animals in GSE and ATR-treated groups were manifested with remarkable reduction in angiogenesis which clarified with lowered micro and macro-vessels distribution. The biochemical analyses revealed that the GSE and ATR administration significantly lowered serum concentration of estradiol and remarkably up-regulated the serum level of TAC. Our data suggests that, the GSE exerts a potent inhibitory effect on development of endometriotic implants similar to ATR. Mechanism of action of GSE may include inhibition of estradiol synthesis in implanted tissue, indirectly controlling angiogenesis by anti-cholesterol effects and finally by increasing serum antioxidant capacity.</p>

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Poster Presentation ID: 143

### The Antioxidant Capacity of Methanolic and Ethanolic Extracts of Saffron Petals

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#### ARTICLE INFO

##### Keywords:

*Crocus sativus* L. petal  
Antioxidant capacity  
Methanol extract  
Ethanolic extract

#### ABSTRACT

*Crocus sativus* L. (saffron) is known as an expensive spice in the world which is cultivated the most in Iran (1). However, the most parts of saffron plant (petals or saffron leaves) are considered as waste agriculture by-product. Therefore, we aimed to measure the antioxidant capacity of methanolic (MSP) and ethanolic extract (ESP) of saffron petals to use in functional food as a natural colorant in future works. The methanolic and ethanolic extract of saffron petals was prepared and the antioxidant capacity was determined by FRAP and DPPH. Also, the total phenolic (TPC) and flavonoid content (TFC) of extracted samples was analyzed. According to the results, the TPC of ethanolic and methanolic extracts of saffron petals were estimated 136.56 and 179.54 mg/g GAE, respectively. The TFC of MSP and ESP were 163.03 and 78.88 mg rutin/100g. The FRAP and DPPH of MSP and ESP were estimated 612.29 and 267.4 m molar H<sub>2</sub>SO<sub>4</sub> and 77.1% and 85.37 %, respectively. As can be seen except for DPPH, all analysis was significantly higher in MSP than ESP samples. According to the results, the saffron petals as a waste product can have high antioxidant capacity which can be used in functional food as an antioxidant as well as natural food colorant (2). Also, the methanolic extract can be more effective in extraction of antioxidant compounds.

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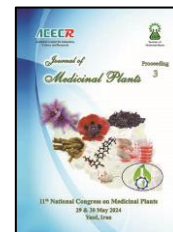
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Poster Presentation ID: 144

### Ethnobotany of medicinal plants of nomadic tribes, a case study: Raini and Posht Kohi in Kerman Province

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#### ARTICLE INFO

##### Keywords:

Word 1 Ethnobotany  
Word 2 Medicinal plant  
Word 3 Nomadic tribes

#### ABSTRACT

Ethnobotany is a method of scientific monitoring of the information available in the public mind. The topic of this science is related to the use of plants in the life of the people of a nation. A very important part of the sources of information in an ethnobotanical study is related to the data obtained from the natural life of the people of a tribe (about their attitude to plants), which usually, these data have a narrative structure in the mind and language of those people. Raini and Posht Kohi are among the remaining tribes in Kerman province who use plants to treat many diseases in terms of their lifestyle and seasonal movements and lack of proper access to common treatments. In order to check their awareness and utilization of medicinal plants, 23 local experts were selected and investigated using the snowball method or chain reference sampling. The results showed that among the 73 investigated plant species, 8 species were the most used in the treatment of colds, coughs and dry throat with a frequency of 10.96%, and the leaves of plants with a frequency of 23.7% were the most used plant parts. *Glycyrrhiza glabra*, *Ocimum basilicum* and *Prangos ferulacea* are the most widely used plant species with 7, 6 and 6 uses, respectively.

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Poster Presentation ID: 145

### Effect of biological and chemical fertilizers on alleviation effects of salinity on marjoram (*Origanum vulgare* L.) as a medicinal plant

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#### ARTICLE INFO

##### Keywords:

Biological fertilizers  
*Origanum vulgare* L.  
Phormidium  
Salinity stress

#### ABSTRACT

Salinity stress in arid and semi-arid regions changes plant composition and characteristics [1]. Cyanobacteria can attenuate such stress and act as bio-fertilizers [2]. This study explores the role of cyanobacteria biofertilizer in reducing salinity stress on *Origanum vulgare* L. The experiment was conducted as a factorial in the form of a completely randomized design with 3 replications in the research greenhouse of Yazd University. The investigated treatments include fertilizer type [NPK fertilizer (control), Acadian, Phormidium (isolated algae), NPK + Phormidium combination] and salinity stress (3, 6 and 9 dS/m and city water as control). According to the findings, the Acadian treatment at 3 dS/m salinity level produced the tallest plants, while the NPK treatment at 9 dS/m salinity level resulted in the shortest plants. When exposed to 9 dS/m salinity stress, Phormidium, Acadian, and NPK + Phormidium fertilizers increased the inflorescence length by 45%, 80%, and 47% respectively, compared to NPK fertilizer. The highest number of sub-branches was observed in the Phormidium treatment at a 3 dS/m salinity stress level, which was comparable to the Acadian fertilizer at the same salinity level. Generally, it can be concluded that biological fertilizers are effective alternatives to chemical fertilizers in arid regions, and can enhance the tolerance of medicinal plants such as *O. vulgare* to salinity.

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Poster Presentation ID: 146

### Optimizing Saffron Petal Extract Delivery: Development of Nano Lipid Carriers

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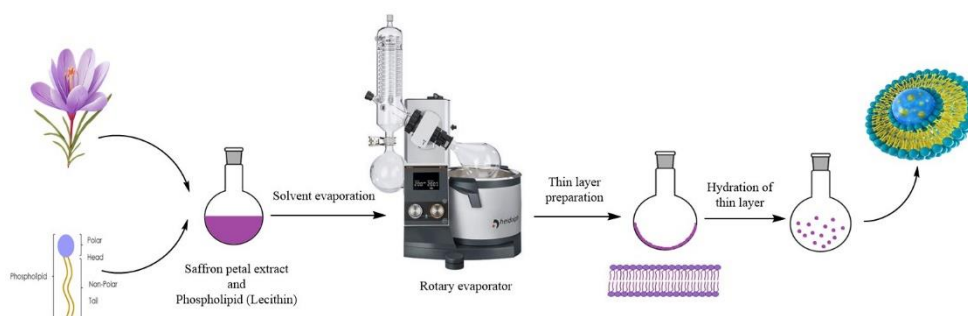
#### ARTICLE INFO

##### Keywords:

Saffron petal  
Anthocyanin  
Polyphenols  
Lipid  
Liposome

#### ABSTRACT

Saffron (*Crocus sativus* L.) petal, a major by-product of saffron processing, is produced in large quantities annually and is a potential source of phenolic compounds with high antioxidant activity. For economic and environmental reasons, researchers have explored the recovery of valuable components from the significant amount of food waste generated during manufacturing. This highlights the need to better manage anthocyanin-rich residues and develop methods to recover this valuable compound. Liposomes, a novel technology for encapsulating and delivering bioactive agents, offer the potential to enhance activity and address challenges related to phytoconstituents by increasing solubility, stability, absorption, and bioavailability [1]. The study aimed to encapsulate polyphenolic compounds, including anthocyanins, extracted from saffron petals, in liposomes. Maceration was employed as the extraction method, while drying of the hydroalcoholic extract was conducted using three techniques: dry bath with air purge, oven drying, and freeze-drying. The anthocyanin content in the initial extract and after drying was 11.19 mg/L for the initial extract, 6.19 mg/L after dry bath with air purge, 7.99 mg/L after oven drying, and 10.54 mg/L after freeze-drying. Consequently, freeze-drying proved to be the most effective method for preserving anthocyanin content. The extract was loaded into liposomes using the thin layer film hydration method. The resulting liposomes had a particle size of 697 nm, a polydispersity index (PDI) of 0.52, and an encapsulation efficiency of 30%. These findings demonstrate the potential of liposome encapsulation for enhancing the delivery and stability of anthocyanins extracted from saffron petals.



Thin layer hydration preparation using saffron petal extract

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### Investigating the possible effects of isoimperatorin in an animal model of IBD induced by acetic acid

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#### ARTICLE INFO

##### Keywords:

Isoimperatorin  
Irritable bowel disease  
Anti-inflammatory  
Ferulago trifida root

#### ABSTRACT

Irritable bowel disease (IBD) is a chronic disease of unknown origin that is affected by genetics, immune system and environmental factors. In this study, 80% methanolic total extract and chloroform fraction of *Ferulago trifida* roots were prepared. By means of different chromatography and spectroscopy methods, furanocoumarin compound isoimperatorin was isolated, purified and identified. In the next step, the protective effects of isoimperatorin in the colitis model induced by acetic acid were investigated. For this purpose, colitis was induced by intracolonic administration of 4% v/v acetic acid solution in male rats. The animals were divided into 6 groups with 6 mice in each group, which are: the group of healthy mice (Sham), the group of mice with colitis that received normal saline (negative control), the group of mice those with colitis who received dexamethasone at a dose of 1 mg/kg per day orally (positive control) and three groups that received orally isoimperatorin at doses of 0.1, 1 and 10 mg/kg per day. The treatment was performed for three days and after that, the condition of the colon was evaluated in terms of macroscopic, histopathological and biochemical factors. The results of the study showed that isoimperatorin significantly reduced the severity of macroscopic and microscopic colon injuries and this reduction was dose-dependent. Isoimperatorin has also been able to reduce the level of neutrophils infiltration and lipid peroxidation by reducing the levels of myeloperoxidase and malondialdehyde respectively. The anti-inflammatory activity of isoimperatorin is shown by decreasing the level of cytokines TNF- $\alpha$  and IL-1 $\beta$ .

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### Synthesis of quantum dots using black tea extract as quenched fluorescence

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#### ARTICLE INFO

##### Keywords:

Quantum dots  
Fluorescence  
Polyphenol

#### ABSTRACT

Quantum dots containing plants are a useful type of nanomaterials that have potential applications in medicine, drug delivery, and sensors [1]. These points have great potential as photosensitizers due to their excellent biocompatibility and high production of reactive oxygen species. So far, the effects of black tea and N-epigallocatechin, as the major component, have been studied extensively [2]. In this research, the polyphenol extracted from tea was used as a raw material to synthesis polyphenol quantum dots along with water-alcohol solvent. Using a hydrothermal autoclave for this propose, A 3 g of the dried tea leaves was extracted using liquid-liquid extraction method by water and dichloromethane respectively, then, the obtained powder was dissolved in 20 mL of water: alcohol and poured in a hydrothermal autoclave at 160 °C for 6 h (QD6) and 24 h (QD24). After that, the florescence property of the synthesized quantum dot was investigated using an UV-Vis. Spectrophotometer. According to the results, QD6 shows a florescence white light however, QD24 did not shows this property. However, QD24 showed two peaks at 261 and 283 nm similar to those of QD6. The peaks are related to the  $\pi$ - $\pi^*$  transition of c=c and c=o bonds respectively. The Obtained results reveals the QD can be used as a sensor to screening of tumor cells by injection to the body, however, it needs more investigation including in vivo assays.

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Poster Presentation ID: 149

### Examine the effect of *Cicer arietinum* extract on the expression of Sertoli cell androgen receptors in mouse azoospermia model

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#### ARTICLE INFO

Keywords:

*Cicer arietinum*

Total extract

Azoospermia

Busulfan

#### ABSTRACT

Infertility is one of the problems of today's societies. 50% of infertility cases are related to male causes, which is one of the common cases of azoospermia [1]. Chickpea, which seems to be effective on spermatogenesis and male infertility in different ways. Therefore, the aim of the present survey is to study the effectiveness of the total extract and different fractions of chickpea seeds on the effective factors in male infertility. In this study, 30 mice were used, which were randomly divided into 6 groups; The control group, which were kept under normal conditions, the azoospermic group, in which the rats received a single intraperitoneal dose of busulfan at a dose of 40 mg/kg; Groups 3 to 6, after 35 days of receiving a single dose of busulfan, received total extract and hexane, chloroform, and methanolic fractions of chickpea seeds at a dose of 400 mg/kg for one week. The diameter of the seminiferous tubules showed a significant increase in the control group compared to the azoospermic group. The total number of Sertoli cells, spermatogonia and spermatocytes counted in the group receiving total extract had a significant increase compared to the azoospermic group. In the Immunohistochemistry test, the expression level of androgen receptor in the total extract group and fractions increased significantly compared to the azoospermic group. Total extract of *Cicer arietinum* can improve the destructive effects of busulfan on spermatogenic cells and the process of spermatogenesis.

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### Comparison between *Rosa foetida* and *Rosa canina* in flowers essential oil profiles

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#### ARTICLE INFO

Keywords:

*Rosa foetida*

*Rosa canina*

Essential oil

GC-MS

#### ABSTRACT

There are more than 120 species of *Rosa* genus growing worldwide [1]. *Rosa foetida* Herrm is one of the species scattered throughout the Iran from Western to central and southern parts [2]. *Rosa* species are well known for their medicinal and cosmetic properties as well as antibacterial, anti-inflammatory and diuretic properties [3]. The present research was conducted in order to Comparison between *Rosa foetida* and *Rosa canina* in flowers essential oils. For this purpose the flowers of two genotypes of *Rosa foetida* (having yellow and yellow-red petals) and one genotype of *Rosa canina* were collected, and the essential oils were isolated from the fresh flowers (100 g from each sample) by hydrodistillation for 3 hours, using a Clevenger-type apparatus according to the European Pharmacopoeia. The extracted essential oils were collected and Gas chromatographic (GC) analyses were performed using a Perkin–Elmer Autosystem XL gas chromatograph. Results showed that, Heneicosane (20.8–53.54%) and Nonadecane (29–34.62%) were the main constituents of all the samples. 1- Pentadecene (4.33–10.32%) was also detected in the composition of two samples of *Rosa foetida*. Heptadecane (5.76%) was detected only in the yellow petal genotype of the *Rosa foetida*, Heptadecane (7.11%) was detected only in the red-yellow petal genotype of the *Rosa foetida* and Pentadecene (9.07%) was detected only in the flowers of *Rosa canina* species. As a result, most of the compounds identified in these two species are Cosanes and Decanes.

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Poster Presentation ID: 151

### The Antioxidant Capacity of Methanolic Extract of Prickly Pear Cultivated in Yazd, Iran

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#### ARTICLE INFO

Keywords:

Prickly pear

Methanolic extract

Antioxidant capacity

#### ABSTRACT

The prickly pear (*Opuntia ficus-indica*), belongs to the *Cactaceae* family, is an edible fruit which is rich in antioxidants, fatty acids, and vitamin E (1). Due to existence of this fruit in Yazd province, we aimed to investigate the antioxidant capacity, phenolic and flavonoid content of methanolic extract of prickly pear. Therefore, the methanolic extract of prickly pear (MPP) in concentration of 5, 10, 20, and 30 % was prepared. The antioxidant capacity (FRAP), total phenolic (TPC) and flavonoid content (TFC) of extracted samples was analyzed. According to the results, by increasing in the prickly pear concentration, the FRAP, TPC, and TFC of samples was increased. The TPC of 5, 10, 20, and 30 % of MPP was evaluated 442.22, 900.98, 1413.16, and 1650.12 mg/g GAE, respectively. The TFC of MPP was ranged from 785.28 to 1639 g rutin in 5 and 30% concentration, respectively. According to the results, the prickly pear can have high antioxidant capacity which can be used in food as a natural antioxidant as well as food colorant (2). Also, MPP can be a potential source of natural compounds and therapeutic agents which could prevent the diseases associated with oxidative stress.

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Poster Presentation ID: 153

### Impact of *Staphylococcus warneri* biostabilizer on *Agoropyron desertorum* seed germination and acute toxicity evaluation

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#### ARTICLE INFO

##### Keywords:

Biocementation  
Soil stabilization  
Toxicity  
Wind erosion control

#### ABSTRACT

Microbial-induced calcite precipitation (MICP) is an eco-friendly technique that can enhance soil surface stability and resistance to wind erosion [1]. This study investigated the performance of MICP using the bacteria *Staphylococcus warneri* for soil surface improvement. The focus is on using *S. warneri* within a biostabilizer, combined with a cementation mix of calcium chloride and urea, and its efficacy in soil improvement [2]. The enhanced soil samples underwent thorough assessments to gauge their safety through oral, dermal, and ocular toxicity evaluations, in line with OECD guidelines [3]. Research findings revealed that while the biostabilizer might slightly delay seed germination of *Agoropyron desertorum* at high concentrations, it did not exhibit any phytotoxic effects. Acute toxicity tests conducted on rats for oral and dermal exposure resulted in LD<sub>50</sub> values exceeding 5000 mg/kg and 1000 mg/kg, respectively, indicating a high level of safety while used for consumption over 14 days. Additionally, ocular tests in rabbits confirmed the absence of eye irritation when used in a single 0.1 drop dose and observed for 21 days, further supporting the harmlessness of the biostabilizer. These results highlight the potential of the MICP technique, utilizing *S. warneri*, as an effective and safe strategy for soil improvement, particularly in mitigating wind erosion of soil.

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Poster Presentation ID: 154

### In vitro propagation of marigold (*Silybum marianum* L.) via direct regeneration

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#### ARTICLE INFO

*Keywords:*

Regeneration  
Milk thistle  
Silymarin  
Hormone

#### ABSTRACT

*Silybum marianum* L., a member of the Asteraceae family, is a highly valuable medicinal plant in the pharmaceutical industry due to its active ingredient, silymarin. Silymarin boasts significant effectiveness in treating liver diseases, hepatitis, and cardiovascular disorders. However, natural habitats struggle to produce this medicinal compound at both sufficient potency and production speed. Consequently, researchers have explored the use of genetic engineering and transgenic plant production techniques, such as tissue culture, for this plant [1, 2]. The initial step in this approach involves establishing an in vitro regeneration protocol. This study investigated the impact of various hormone combinations on direct regeneration using leaf explants obtained from the Hungarian cultivar of *S. marianum*. After six weeks in culture, the highest shoot formation (57%) was achieved in a half-strength MS medium supplemented with 0.4 mg/l zeatin, 0.2 mg/l BAP, and 0.2 mg/l NAA. Subsequently, the shoots were transferred to a root culture medium containing different hormonal combinations. The results indicated that the optimal treatment for promoting long and well-developed roots was a half-strength MS medium containing 0.25 mg/l NAA and 2 g/l activated charcoal. Finally, the seedlings obtained through direct regeneration exhibited successful growth after being transplanted into soil.

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Poster Presentation ID: 155

### Evaluation of anxiolytic, anti-depressant, and hypnotic effects of citral using different experimental models in mice

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#### ARTICLE INFO

##### Keywords:

Citral  
Anti-depressant  
Sedative  
Hypnotic  
Neurological disorders

#### ABSTRACT

Depression, anxiety, and sleep disorders are prevalent neurological disorders globally, with limited treatment options due to the adverse effects and dependency associated with conventional medications. Natural origin compounds have gained significant interest as potential alternatives. This study investigates the anxiolytic, antidepressant, and sedative-hypnotic effects of citral, a natural compound, using various experimental models. Citral was administered orally to mice at different doses, and its effects were compared to a control group. In the open field test, citral significantly reduced locomotor activity at a dose of 400 mg/kg. Additionally, citral increased pentobarbital-induced sleeping time at the same dose, indicating sedative and hypnotic effects. In the forced swimming test, citral reduced immobility time at doses of 100-400 mg/kg, suggesting antidepressant activity. However, citral did not exhibit significant effects in the elevated plus maze test. The results suggest that citral possesses sedative, hypnotic, and antidepressant properties, making it a promising natural compound for the treatment of neurological disorders. Further studies are necessary to elucidate the underlying mechanisms of citral's activities. This research contributes to the ongoing search for effective and safe natural remedies for depression, anxiety, and sleep disorders, and may pave the way for the development of novel therapeutic agents.

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Poster Presentation ID: 156

### Investigating the authenticity of medicinal plants used in the treatment of gastrointestinal diseases in Mashhad, Iran

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#### ARTICLE INFO

##### Keywords:

Medicinal plants  
Authentication  
Gastrointestinal diseases  
Mashhad  
Traditional medicine

#### ABSTRACT

The rich floral diversity of Iran plays a significant role in traditional medicine, which can be one of the major components of the primary healthcare system [1]. Traditional plant utilization for treating diseases has a long history among Iranian indigenous people [2]. In Mashhad, the second-most-populous city in Iran, a variety of medicinal plants are utilized in remedy preparation, frequently in their dried form. This can result in similarities and challenges in the identification and authentication of these plants. Due to these similarities, the same names may be used for different plant species. According to the previous studies, 20 medicinal plant species, belonging to 12 different families were used for treating gastrointestinal diseases in Mashhad [1]. In this study, our objective was to examine the identification and authenticity of these medicinal plants available in the markets of Mashhad. To collect information and acquire the reported medicinal plants, we conducted personal interviews with various traditional healers. Our findings suggest that the similarity in the dried form of different species, such as *Ziziphora tenuior* and *Z. clinopoides*, may lead to their misuse. For example, both of these species are traditionally used for treating digestive disorders. However, due to the resemblance of their leaf forms to *Thymus* species, misidentification and subsequent misuse of these plants may occur. Hence, precise identification and authentication of medicinal plant species are crucial. Utilizing a combination of morphological investigations, phytochemical techniques, and DNA barcoding approaches is essential for achieving accurate results in this regard.

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Poster Presentation ID: 157

### Ethnobotanical survey of certain adulterant medicinal plants sold in the markets of Mashhad

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#### ARTICLE INFO

##### Keywords:

Medicinal plants  
Herbal markets  
Adulteration  
Mashhad  
Ethnobotany  
Misuse

#### ABSTRACT

The international trade of medicinal plants and herbal products has increased over the past decades in Iran due to great folk medicine and civilization [1]. Regarding the rich Flora of Iran, different societies have their unique local name for plants. Hence, different names may be used for one species or may be the same names for different plants in different languages and so numerous mistakes have been generated as a result of the similarities and misuse of medicinal plants. Herbal markets as an integral part of the medical culture of Iran have a crucial role in medicinal plants identification and sale [2]. An ethnobotanical survey was conducted in the markets of Mashhad to explore the adulterated medicinal plants and the dangerous aspects of using them. Data collection involved personal interviews with traditional healers. As a result, 33 species of medicinal plants were documented and identified using valuable Floras. The most significant families included Lamiaceae (16), Asteraceae (5) and Apiaceae (4) species. Ethnobotanical data consisting of scientific and vernacular names, parts used, traditional use, and methods were documented. Plants sold in the markets were predominantly used for treating various human disorders. Our findings confirmed that the resemblance of the plant parts of some medicinal plants is the major challenge of the medicinal plant market of the city and many problems can occur during the adulteration and misidentification of plants such as *Lavandula*, *Nepeta*, *Hyssopus*, *Silybum*, *Echinops*, *Hymenocrater*, *Carum*, *Bonium*, etc. Therefore, the correct authentication of medicinal plants and documentation of their indigenous knowledge can provide the way for better utilization of these plants and their derived products.

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### Phytochemical diversities among some *Quercus brantii* L. ecotypes in Iran

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#### ARTICLE INFO

##### Keywords:

Diversity phytochemical  
Phenolic compounds  
Tannin  
*Quercus*

#### ABSTRACT

The *Quercus* genus is an evergreen or deciduous tree, belonging to the Fagaceae family. These genus contain about 450 species and represent an important tree group widespread in Europe, Asia, North Africa, North, Central and South America [1]. The plants against some herbivores and affect positively mammals (humans included) due to the antioxidant, antimicrobial, anti-inflammatory and anticarcinogenic activities [2]. In order to investigate the phenolic compounds and total tannin content of *Quercus brantii* ecotypes, samples from different regions (West Azarbaijan, Kurdistan, Ilam and Kermanshah provinces) of Iran were collected. Phytochemical properties of total phenol content (TPC) and total tannin content (TTC) (Folin-Ciocalteu method) and total flavonoid content (TFC) (aluminum chloride method) were evaluated. The TFC varied from 2.01 to 41.50 mg GAE/g DW of fruit. Its maximum and minimum levels were observed in Sardasht and Kermanshah ecotype, respectively. Kermanshah was the richest ecotype in TFC (583 mg RE/g DW) and Sardasht ecotype had the lowest amount (203 mg RE/g DW). The highest amount (49.1 µg/g DW) of TTC was observed in Sardasht ecotype and the lowest (31.1 µg/g DW) in Ilam ecotype. The results of the present study declare immense scope for devising effective breeding strategies that will enable optimum utilization of *Quercus* resources by the pharmaceutical and nutraceutical industries.

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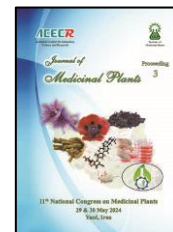
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### Phytochemical and taxonomical study of the genus *Lavandula* L. in Iran

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#### ARTICLE INFO

##### Keywords:

Lavandula  
Phytochemicals  
GC/MS analysis  
Taxonomy  
Classification

#### ABSTRACT

The genus *Lavandula* L. is one of the most important taxa of the family Lamiaceae which is widely used in pharmaceutical, perfumery, and cosmetic industries due to its rich source of phytochemicals. Different species of this genus occur naturally in the Mediterranean basin and are also frequently cultivated in France, Italy, Spain, and North Africa for their essential oils. In Iran, two endemic species of *Lavandula*, *L. stricta* Delile (synonym of: *L. coronopifolia* Poir.) and *L. sublepidota* Rech.f. are widely grown in the south [1]. Recently another new species, *L. pubescens* Decne. was also reported in Bushehr Province [2]. *L. pubescens* populations are characterized by their single-flowered cymes borne in a decussate arrangement. Due to Iranian traditional medicine, the therapeutic utilization of lavender for the treatment of various diseases, including neurological, digestive, and respiratory diseases dates back centuries [3]. Phytochemical investigations, along with morphological characteristics, can be helpful in taxonomic classification of *Lavandula* species. In this study, the chemical composition of 6 samples of *Lavandula* purchased from different herbal markets in Iran was evaluated and investigated using GC/MS analysis. The results showed that linalool and linalyl acetate in *L. angustifolia*, 1,8 cineole and camphor in *L. latifolia*, and camphor in *L. dentata* were the major chemical compounds in the essential oil. Moreover, *L. angustifolia* showed the highest amount of linalool among different species. Our findings suggest that the chemical constituents of the genus *Lavandula* can be effective in the identification and taxonomic classification of these species.

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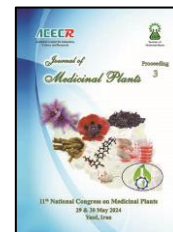
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## 11<sup>th</sup> National Congress on Medicinal Plants

29 & 30 May 2024  
Yazd, Iran



Poster Presentation ID: 160

### Design and fabrication of nanoparticles containing *Aloe vera* leaf extract and cytotoxicity evaluation on HepG2 liver cancer cells

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#### ARTICLE INFO

##### Keywords:

*Aloe vera*  
Anthraquinone  
Nanoemulsion  
Cytotoxicity  
HepG2 cell line

#### ABSTRACT

*Aloe vera* is a plant that belongs to the genus *Aloe*, the Asphodelaceae family, and the Asparagales order. While it is utilized as an anti-irritant, the skin leaf of the *Aloe vera* plant contains Aloin derivatives and Aloe-emodin that exhibit anticancer properties, against numerous cell lines. This is attributed to the high concentration of anthraquinones present in the plant. With an extraction efficiency of  $20 \pm 3.5\%$ , *aloe vera* skin leaves were extracted using ultrasonic waves, and the amount of aloin A, aloin B, and aloemodin ( $\mu\text{g/g}$  of dried powder) was determined using HPLC-UV. The cytotoxicity of the produced extract was then evaluated using an MTT assay against HepG2 liver cancer cells during 48 hours of treatment, and the half-maximal inhibitory concentration ( $\text{IC}_{50} = 144.17 \pm 6.23 \mu\text{g/ml}$ ) was recorded. To improve drug delivery of these compounds, *Satureja khuzestanica* essential oil nanoemulsions (to produce a synergistic effect) were used and compared to the positive control cisplatin ( $\text{IC}_{50} = 12 \pm 1.2 \mu\text{g/ml}$ ). Dynamic Light Scattering was used to study the nanoparticles' size and stability (over 3 months), and polydispersity index. The experimental design, Box-Behnken response surface methodology was used to optimize the preparation conditions. Ultimately, the cytotoxicity against hepatocellular carcinoma and mouse connective tissue fibroblast cells (L929) and nanoparticle morphology using Transmission Electron Microscopy were evaluated. According to the results, the optimum nanoemulsion has a roughly 13-fold decreased cytotoxicity on healthy cells. According to the findings, the fabrication of stable nanoparticles resulted in enhanced cytotoxic activity compared to the crude extract, demonstrating improved efficacy.

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Poster Presentation ID: 161

### Green synthesis of Ag<sub>2</sub>Se nanoparticles after ultrasonic-assisted extraction of aqueous extract of *Ficus Johannis* and evaluation of antibacterial activity

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#### ARTICLE INFO

##### Keywords:

Antimicrobial activity

Ag<sub>2</sub>Se nanoparticles

Ultrasonic-assisted  
extraction

*Ficus Johannis*

#### ABSTRACT

Recently, the green synthesized nanoparticles (NPs) using plant extracts have attracted great attention due to their prospective nanomedical applications. This study investigated a proficient, safe, and sustainable way for Ag<sub>2</sub>Se NPs preparation, using the fruit extract of the *Ficus Johannis* plant. The aqueous extract of the fruits was obtained by ultrasonic technique at 40 °C for 15 min. The extract was used as a natural stabilizing precursor for Ag<sub>2</sub>Se NPs synthesis, in the presence of silver nitrate and selenium dioxide. Characterization of the synthesized Ag<sub>2</sub>Se NPs was carried out using UV-Vis, fluorescence, Fourier transform infrared (FT-IR) spectroscopy, Scanning electron microscopy (SEM), and X-ray diffraction (XRD). A clear absorption spectrum around 450 nm and a maximum fluorescence peak at 530 nm clarified the successful synthesis of Ag<sub>2</sub>Se NPs. The results revealed the uniform spherical morphology for the synthesized Ag<sub>2</sub>Se NPs with an average diameter of 60 nm. Moreover, the biological properties of the extracts and biosynthesized Ag<sub>2</sub>Se NPs were investigated by antimicrobial tests including disk-diffusion, minimum inhibitory concentration, minimum bactericidal concentration, proteins, and nucleic acid release. Subsequently compared to the free forms, the generated nanoparticles exhibited higher biological activity, qualifying them for use in various agricultural domains.

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Poster Presentation ID: 162

### Characterization of essential oils and antioxidant activity of the essential oils of *Salvia oligophylla* and *S. atropanata*

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#### ARTICLE INFO

Keywords:

Essential oil

*Salvia oligophylla*

*Salvia atropanata*

GC/MS

Antioxidant

#### ABSTRACT

This study was conducted to evaluate the chemical composition and *in-vitro* antioxidant activity of the essential oils of *Salvia oligophylla* and *S. atropanata* which were collected from their natural habitats in Qazvin province. The aerial parts of plants were collected at full flowering stage. The essential oils were isolated by hydrodistillation and analyzed by a combination of capillary GC and GC/MS. The samples were also subjected to screening for their possible antioxidant activity by using 2,2-diphenyl-1-picrylhydrazyl (DPPH) assay. According to the obtained results, 27 components (representing 97.9 %) were identified in the essential oil of *S. oligophylla*. The major compounds of this essential oil were determined as germacrene-D (23.4 %), trans-caryophyllene (20.3 %), bicyclogermacrene (13.7 %), and  $\alpha$ -pinene (9.3 %), respectively. Twenty-two compounds were characterized in the oil of *S. atropanata* representing 92.8 % of the total oil with germacrene-D (33.5 %), bicyclogermacrene (15.1 %), and trans-caryophyllene (8 %), as the major constituents. None of the essential oils showed antioxidant activity.





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Poster Presentation ID: 163

### Evaluation of *Satureja khusitanica* nanoemulsions' antibacterial activity using femtosecond laser and microfluidic chip

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#### ARTICLE INFO

##### Keywords:

Femtosecond laser  
pulses  
*S. aureus*  
Antimicrobial activity  
Cytotoxicity  
*Satureja khusitanica*  
essential oil

#### ABSTRACT

Food preservation is the most significant concern to maintain food health for a longer period by harmful microbes growth prevention. This study aims to determine whether it is feasible to produce a stable SKEO nanoemulsion (NE) and to examine the effects of various formulation concentrations on bacterial cells by trapping the *S. aureus* bacteria and looking for potential morphological changes. More importantly, femtosecond laser pulses are used to illuminate trapped cells in SKEO NE to confirm any potential effects on the rate at which the cells undergo morphological changes as well as the enhanced effect of nanoemulsion on the bacteria due to likely cell wall debilitation. The effect of different residence times and concentrations on the antibacterial activity of nanoemulsion was studied by evaluating the release of cytoplasmic components, and also MIC, MBC, and time-killing assays. Remarkable intensification was observed by employing a microfluidic chip owing to the provision of a high contact surface area between nanodroplets and bacterial membranes. The MIC and MBC values in the conventional method were obtained at 0.62 mg/ml. These values were reduced to 8, 25, and 50 µg/ml concentrations using a 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 20-min residence time as compared to the conventional method for 5 h operation. Concludingly, the amounts of bacterial cell distraction at shorter times will be seen, demonstrating the useful functions of femtosecond pulse inclusion.

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Poster Presentation ID: 164

### Evaluation of Quercetin *Satureja khuzistanica* essential oil nanoemulsions antibacterial efficacy against *E. coli* employing a microfluidic device

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#### ARTICLE INFO

##### Keywords:

Microfluidic chip  
*E. coli*  
Antimicrobial activity  
Quercetin  
*Satureja khuzistanica*  
essential oil

#### ABSTRACT

The present study aims to evaluate the antibacterial activity of Quercetin /*Satureja khuzistanica* essential oil (Qu/SKEO NE) against a Gram-negative (*E. coli*) 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 the 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 a microfluidic chip owing to the provision of a high-contact surface area between nanodroplets and bacterial membranes. The MIC and MBC values for *E. coli* in the conventional method were obtained at 0.012 mg/ml. whereas these values were reduced to 8, 25, and 50 µg/ml concentrations using a 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 20-min residence time as compared to the conventional method for 5 h operation.

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Poster Presentation ID: 165

### Comparison of antibacterial activity of Mentosin herbal drug and *Mentha piperita* essential oil

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> <i>Escherichia coli</i> Minimum Inhibitory Concentration (MIC) Minimum Bactericidal Concentration (MBC) Mentosin</p>	<p>The antibacterial activity of the essential oils and their constituents against some pathogenic bacteria has been reported. [1]. <i>Mentha piperita</i> (Lamiaceae) is one of the mint species. A large number of studies have concerned the antibacterial effect of mint oil [2]. The Pardis Daru Arvand Company produces the Mentosin herbal drug that is a veterinary medicine. It contains several active substances from different medicinal plants such as peppermint, eucalyptus, etc. The antibacterial effect of these plants has previously been reported. To reduce the use of synthetic antibiotics, recently considerable attention has been given to the search for naturally occurring compounds. The present work aimed to compare the antibacterial effect of peppermint oil and Mentosin. The in vitro antibacterial activity against six pathogenic bacteria (<i>Salmonella enteritidis</i>, <i>Escherichia coli</i>, <i>Salmonella typhi</i>, <i>Staphylococcus aureus</i>, <i>Klebsiella pneumoniae</i>, <i>Listeria monocytogenus</i>) was evaluated by agar dilution method. The data were subjected to ANOVA according to the Minitab 17 software. The result indicates that Minimum Inhibitory Concentration (MIC) for the bacterial species ranged from 1.16 to 2.36 % in Mentosin application which is better than peppermint oil application. The Minimum Bactericidal Concentration (MBC) value of Mentosin indicates that <i>S. typhi</i> and <i>K. pneumoniae</i> are less susceptible than other bacteria. According to this research, Mentosin application is recommended to prevent the growth of pathogenic bacteria.</p>

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Poster Presentation ID: 166

### Investigating the effect of growth regulators on the induction of shoot production in (*Dracocephalum kotschy*) in vitro

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> <i>Dracocephalum</i> Lamiaceae Callus Shoot</p>	<p><i>Dracocephalum kotschy</i> is a medicinal plant belonging to the Lamiaceae family and is one of Iran's endemic plants. Its habitats include the north, west and center of Iran and provinces such as Isfahan, Yasouj, Mazandaran and East Azerbaijan, as well as cold and mountainous regions. Due to the presence of complex seed dormancy and growth in certain habitat areas, its distribution in nature has been reduced and despite its medicinal properties, it has been placed among plants in danger of extinction. Plant tissue culture is considered more suitable for this plant due to the reasons mentioned, including propagation and micropropagation methods. One of the most important propagation methods is micropropagation through the induction of callus and somatic embryos and then shoot production. In the research, the effect of different treatments including gibberellic acid (0.3 mg/l) and charcoal (3 g/l) alone and in combination with BAP (3, 4 mg/l) in combination with 2,4-D 1 mg/L) and NAA (1 mg/L), on the micropropagation of the plant through callus shooting was investigated. Finally, the number of productive shootes and their length and their wet and dry weight were measured and the results showed that the culture medium containing 1 mg of NAA and 4 mg of BAP led to the highest production of shooting (83%) and the highest weight Wet and dry branches were also appropriated. And in the environment with gibberellic acid alone or with charcoal, shooting did not occur.</p>

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Poster Presentation ID: 169

### Design and development of *Melissa officinalis* essential oil microcapsules based on maltodextrin and gum arabic by spray drying

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#### ARTICLE INFO

##### Keywords:

Microencapsulation  
Essential Oil  
*Melissa officinalis*  
Spray Drying

#### ABSTRACT

Essential oils are mixtures of natural compounds with high volatility that are used in the pharmaceutical, cosmeceutical, food, agricultural, and textile industries. *Melissa officinalis* essential oil is one of the essential oils that has attracted the attention of medicinal researchers, which has anti-cancer, antimicrobial, antihistamine, anti-spasm, and anti-oxidant effects. In general, using essential oils faces major challenges such as high volatility, poor solubility, and sensitivity to oxygen, heat, and light. One of the common approaches to overcome these challenges is microencapsulation technology. Microencapsulation is defined as a process of encapsulating the active ingredient as a core via a coating agent as a shell. In this technology, different methods are used. Among these methods, spray drying has attracted the attention of researchers due to the high rate of processing, flexibility, low energy consumption, cost-effectiveness, industrialization capability, and the ability to produce powder particles with appropriate quality. In this project, the microencapsulation of *Melissa officinalis* essential oil was studied by spray drying using maltodextrin and gum arabic as coating agents. By optimization of the process with Design-Expert software, the optimum ratio of coating agents, feed flow rate, and initial temperature were determined, the stability of the essential oil was evaluated until 180 days, and the physicochemical characteristics of the microcapsules were investigated. In the optimum formulation, the encapsulation efficiency was 97%. Also, the coating of essential oil was confirmed by scanning electron microscopy (SEM) and fluorescence microscopy.

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Poster Presentation ID: 172

### Study on *Eucalyptus* endophytic fungi

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#### ARTICLE INFO

##### Keywords:

Eucalyptus  
Endophytes  
Symbiosis

#### ABSTRACT

The genus *Eucalyptus*, comprising of more than 700 species, is cultivated worldwide due to its medicine, oil, gum, pulp, timber, paper, charcoal and etc. [1]. Endophytic fungi are microorganisms which colonize plants during their entire, or at least a significant part of their life cycle without any symptoms [2]. These microorganisms are prolific producers of compounds with practical applications in agrochemicals or medicine such as antiviral, antimicrobial, anticancer, immunosuppressive, antidiabetic, antioxidant, and etc. which may be similar to those produced by their host plants [3]. In the present study, in order to isolate and identify the *E. camaldulensis* fungal endophytes, healthy and symptomless samples were collected from trees located in some provinces of Iran during the autumn. Among 753 fungal isolates obtained from 44 plant samples, 25 (72 % leaf, 28 % branch, 0 % fruit), 88 (78 % leaf, 6 % branch, 16 % fruit), 382 (38 % leaf, 24 % branch, 38 % fruit), 109 (58 % leaf, 30 % branch, 12 % fruit) and 152 (63 % leaf, 21 % branch, 17 % fruit) isolates were related to Alborz, Isfahan, Mazandaran, Qom and Tehran provinces, respectively. In addition, 15 fungal genera including: *Alternaria*, *Aspergillus*, *Bipolaris*, *Botrytis*, *Chaetomium*, *Cladosporium*, *Fusarium*, *Paecilomyces*, *Penicillium*, *Pestalotiopsis*, *Rhizopus*, *Trichoderma*, *Ulocladium*, *Pseudosydowia* and *Phaeophleospora* were identified using their morphological characteristics. Across identified genus, some were sporeless and some of them had pycnidium. The results indicated that the most isolated endophytes from fruit, leaves and branches belonged to *Cladosporium*, *Chaetomium* and *Penicillium* genera, respectively. In the next step, some compounds production of these fungi will be evaluated.

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### Examining Cyclodextrin's Potential for Taste Masking of Natural Antioxidants in Meat: An In Silico Approach

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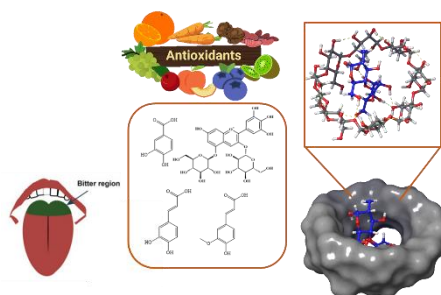
#### ARTICLE INFO

##### Keywords:

Meat products  
Lipid oxidation  
Taste masking  
Molecular docking  
Molecular dynamic

#### ABSTRACT

Lipid oxidation and microbial spoilage are the most important causes of meat spoilage that have a direct impact on the quality of meat products. The awareness of the health implications of the extended use of synthetic meat preservatives has increased consumer demands for the use of natural compounds. However, the bitter taste of some of the natural compounds has limited their usage in food products (1). This study evaluated the ability of natural compounds to inhibit lipid oxidation while exhibiting strong antibacterial properties and masking their bitterness through cyclodextrin inclusion complexes. The investigation focused on the capacity of 3,000 natural compounds to inhibit both the 12-lipoxygenase enzyme, a catalyst of lipid oxidation, and *Pseudomonas aeruginosa* via the MurA inhibitor. Additionally, the bitterness intensity of selected compounds with docking scores lower than -8 kcal/mol was assessed through screening with the TaS2R46 enzyme. Approximately 83% of the selected compounds exhibit docking scores lower than -5 kcal/mol, indicating the bitterness of these compounds, which is consistent with their phenolic structures. To overcome the bitter taste of these compounds, their ability to form an inclusion complex with  $\alpha$ ,  $\beta$ , and  $\gamma$ -cyclodextrin was investigated using XP docking and molecular dynamic studies. Based on the obtained data, rutin and procyanidin demonstrated the most stable interactions with gamma and beta cyclodextrin under physiological conditions, with maximum cyclodextrin RMSD values of 1.195 Å and 1.397 Å, respectively. However, the selected compounds did not fit well with alpha cyclodextrin, showing docking scores ranging from -4 to -5.6 kcal/mol.



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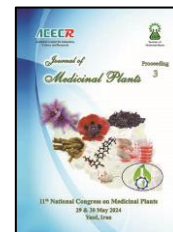
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Poster Presentation ID: 174

### Effect of cerium oxide nanoparticles on morphological and photosynthesis pigments of *Salvia virgata* under drought stress

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#### ARTICLE INFO

##### Keywords:

Cerium nano oxide  
Chlorophyll  
Drought stress  
Root  
*Salvia virgata*

#### ABSTRACT

Cerium oxide nanoparticles can have different effects on the morphological and biochemical of plants depending on the plant species, cultivation conditions, concentration and method used [1]. To investigate the effects of cerium nano oxide on morphological and photosynthesis pigments characteristics of *Salvia virgata* under drought stress, a factorial experiment based on a completely randomized design with three replications was carried out in the research greenhouse of the Department of Horticultural Science, Ferdowsi University of Mashhad. The factors studied in this research included drought stress at three levels (50, 75, and 90% (control) field capacity) and cerium oxide nanoparticles at four levels (0 (control), 250, 500, and 750 mg/L). The results showed that cerium nano oxide at a concentration of 500 mg/L in 75% FC caused an increase in the dry weight (74.32%), the fresh weight (8.95%), and the volume (40/84%) of the root. Also, applications 500 and 750 mg/L of cerium nano oxide led to an increase in chlorophyll *a* (27.31%), chlorophyll *b* (15.33%), and carotenoids (26.92%) in 50% FC. The results of the present study showed that the application of cerium oxide nanoparticles to a large extent eliminated the negative effects of drought stress in *S. virgata* by improving the morphological and photosynthesis pigments of the plant under drought stress conditions.

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Poster Presentation ID: 175

### The effect of Cocopeat, Sawdust and its Compost on the flower and stigma fresh weight of Saffron

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#### ARTICLE INFO

Keywords:

*Crocus sativus* L.

Sawdust

Soilless Cultivation

#### ABSTRACT

Saffron is obtained from the dried red stigmas of *Crocus sativus* L., is one of the most important and expensive spices in the world [2]. Due to its color, fragrance and compounds, saffron has many uses in the food and pharmaceutical industries, and so far, many researches have been conducted, especially regarding its health and medicinal effects [1]. the aim of this study was to investigate the effect of substrate type on fresh weight of saffron flower and stigma in the hydroponic system. Experimental treatments included three types of culture medium: cocopeat, sawdust and sawdust compost. Based on the result of this study, the amount of flower fresh weight in sawdust compost was %85 higher than cocopeat substrate. Also, the amount of stigma fresh weight in the sawdust compost was higher than sawdust and cocopeat substrate.

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Poster Presentation ID: 176

### Subcritical Extraction of Coriander Seed Oleoresin: Optimization Through Response Surface Methodology

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#### ARTICLE INFO

##### Keywords:

Oleoresin extraction  
Hydrothermal  
autoclave  
Response Surface  
Methodology (RSM)  
Subcritical extraction  
Green extraction

#### ABSTRACT

Coriander (*Coriandrum sativum* L.) is a widely recognized plant in the Umbelliferae family, utilized primarily for its biological active compounds such as fatty acids, polyphenols, and essential oils, which enhance the flavor of food and contribute to various medicinal products. This study aimed to optimize oleoresin extraction using a hydrothermal autoclave. The optimization process employed a Box-Behnken Design protocol, a subset of Response Surface Methodology (RSM), to assess extraction conditions. Variables included temperature (100-150°C), extraction time (5-30 minutes), and ethanol concentration (0-100 %). Yield, total flavonoid content (TFC), and total phenolic content (TPC) were measured as response variables. Results demonstrated a significant correlation between ethanol concentration and extraction yield. Optimal conditions for extraction were identified as 125°C, 17 minutes 30 seconds, and 50 % ethanol, achieving a yield of 7.25 %. These findings adhere to principles of green extraction and provide valuable insights into oleoresin extraction using water as a solvent. Additionally, subcritical extraction techniques offer efficient, low-energy alternatives to conventional methods, preserving the integrity of the bioactive compounds while minimizing environmental impact. This approach enhances the sustainability and applicability of oleoresin extraction for various industries.

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Poster Presentation ID: 177

### The effect of foliar application of micronutrient elements on the growth and yield of saffron (*Crocus sativus* L.)

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#### ARTICLE INFO

##### Keywords:

Foliarspraying  
Micronutrients  
Saffron

#### ABSTRACT

Saffron (*Crocus sativus* L.) is one of the most important crops and medicinal plants in Iran. The balanced supply of nutrients plays a very important role in the sustainability of saffron production, especially in arid and semi-arid regions [1]. But in these areas, micronutrient elements, especially iron, manganese, and zinc, are largely unavailable in the soil due to reasons such as high pH, high percentage of lime, and stabilization by the soil, and the plant shows signs of deficiency [2]. Therefore, according to the nutritional problem of micronutrient elements in the soil, this research was conducted with the aim of investigating the effect of micromix fertilizer application on the growth and yield of saffron, as an economically and medicinally important plant. Micromix fertilizer used for foliar spraying contained 1.44 % iron, 0.81 % zinc, 0.78 % copper, 0.2 % boron and 0.1 % molybdenum. Foliar spraying was done in two stages in March 2017 and April 2018 with a concentration of 0.25 %. The results showed that foliar spraying had a significant effect on the fresh weight of stigma, petal and flower. The weight of stigma 3.7 %, petal 22.5 % and flower 8.3 % was more than control treatment.

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Poster Presentation ID: 180

### **Biomass accumulation and rosmarinic acid production by immobilized cells of *Salvia Hydrangea* DC. Ex Benth in a batch culture system**

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#### ARTICLE INFO

##### Keywords:

Calcium chloride  
Lamiaceae  
Photoperiod  
Sage

#### ABSTRACT

*Salvia* is one of the largest and most important genera of the Lamiaceae family, which has more than 1000 different plant species worldwide. *Salvia hydrangea* DC. ex Benth grown in different regions of Iran, Anatolia and Transcaucasia [1]. The plant is traditionally used for against wounds, pharyngitis, stomatitis, stomachache, headache, common cold, memory problems, and galactorrhoea. *S. hydrangea* comprises several phytochemical compounds such as volatile mono, diand triterpenes flavonoids, and phenolic acids. It has been recently revealed that the plant aerial parts are rich in rosmarinic acid (RA), as a well-known phenolic acid [2]. Recently, the plant cell suspension culture for the production of RA has also been established by our team. In the present study, immobilization of 21-day-old cells of *S. hydrangea* by different concentrations of alginate sodium (1.5, 2, and 3 %) and calcium chloride (1.5, 2, and 2.5 %) was performed. The growth index and RA production of the immobilized cells were measured. The immobilized cells were then cultured in a batch system containing MS liquid medium supplemented with 5 mg/l BA and 5 mg/l NAA. The cultures were incubated in an orbital shaker (80 rpm) in the dark and photoperiod of 16 h light and 8 h darkness for 21 days. The results showed that the biomass accumulation and RA production in the immobilized cells were more than the control culture. The best results were obtained from the immobilized cells with sodium chloride 1.5 % and calcium chloride 2 %. This information can be interestingly used to produce this valuable compound with high yield through *in vitro* systems such as bioreactors.

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Poster Presentation ID: 182

### Utilizing Black Hollyhock Flower Pigments for Natural Coloring in Jellies and Effervescent Tablets

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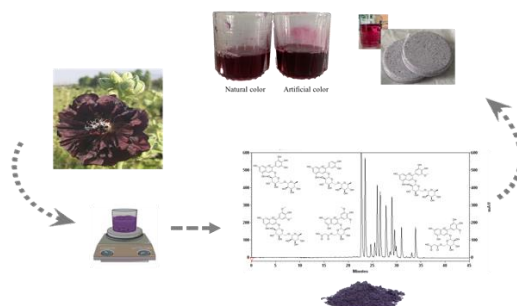
#### ARTICLE INFO

##### Keywords:

Black hollyhock  
Anthocyanin  
Natural pigment  
Jelly  
Effervescent tablet

#### ABSTRACT

Color is a key sensory attribute of food products and plays a significant role in consumer preferences. In recent decades, concerns regarding the potential health risks associated with artificial colorants have prompted the modern food industry to shift towards natural pigments [1]. In this study, black hollyhock (*Alcea rosea* var. *nigra*) flower extract (BHE), which is rich in nutrients, particularly carbohydrates and anthocyanins, was used to color jelly powders and effervescent tablets as an alternative to synthetic colorants. The tablets were formulated with a hardness of 11.8 kp and a disintegration time of 74 seconds. Jellies containing just 0.2% w/w of the extract achieved a color comparable to that of commercial jellies with synthetic colors. The results demonstrated that the tablets and jellies had excellent sensory and color properties, establishing a foundation for the industrial use of BHE as a functional ingredient that aligns with consumer preferences.



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Poster Presentation ID: 185

### Allelopathic effect of saffron corm extract on germination and growth traits of some narrow-leaf weeds

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#### ARTICLE INFO

##### Keywords:

Alcoholic extract  
Aqueous extract  
Allelochemical

#### ABSTRACT

This study investigated the allelopathic potential of aqueous and alcoholic extracts of saffron corm on the germination and growth of select narrow-leaf weeds. Two separate factorial experiments were conducted in a completely randomized design with four replications at the weed laboratory of Aburaihan Faculty of Agricultural Technology, University of Tehran, during the years 2020-2021. The experiments evaluated the impact of different extract concentrations (0.5-1.0-1.5-2% by volume) on *Avena ludoviciana*, *Phalaris minor*, *Hordeum murinum*, *Lolium rigidum*, and *Bromus tectorum*. Weed seed dormancy was alleviated and then incubated in petri dishes containing filter paper and the respective extract concentrations. The dishes were then placed in an incubator with alternating cycles of light/ darkness (12/12 hours at 25/20°C) for 14 days. The results revealed that both aqueous and alcoholic extracts of saffron corms exerted inhibitory effects on the germination and growth parameters of the tested weeds. These effects were manifested as reductions in germination percentage, germination speed, shoot and root length, as well as dry weights of the weeds. Overall, the most pronounced inhibitory effects were observed at a concentration of 10% for both aqueous and alcoholic extracts, resulting in approximately 40% reduction in germination percentage for *A. ludoviciana*, 80% for *L. rigidum*, and 90% for *Ph. minor*, along with significant decreases in germination percentage and seedling length for *Bromus tectorum* and *H. murinum*. These findings underscore the potent allelopathic activity of saffron corm extracts in suppressing the germination and growth of narrow-leaf weeds, suggesting their potential utility as natural herbicidal agents.

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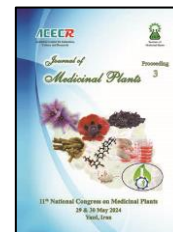
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Poster Presentation ID: 186

### Green Synthesis of Iron Oxide Nanoparticle and its Effect on Seed Germination of *Ocimum basilicum* var. *dark opal*

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#### ARTICLE INFO

##### Keywords:

Green synthesis  
Nanoparticles  
Germination  
Basil

#### ABSTRACT

Nanoparticles (NPs) have become the focus of many fields due to their cost-effectiveness, environmental friendliness, and high performance, especially in sustainable agriculture [1]. In this research, ultrasonic-assisted extraction (UAE) was applied as an efficient and rapid approach for preparing the extract of the *Thymus daenensis* plant. The extract of the plant was used in a green and eco-friendly procedure for iron oxide nanoparticles (Fe<sub>2</sub>O<sub>3</sub> NPs) synthesis. The synthesized Fe<sub>2</sub>O<sub>3</sub> NPs have been characterized via different techniques including UV-Vis absorption, Fourier transform infrared (FT-IR), scanning electron microscopy (SEM), and X-ray diffraction (XRD). According to the results, the average size of the prepared Fe<sub>2</sub>O<sub>3</sub> NPs was estimated at around 98 nm. A broad absorption band around 400 nm in the UV-Vis spectrum clarified the successful biosynthesis of Fe<sub>2</sub>O<sub>3</sub> NPs [2]. In addition, in this study, the effect of Fe<sub>2</sub>O<sub>3</sub> NPs in different concentrations (0, 50, 100, and 200 ppm) and two exposure times (6 and 12 h) were investigated on the seed germination traits of *Ocimum basilicum* var. *dark opal* such as germination rate, germination percentage, and mean germination time. According to the obtained results for the *dark opal* cultivar, the highest germination percentage (91.00 %) was recorded at the concentration of 200 ppm of Fe<sub>2</sub>O<sub>3</sub> NPs and 12 h exposure time. The lowest mean germination time was also observed at 200 ppm concentration and the exposure times of 12 h. As a result, the seed priming of *Ocimum basilicum* var. *dark opal* with green synthetic iron nanoparticles increased its germination characteristics compared with the control.

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Poster Presentation ID: 187

### Plant Extract Mediated Iron Oxide Nanoparticle: Synthesis and Its Seed Priming Effect

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ARTICLE INFO	ABSTRACT
<p><i>Keywords:</i> Green synthesis Fe<sub>2</sub>O<sub>3</sub> NPs Nanoparticles Germination <i>Ocimum basilicum</i></p>	<p>The conventional methods are usually employed for nanoparticles (NPs) synthesis through generally unsafe chemical reduction. Plant bioactive compounds can replace such toxic reductant because of their environmental friendliness and hence plant-mediated green synthesis of NPs has arisen as an emerging technology [1]. Seed priming is an effective tool for increasing seed germination and plant growth traits. Among the different seed priming methods, nano-priming is more effective mainly because of its small size and unique physicochemical properties [2]. In this study, the extract of <i>Thymus daenensis</i> plant was used for Fe<sub>2</sub>O<sub>3</sub> NPs synthesis. Afterward, the seeds of purple basil (<i>Ocimum basilicum</i> L.) were treated by different concentrations of synthesized Fe<sub>2</sub>O<sub>3</sub> NPs (0, 50, 100, and 200 ppm) in two exposure times (6 and 12 h) to evaluate the effect of NPs on seed germination and growth-related traits of the plant. The synthesized NPs were characterized via different techniques including UV-Vis absorption, Fourier transform infrared (FT-IR), scanning electron microscopy (SEM), and X-ray diffraction (XRD). The results showed that the average size of the prepared Fe<sub>2</sub>O<sub>3</sub> NPs was around 98 nm. Based on the results, the nanoparticles concentration was directly related to seed germination traits, wherein the germination characteristics was increased with increment in NPs concentration. An increase in the root length (33.5 mm) was observed compared with the control (20.90 mm) at the concentration of 100 ppm of Fe<sub>2</sub>O<sub>3</sub> NPs and 12 h exposure time. Application of new method and procedure to promote germination capacity can lead to the successful establishment and deep root system of plants.</p>

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Poster Presentation ID: 188

### Ultrasonic assisted extraction as an efficient approach for green synthesis of zinc oxide nanoparticles: Synthesis, characterization, and biological properties

Fateme Asghartabar Kashi<sup>1</sup>, Hassan Esmaili<sup>1\*</sup>, Zinab Moradi Alvand<sup>2</sup>, Liana Parseghian<sup>2</sup>

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#### ARTICLE INFO

##### Keywords:

Green synthesis  
Zinc oxide nanoparticles  
Antioxidant  
Antibacterial

#### ABSTRACT

In the present study, ultrasonic-assisted extraction (UAE) was applied as an efficient, and rapid approach to preparing the extract of *Mentha pulegium* L. plant. The extracts were obtained by ultrasonic (at 40 °C for 15 min) and maceration methods (24 h) and were used in a green and eco-friendly approach for the synthesis of zinc oxide nanoparticles (ZnO NPs) [1]. The synthesized ZnO NPs have been characterized via different techniques including UV–Vis absorption, Fourier Transform Infrared (FT-IR), Scanning Electron Microscopy (SEM), and X-ray Diffraction (XRD). According to the results, the average size of the prepared ZnO NPs was around 85 nm. A broad absorption band around 390 nm in the UV–Vis absorption spectrum clarified the successful biosynthesis of ZnO NPs [2]. In addition, the biological properties of the extracts and biosynthesized ZnO NPs were investigated by different antimicrobial and antioxidant assays. The results indicated the significant antioxidant and antibacterial activity of the ZnO NPs. The acquired results demonstrated that the antibacterial properties of nanoparticles were twenty times higher than the extract. This feature can be due to the high surface-to-volume ratio of nanoparticles and also their small size. In conclusion, the produced nanoparticles showed superior biological activity than the extracts, which qualified them for application in related fields.

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Poster Presentation ID: 190

### Investigating factors affecting the consumption of medicinal plants (case study: Najafabad city in Isfahan province)

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#### ARTICLE INFO

##### Keywords:

Medicinal plants  
Consumption level  
Willingness to consume  
Logit model

#### ABSTRACT

The present study was conducted to investigate the factors affecting the consumption of medicinal plants in Najafabad city. Information from 385 people was analyzed by an ordinal logit model. The results showed that an increase of one year in the user's age reduces the probability of being in the low-consumption group of medicinal plants by 0.008 %. Also, being a woman reduces the probability of being in the group of low consumption of medicinal plants by 0.12%. Being in the situation of an epidemic disease reduces the probability of being in the group of low consumption of medicinal plants by about 0.1 %. to give Internet advertisements (advertisements in virtual groups) and advertisements other than media have the opposite effect on the consumption of medicinal plants and increase the probability of being in the low consumption group by about 0.18%. Having strong therapeutic effects in a medicinal plant has the most important effect on the amount of medicinal plant consumption. So that this effect reduces about 0.42% the probability of being placed in the low-consumption group of that medicinal plant. Informing about the effects of the abuse of chemical drugs and increasing public knowledge about the need to use chemical drugs according to the level of the disease, conducting studies to find the therapeutic effects of various types of plants and their use in the treatment of various clinical diseases, and epidemiological and information studies, are suggestions that were mentioned in this research.

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Poster Presentation ID: 191

### Encapsulation of ethanolic extract of *Berberis vulgaris* L. by using casein and comparison the antioxidant activities of extract and prepared capsules

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#### ARTICLE INFO

##### Keywords:

Casein  
Anthocyanin  
Encapsulation  
Antioxidant

#### ABSTRACT

*Berberis vulgaris* L, known as barberry, is utilized as an analgesic and febrifuge due to its biological compounds such as anthocyanins and alkaloids. It also contains berberine, which reduces cholesterol and blood glucose levels and plays a significant role in preventing various diseases (1). This study was carried out to improve the stability and to increase antioxidant activity of barberry anthocyanin by using encapsulation method (2). Fresh barberry fruits were initially extracted with 96% ethanol, and for encapsulation a natural polymer, casein, was used as a coating layer at pH 2. The freeze-drying process was used for preparing capsules. Encapsulation efficiency results showed that capsules had the highest encapsulation efficiency of 59.33%. The results of Field emission scanning electron microscopy (FESEM) indicated that anthocyanin microcapsules had a mean diameter of approximately 0.385 micrometers and according to the DPPH assay the microcapsules exhibited higher antioxidant capacity compared to ethanolic extract. These microencapsulated barberry antioxidants can be applied in food and pharmaceutical industries.

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### A subject analysis of Iranian medicinal plants research: based on the web of science

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#### ARTICLE INFO

*Keywords:*

Medicinal plants

Bibliometric

Iran

Subject Analysis

#### ABSTRACT

Many published resources on the topic can trace the research community's increasing interest in medicinal plant research. However, there is no systematic bibliometric review in the field of medicinal plants (Batooli and et al., 2023). This research's primary purpose was to analyze research output on the medicinal plant by the Iranian researcher from 1987 to 2023 through a bibliometric perspective. To analyze and present the results based on bibliometrics indicators, namely yearly research trends, relevant journals, social network, hierarchical cluster, and strategic diagram analyses to identify major research themes, country collaboration level (Rahaman and et al., 2021). A total of 3806 quality research papers have been downloaded from the web of science. Data was analyzed with Microsoft excel, bibliometrics, and scientometric software, namely, VOSviewer, and Biblioshiny (RStudio). 995 scientific resources, including journals, books, etc., are indexed in Web of Science from 1987 to 2023 on the subject of medicinal plants. The annual growth rate of documents is equal to 13.74 and the average age of each document is equal to 5.69. The rate of international cooperation in compiling documents is 27/38. The top keywords were “Essential oil” and “antioxidant”. The results shaped the concepts of medicinal plants in 4 clusters. The themes: “oxidative stress and herbal medicine” indicating that these subject is well developed and has a powerful internal correlation and maturation. The subjects “genetic diversity and genetic flow” are not axial but well-developed. “immunity, gene expression and growth” are not central; however, it is well developed. Finally the subjects: “antioxidant, apoptosis and cytotoxicity” are basic and transversal.

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Poster Presentation ID: 193

### Investigating the morphological diversity and yield of different *Mentha spicata* populations in field conditions

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#### ARTICLE INFO

##### Keywords:

Spike mint  
Morphological  
diversity  
Flowering head branch

#### ABSTRACT

In order to investigate the morphological diversity and yield of 11 *Mentha spicata* populations, their rhizomes were transferred from the cities of Yasouj, Qazvin, Isfahan, Arak, Khorram Abad, Karaj, Ardabil, Rasht, Gorgan, Kerman and Qom to Research Institute of Forestry and rangelands. The statistical was a randomized complete block design with 3 replications. The dimensions of the plots were 2 x 1.5 meters, the size of the rhizomes was 10 to 12 cm, and the planting distances were 20 x 25 cm. Traits were measured and harvested at the full flowering stage. The results of analyzing the variance of the morphological traits of different populations of spearmint in the first year showed that there was a difference between the investigated populations in the traits of plant height, inflorescence length, number of lateral stems, leaf length and width, inflorescence diameter and stem diameter at the level of one percent. It was observed that there was a statistical difference at the 1 % level between different populations in the dry yield of leaves, stems, inflorescences and flowering branches. Comparison of averages showed that the highest yield of leaves (1732 kg/ha), stem yield (1930 kg/ha) and flowering branch (4053 kg/ha) belonged to Yasouj population. Also, in terms of flower yield, Gorgan, Qazvin and Karaj populations had the highest yield with 630, 623 and 514 kg/ha, respectively. The results show the existence of high diversity among the populations and for the economic production of this plant, it is better to select the appropriate populations first.

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Poster Presentation ID: 194

### Biosynthesis of copper nanoparticles using *Alcea rosea* ethanolic extract and comparison of the antioxidant activity of the extract and copper nanoparticles

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#### ARTICLE INFO

Keywords:

*Alcea rosea*

Extract

Copper nanoparticles

Antioxidant activity

#### ABSTRACT

Holyhock with the scientific name of *Alcea rosea* belongs to the Malvaceae family. Several pharmacological studies have proven the anti-inflammatory, antibacterial, anti-oxidative and anti-pain properties of this plant (1). In recent years the utilization of phytochemicals from medicinal plant extracts has become a unique technology for the synthesis of nanoparticles. In this study the copper nanoparticles were synthesized from ethanolic extract of *A. rosea* flowers. The synthesized nanoparticles were characterized using UV-Vis, Fourier-transform infrared spectroscopy (FTIR) and field emission scanning electron microscopy (FESEM) methods. The average size of spherical copper nanoparticles was 19.53 nm. Moreover, the total phenol content (TPC), total flavonoid content (TFC) of extract and copper nanoparticles were determined. The antioxidant activity of extract and copper nanoparticles was compared by using DPPH and FRAP assays. The ethanolic extract and copper nanoparticles exhibited the higher TPC with  $7.45 \pm 1.19$  mg GAE/ g sample and the higher TFC with  $11.52 \pm 1.11$  mg QUE /g sample, respectively. Also, the obtained results indicated that the ethanolic extract showed higher DPPH radical scavenging activity ( $93.70 \pm 0.04\%$ ), and FRAP content ( $1.42 \pm 0.79$  mol FeSO<sub>4</sub>/g extract) than copper nanoparticles. Extract and copper nanoparticles showed strong antioxidant activities and may be used as a potential source of natural antioxidant against free radical associated diseases.

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Poster Presentation ID: 195

### Secondary metabolite as a potent novel strategy against human viral disease; its present and prospects

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#### ARTICLE INFO

##### Keywords:

Coronavirus  
COVID-19  
Medicinal Plants  
Secondary metabolites

#### ABSTRACT

Numerous researchers have extensively reviewed Coronavirus disease-2019 (COVID-19), examining its history, origin, spread, epidemiology, pathogenesis, clinical features, and differential diagnosis. However, our particular focus lies on the potential of medicinal plants as a promising avenue for COVID-19 treatment, either as standalone therapies or in combination with other approaches. The elucidation of secondary metabolites with potent antiviral activity holds promise for the development of effective antiviral agents. Efforts are essential to prevent similar zoonotic outbreaks in the future. Here we explore logical strategies for identifying or creating drugs specifically targeting COVID-19. Additionally, it investigates into herbal remedies. Given the limitations of antiviral drugs (which often lead to viral resistance), evaluating the effectiveness of medicinal plants against synthetic drugs is crucial. Researchers are encouraged to focus on the molecular interactions between COVID-19 and secondary metabolites. We found that discovering a drug that can prevent infection and is safe for all population groups would significantly benefit public health. Plant-based drugs, especially those derived from secondary metabolites (SMs), have the potential to treat human viral diseases. Based on our finding, SMs from plants with antiviral properties offer a promising alternative approach for managing viral illnesses in humans and herbal medicine could offer a safer and potentially faster solution in combatting the COVID-19 pandemic. Additionally, considering the ethnopharmacology and ethnobotany of medicinal plants is crucial for plant-based drug discovery in the context of viral diseases. Furthermore, the synergistic interactions among different phytochemicals may enhance bioactivity efficacy or mitigate toxicity.

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Poster Presentation ID: 196

### The Potential of Meroterpenoids as Plant-based Fungicide: An Alternative Method Against Ochratoxin A

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#### ARTICLE INFO

##### Keywords:

Bio-control  
Mycotoxin  
Ochratoxigenic activity

#### ABSTRACT

Despite advances in the control of ochratoxin A through the enhancement of synthetic fungicides, there remains a significant demand for strategies that pose reduced risks to both the environment and public well-being. Consequently, the primary objective of fungicide research is to introduce fewer toxic agents capable of combating a wide array of fungal species. Meroterpenoids originate from a mixed terpenoid biosynthetic route. They are characterized as secondary metabolites exhibiting remarkable biological and pharmacological properties, and are prevalent in various marine organisms, fungi, and plants. The goal of this study was to assess the antifungal activity of four meroterpenoids (arnebinol A-D) isolated from *Arnebia euchroma* root against *Penicillium verrucosum*. Assay of anti-ochratoxigenic of arnebinol A-D, as well as, minimum inhibitory concentrations (MIC) and minimum fungicidal concentration (MFC) values were conducted. The results showed that all the four compounds exhibited inhibitory effects against *P. verrucosum* at varying degrees, with the following antifungal activity order: arnebinol D > arnebinol C > arnebinol B ≥ arnebinol A. The antifungal assessment showed that arnebinol D had a noticeable ochratoxigenic activity which was comparable to that of positive control against *P. verrucosum*.

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### Investigating the amount of fat and profile of saturated and unsaturated fatty acids in seeds (*Cydonia oblonga miller*)

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#### ARTICLE INFO

##### Keywords:

Palmitic acid  
Seed oil  
Butyric acid

#### ABSTRACT

Oils extracted from plant seeds play an important role in human nutrition by producing more than twice as many calories per unit of weight. One of the plants that Iran plays an essential role in producing and exporting to other countries in the world is "*Cydonia oblonga* seed". The present study was conducted in 2023 with the aim of investigating the amount of fat and the composition of saturated and unsaturated fatty acids in beet seeds at Isfahan Islamic Azad University (Khorasgan). For this purpose, the fruit belonging to *C. oblonga* species was collected in the summer season from Isfahan province and then in the laboratory environment after cutting the fruit, the seeds removed from the fruit were dried and packed at room temperature and placed in It was stored dry and at low temperature (8°C) until extraction. According to the results, the amount of fat in the seed was 7.6 g/100. Also, 10 fatty acid compounds were identified in the seeds, the highest amount of which was related to palmitic acid with 6.15%. Other fatty acids identified included palmitoleic acid, myristic acid, butyric acid, undecylic acid, caproic acid, pentadecanoic acid, lauric acid, ristheolic acid and pentadecylinic acid. Today, the consumption of vegetable oils has increased in the world, because these oils can have a good balance of essential fatty acids and non-essential fatty acids. According to the results, the oil obtained from the seeds contains unsaturated fatty acids and saturated fatty acids, which are nutritionally vital for human consumption.

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### Changes in Flavonoids Content in Orange Peel (*Citrus sinensis*) Influence of Different Drying Methods

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#### ARTICLE INFO

##### Keywords:

Microwave  
Oven  
Sun drying  
Shade  
Flavonoids

#### ABSTRACT

The main waste from citrus fruit is their peel, and the volume of this waste has caused problems for citrus processing factories. Meanwhile, citrus peel contains valuable compounds that have many uses in the food, pharmaceutical and cosmetic industries [1]. The drying process changes the quantity and quality of the active substances in the plants and this effect is different based on the drying temperature, duration of drying and plant species [2]. In this research, the effect of different drying methods, including: sun, shade (ambient temperature), oven with 50°C and microwave with 400W, on the flavonoid contents of orange peel has been investigated. The highest flavones and flavonols contents (0.13 mg quercetin/g dry weight) was related to microwave treatment, followed by the sun-dried sample (0.12 mg). While the lowest amount (0.09 mg) was related to the sample dried in the oven with 50°C. In terms of total flavonoids, a great difference was seen between different samples, so that the highest amount (13.15 mg quercetin/g of dry weight) was related to the sample dried by microwave and then to the sun dried samples (12.34 mg). The total flavonoids content in the samples dried by oven at 50°C (11.7 mg) was also relatively high. While the amount of total flavonoids in the dried samples at ambient temperature (shade) decreased sharply and reached almost half (6.87 mg). In general, microwave drying was more effective in preserving flavonoids due to the short drying time.

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Poster Presentation ID: 199

### Feasibility Production of Natural Herbicide by Using the Peel Extract of *Citrullus colocynthis*

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#### ARTICLE INFO

##### Keywords:

Herbicide  
Extract  
Organic  
Allelopathy  
Weed

#### ABSTRACT

Due to the increase of weeds resistant to chemical herbicides and the environmental concerns caused by the use of these substances, a lot of efforts are being made for non-chemical weed management [1]. The use of natural compounds as natural herbicides can be an alternative to synthetic chemical compounds [2]. In this regard, the use of allelopathic properties of plants can play an important role in the management and control of weeds. This research was designed with the purpose of investigating the allelopathic effect of the fruit peel of *Citrullus colocynthis* in controlling the seed germination of several plants including corn, wheat and cowpea. *Citrullus colocynthis* peel extract was prepared with different concentrations (0, 10, 20 and 30%) and 7 ml of extract was added to petri dishes containing seeds. Distilled water was added to control samples instead of extract. Germinated seeds were counted to determine the percentage and speed of germination on a daily basis. Germination percentage of plants decreased with the increase in the concentration of the extract. According to the results, the use of *Citrullus colocynthis* peel extract with a concentration of 20% can be effective in reducing the germination and growth of plants, which can be a suitable option for making natural and organic herbicides. Also, this study can indicate that due to the allelopathic effects of this extract, the presence of *Citrullus colocynthis* plant as a weed in fields, especially corn and cowpea fields, can cause damage to their germination and growth.

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### Producing a Functional Sedative Candy and Investigating Its Anti-anxiety Effects

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#### ARTICLE INFO

##### Keywords:

Stress  
Candy  
Anxiety  
Sedative  
Extract

#### ABSTRACT

Anxiety is a very common disorder that affects many people in the society and is associated with physiological symptoms such as tachycardia, sweating, breathing disorder, insomnia and etc [1,2]. For this purpose, in this research, a functional candy was first produced, which had a sedative effect due to the extract of sedative plants (Lavender, Valerian, Adiantum capillus-veneris, Lemon balm, Vanilla, Saffron, Lemon Verbena, Orange blossom, Rosemary, Borage, Tilia, Chamomille) used in it. In this double-blind clinical trial, 20 different people who had anxiety according to their statements were included in the study. In this experiment, two types of candies were prepared and the patients were divided into two groups. The first group consisted of people who used candies that contained extracts of sedative plants, and the second group (control group) consisted of people who used candies without extracts (placebo). The distribution of candies among people was random and both groups were unaware of the type of candies. After consuming candies, both groups were given the Spielberger Anxiety Questionnaire, which is one of the most reliable tools for measuring anxiety, to be completed by these people. The results showed that in the control group, 50% had moderate to high anxiety and 50% had relatively severe anxiety. While in the treatment group (consumption of functional candies), 90% had mild anxiety and only 10% had moderate to low anxiety. These results show that this candy can help as a functional food in people's nutrition in order to reduce stress and anxiety.

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Poster Presentation ID: 201

### Antifungal activity of aqueous and alcoholic extracts of *Origanum majorana* leaves against aflatoxigenic *Aspergillus flavus*

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#### ARTICLE INFO

##### Keywords:

*Origanum majorana*  
Antifungal effect  
*Aspergillus flavus*  
Aflatoxin.

#### ABSTRACT

*Origanum majorana* is a widely used additive in the food industry. It is mainly used for its aromatic properties with a primary role to enhance the taste and aroma of foods. Due to high content of oleanolic, ursolic, caffeic, rosmarinic, lithospermic acids, flavonoids, hydroquinones, tannins, and phenolic glycosides, oregano has been shown to exhibit antioxidative and antimicrobial activity [1]. The aim of this study was to investigate the antifungal activity of the aqueous and alcoholic extracts of this plant against aflatoxigenic *Aspergillus flavus*. The antifungal activity of the aqueous and alcoholic extracts of the leaves was determined by macrodilution and determination of MIC and MFC. The antioxidant properties of the leaves extracts were determined by DPPH method. The MIC of the alcoholic and aqueous extracts on *A. flavus* were 1.34 and 3.41 mg/ml respectively. Also, the MFC of the alcoholic and aqueous extracts were 3.25 and 5.50 mg/ml respectively. These results show that the alcoholic extract had better antifungal activity than the aqueous extract. The investigating of the antioxidant properties of the extracts using the DPPH method and the IC<sub>50</sub> of ascorbic acid as a positive control showed that the IC<sub>50</sub> value were 0.2, 1.9, and 3.1 mg/ml for ascorbic acid, the alcoholic extract, and the aqueous extract respectively. By demonstrating the efficacy *O. majorana* extracts against *A. flavus*, we can hope that in the future, by purifying the active substance of *O. majorana* and conducting further research, we will obtain combined herbal medicines with acceptable antifungal effects and low side effects [2].

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Poster Presentation ID: 202

### Assessing the ability of hypocotyl- and cotyledon-derived callus of *Silybum marianum* to undergo somatic embryogenesis in vitro

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#### ARTICLE INFO

##### Keywords:

Somatic embryogenesis  
Callus  
Milk thistle  
In vitro conditions

#### ABSTRACT

Milk thistle (*Silybum marianum*), a promising medicinal plant with potential anti-cancer properties, was the focus of this study [2]. The research aimed to develop efficient methods for producing sterile seedlings and embryogenic callus cultures. Five ecotypes of the plant were tested, along with three different seed disinfection methods [1]. The results identified a solution of tween-20, ethanol, hydrogen peroxide, and sterile water as the most effective disinfection method. This approach yielded sterile seedlings suitable for further research. For callus production, two genotypes (Hungary and Borazjan) and two explant types (cotyledon and hypocotyl) were cultured on Murashige and Skoog (MS) medium supplemented with 2,4-D and BAP hormones. The optimal conditions for callus induction were found to be the Borazjan ecotype, cotyledon explants, 1 mg/liter of 2,4-D, and 0.5 mg/liter of BAP. Interestingly, embryogenic callus formation was only observed in cotyledon explants. The Hungarian variety with 5 mg/liter of 2,4-D and 0.25 mg/liter of BAP emerged as the optimal combination for embryogenic callus production. Overall, this study provides valuable insights for large-scale milk thistle production, potentially benefiting both research and medical applications. The findings highlight the critical role of seed disinfection methods, explant type, and hormone concentrations in optimizing callus and embryogenic callus formation in milk thistle less than 3 spontaneous Manual facilitation.

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Poster Presentation ID: 203

### The Effect of Mycorrhizal Fungus on the Growth Parameters of Medicinal Plant (*Hyssopus officinalis*) Under Drought Stress Conditions

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#### ARTICLE INFO

Keywords:

Medicinal plant

Mycorrhiza

PEG

#### ABSTRACT

In order to investigate the effect of mycorrhizal fungus and drought stress on vegetative traits of hyssop medicinal plant (*Hyssopus officinalis*), a factorial pot experiment was conducted in the form of a completely randomized design with three replications in the research greenhouse of the Faculty of Agriculture of Urmia University in November 2023. The experimental treatments included drought stress caused by polyethylene glycol at three levels (0, 2 and 4% PEG 6000) as the first factor and the mycorrhizal fungus *Trichoderma harizanum* at two levels as the second factor and their combined effects. The duration of stress was 20 days. In mycorrhizal stressed plants compared to water-stressed plants with 2% PEG, the shoot fresh weight was reduced by 11%. The shoot fresh weight in mycorrhizal stressed plants with 4% PEG compared to water-stressed plants with 4% PEG had a 10% increase. The length of the shoot was increased in stressed plants with 2% PEG compared to the control, and with increasing PEG level to 4%, the shoot length was significantly reduced by 22% compared to the control. The shoot length in mycorrhizal plants had an insignificant decrease compared to the control. The results showed that the effect of drought stress and the interaction effect of drought stress and mycorrhiza on root fresh weight were significant but mycorrhizal inoculation hadn't significant effect. The results showed that under mycorrhized conditions the root fresh weight significantly reduced by 59.23% compared to the control, and the interaction effect of mycorrhiza and 4% PEG significantly increased the root fresh weight by 1.65 times compared to the control. Also, based on the results of the present research, the effect of PEG on the number of branches was significant at the 5% level, but the effect of mycorrhiza and mycorrhiza + PEG were not significant. The maximum root length was recorded in the 2% PEG treatment with *T. harizanum* inoculation (23 cm). The root length increased insignificantly with mycorrhiza inoculation compared to the control. In stressed plants, the root length was insignificantly reduced compared to the control.

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Poster Presentation ID: 204

### Investigating the extraction of silymarin flavonoids from induced callus cultures of milk thistle (*Silybum marianum*) under in vitro conditions

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#### ARTICLE INFO

##### Keywords:

Flavonoid  
Hormones  
Hypocotyl explants

#### ABSTRACT

Milk thistle (*Silybum marianum*), a medicinal plant with potential anti-cancer properties, holds promise for silymarin production. Traditionally extracted from seeds, cell culture techniques offer a sustainable alternative [1, 2]. This study sought to optimize silymarin production in milk thistle callus cultures by investigating the effects of genotype, explant type, and plant growth hormone concentrations. Five ecotypes (Hungary, Borazjan, Fereydon Kanar, Jolgeh Khalaj, and Moghan) were tested, with the Hungarian variety exhibiting the highest silymarin content. Interestingly, explant type played a crucial role. Hypocotyl explants, even when producing small, non-embryogenic callus, yielded higher silymarin content compared to cotyledon explants that formed larger, embryogenic callus. Furthermore, lower concentrations of both auxin (2,4-D) and cytokinin (BAP) hormones were more effective in promoting silymarin production. The optimal combination for the Hungarian variety was 1 mg/liter of 2,4-D and 0.5 mg/liter of BAP. These findings offer valuable insights for optimizing silymarin production in milk thistle cell cultures. Using specific cultivated varieties (Hungarian), hypocotyl explants, and low hormone concentrations can significantly enhance silymarin production. This approach offers a promising route to large-scale production of this potentially therapeutic compound.

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Poster Presentation ID: 205

### Molecular Docking of Antifungal Azoles with 14 $\alpha$ Demethylase Enzyme (CYP51)

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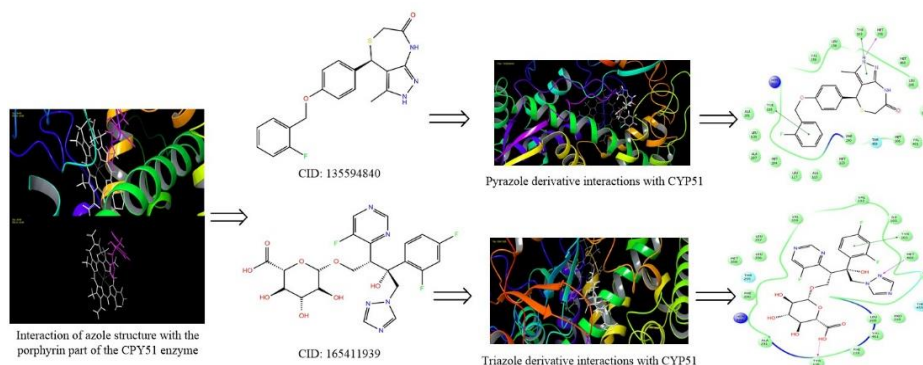
#### ARTICLE INFO

##### Keywords:

Molecular docking  
Azole compounds  
CYP51 enzyme  
Schrödinger Maestro  
Antifungal activity

#### ABSTRACT

Molecular docking techniques are commonly used in modern drug discovery to understand drug-receptor interactions. This study aims to explore the inhibitory effects of azole compounds on the sterol 14 $\alpha$ -demethylase enzyme (CYP51) using computational drug design methods. The CYP51 enzyme is essential for ergosterol biosynthesis, a key component of fungal membranes. A molecular docking study was carried out using Schrödinger Maestro v2015 with CYP51 (PDB code: 3KHM) as the target for antifungal activity. Docking of pyrazole and triazole derivatives with the CYP51 enzyme was performed. The azole compounds were retrieved from PubChem, and the receptor protein and ligands were prepared using Schrödinger's Protein Preparation Wizard. Molecular docking results showed that compounds with CIDs 135594840 and 165411939 had good docking scores of -11.3 $\gamma$  and -10.13 kcal/mol, respectively, indicating strong interactions with CYP51. ADME results demonstrated that these compounds have acceptable profiles and adhere to Lipinski's rule of five. The molecular docking study against sterol 14 $\alpha$ -demethylase (CYP51) provides valuable insights into the binding modes and affinities of these compounds [1].



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Poster Presentation ID: 206

### The effect of various phenological stages on the content of pulegone compound of *Ziziphora clinopodioides*

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#### ARTICLE INFO

Keywords:

Kakuti

Pulegone

Phenological stages

Essential oil

#### ABSTRACT

Phenological stages and harvest time play pivotal roles in influencing the secondary metabolites and biological activities of medicinal plants. *Ziziphora clinopodioides* (Kakuti), a renowned aromatic and culinary herb, holds significance in Iranian folk medicine for its digestive and fever-healing properties. Analysis of Kakuti essential oil composition revealed oxygenated monoterpenoids, notably pulegone, known for their antibacterial, antifungal, and insecticidal properties [1]. Plants in various phenological stages have diverse compositions; therefore, determining the best harvest time is of particular importance [2]. In the present experiment, Kakuti plant were harvested in different phenological stages, including vegetative, full flowering, end of flowering and seed set stages. The essential oil was extracted using Clevenger apparatus and analyzed using GC and GC/MS. Results showed the highest pulegone content during full flowering (75.44 %), significantly differing from other stages, while the lowest was post-flowering (seed set) (42.03 %). These findings serve as valuable guidance for growers aiming to maximize metabolite yield, benefiting food and pharmaceutical industries alike.

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Poster Presentation ID: 207

### Impact of different culture media on hairy roots growth of *Digitalis purpurea* L.

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#### ARTICLE INFO

Keywords:

Foxglove

Hairy root

*Rizobium rhizogenes*

#### ABSTRACT

Plant commonly known as foxglove belong to the genus *Digitalis*, which is a member of the Plantaginaceae. *Digitalis* species are the most important source of cardiac glycosides or cardenolides. Due to their effectivity in the treatment of heart insufficiency, cardenolides from *Digitalis* have been used extensively worldwide [1]. Enhancing the production of secondary metabolites is possible through the application of modern biotechnological techniques such as hairy root culture. Induced hairy roots by *Rizobium rhizogenes* are a suitable tissue for the production of secondary metabolites due to the stability and high production of roots in hormonal-free conditions [2]. The present study was designed in order to investigate the effect of two types of media, MS and B5, on the growth of *Digitalis purpurea* hairy roots. For this purpose, The inoculated hairy roots with *Rizobium rhizogenes* strain A4, after positive confirmation of the gene *rollB* by polymerase chain reaction (PCR) were transferred in two liquid MS and B5 media in different concentrations (X, 1/2X and 1/4X) containing 500 mg L<sup>-1</sup> of cefotaxime. The cultures were maintained on a shaker incubator at 110 rpm at 25±2 °C in the dark for 21 days. According to the results, the effect of different culture media was significant on the growth characteristics of hairy roots. The highest amount of fresh root weight (0.8 g) was observed in MS medium with 1/2X concentration and the lowest amount of fresh root weight (0.25 g) was recorded at B5 medium with 1/4X concentration. Also, there was no significant difference between the roots grown in B5 and MS media with 1/4X concentration. In terms of appearance, hairy roots grown in B5 medium showed a darker color than hairy roots grown in MS medium, which could be assigned to more phenolic compounds production. Also, hairy roots grown in MS medium indicated more diameter and branching than hairy roots grown in B5 medium.

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### The effect of different culture media on the germination and growth characteristics of *Digitalis purpurea* under *in vitro* culture conditions

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#### ARTICLE INFO

Keywords:

*Digitalis Purpurea*

*In vitro* cultures

Secondary metabolites

#### ABSTRACT

*Digitalis purpurea* L. is an important medicinal plant belonging to the family Plantaginaceae. This plant is an important source of secondary metabolites specially, digitoxin, which is extremely poisonous and it is used in the treatment of cardiovascular disease, internal haemorrhage, inflammatory diseases, delirium tremens, epilepsy, acute mania and various other diseases with real or supposed benefits [1]. *In vitro* plant cultures are able to produce and accumulate many medicinally valuable secondary metabolites, as many different *in vitro* approaches have been used for increased biosynthesis and the accumulation of antioxidant compounds in plant cells [2]. This research was conducted in order to investigate two types of culture media (MS and B5) in different concentrations (X, 1/2X and 1/4X) on germination percentage and growth characteristics of *D. purpurea* plant. For this purpose, the seeds after disinfection were cultured in solid MS and B5 media in four replications. The samples were placed in the dark at  $25 \pm 2^\circ\text{C}$ . In related to germination percentage, no significant difference was observed between different culture media. After germination, the samples were transferred to the growth chamber at  $25 \pm 2^\circ\text{C}$ , with 16 h of light and 6 h of darkness. The results revealed that the effect of the investigated media on plant growth characteristics was significant. The highest amount of height (2.46 cm) and fresh weight (3.8 gr) were observed at the plants grown in B5 medium with 1/2X concentration and the lowest amount of height (1.34 cm) and fresh weight (1.67 gr) was related to the plants grown in complete MS culture medium, which could be assigned to the sensitivity of the plant to salinity. Also, in terms of growth characteristics, no significant difference was observed between the plants grown in complete B5 and B5 with 1/2X concentration.

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Poster Presentation ID: 209

### Evaluation of Immunohematology and Biochemical Modulating Effects of *Falcaria vulgaris* Aqueous Extract in Diabetic Male Rats in Kurdish Ethno Medicine

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#### ARTICLE INFO

*Keywords:*

Coronavirus  
COVID-19  
Medicinal Plants  
Secondary metabolites

#### ABSTRACT

Numerous researchers have extensively reviewed Coronavirus disease-2019 (COVID-19), examining its history, origin, spread, epidemiology, pathogenesis, clinical features, and differential diagnosis. However, our particular focus lies on the potential of medicinal plants as a promising avenue for COVID-19 treatment, either as standalone therapies or in combination with other approaches. The elucidation of secondary metabolites with potent antiviral activity holds promise for the development of effective antiviral agents. Efforts are essential to prevent similar zoonotic outbreaks in the future. Here we explore logical strategies for identifying or creating drugs specifically targeting COVID-19. Additionally, it investigates into herbal remedies. Given the limitations of antiviral drugs (which often lead to viral resistance), evaluating the effectiveness of medicinal plants against synthetic drugs is crucial. Researchers are encouraged to focus on the molecular interactions between COVID-19 and secondary metabolites. We found that discovering a drug that can prevent infection and is safe for all population groups would significantly benefit public health. Plant-based drugs, especially those derived from secondary metabolites (SMs), have the potential to treat human viral diseases. Based on our finding, SMs from plants with antiviral properties offer a promising alternative approach for managing viral illnesses in humans and herbal medicine could offer a safer and potentially faster solution in combatting the COVID-19 pandemic. Additionally, considering the ethnopharmacology and ethnobotany of medicinal plants is crucial for plant-based drug discovery in the context of viral diseases. Furthermore, the synergistic interactions among different phytochemicals may enhance bioactivity efficacy or mitigate toxicity.

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Poster Presentation ID: 212

### Study on the acute and subacute toxicity of antidiabetic herbal extracts mixture in animal model

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#### ARTICLE INFO

##### Keywords:

Acute toxicity  
Sub-acute toxicity  
Herbal extracts mixture

#### ABSTRACT

Diabetes is one of the most common endocrine disorders and a global health challenge. The present study was conducted to evaluate the acute and subacute toxicity of *Silybum marianum*, *melissa officinalis*, *vaccinium arctostaphylos*, *Trigonella foenum*, *Urtica doica*, and *citrullus colocynthis* extracts mixture. To investigate the acute toxicity, initially 5 male wistar rats were gavaged with total herbal extract 5000 mg/kg and assessed for 72 hours [1]. For subacute toxicity study 24 male rats in four groups were gavaged with 150, 300, and 600 mg/kg doses of herbal extracts mixture and normal saline (as control) respectively for 29 days and finally the biochemical tests (creatinine, urea, fasting sugar, liver enzymes) and histopathological changes of kidney, liver, and heart tissues were performed [2]. The LD50 of herbal mixture was more than 5000 mg/kg. In the sub-acute study only the levels of AST and ALT were significantly higher than the control group and histopathological changes in liver and kidney tissues were observed at the dose of 600 mg/kg. The present study showed that the LD50 of the herbal extracts mixture is high. The doses less than 600 mg/kg has no adverse effects in animals. Considering the long history of our country in the treatment of diseases using herbal medicines, these medicines are more acceptable to the people. On the other hand, access to herbal sources, fewer side effects of medicinal plants and its acceptance by the majority, research is necessary to obtain the source of effective herbal medicine.

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Poster Presentation ID: 215

### Investigating the Synergistic Effect of Hydroalcoholic Extract of *Falcaria vulgaris* Plant and Newcastle Vaccine in Broilers

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#### ARTICLE INFO

Keywords:

*Falcaria vulgaris*

Newcastle vaccine

Broilers

Immunohistochemistry

#### ABSTRACT

Newcastle disease is a highly contagious disease of birds with high economic losses and mortality. Conventional vaccination in disease control is sometimes associated with insufficient effectiveness. Therefore, investigating new methods for disease control using traditional herbal medicine is useful in strengthening the effectiveness of the vaccine. 40 commercial broiler chickens of Ross 308 strain were treated according to the standard protocol in the rearing system and in four groups of 10, control and treated with hydroalcoholic extract of *Falcaria vulgaris* with concentrations of 100, 200 and 400 ppm plus vaccine, for 42 days. Immune and blood factors were checked. The results showed that the administration of hydroalcoholic extract of F vs at concentrations of 200 and 400ppm had the greatest improvement in vaccine performance in terms of immunohematological factors (Pvalue < 0.05). Due to the presence of effective phenolic and flavonoid antioxidant compounds, the hydroalcoholic extract of the kakuti plant is effective in improving immunohematology parameters. Therefore, probably F vs extract can be effective as a medicinal supplement of traditional medicine in improving the performance of vaccination against Newcastle disease.



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29 & 30 May 2024  
Yazd, Iran



Poster Presentation ID: 216

### Reduce adverse effect of water deficit on *Rosa damascena* by application of soil amendment supplement

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Soil supplement Fertility Yield Growth Index <i>Rosa damascena</i></p>	<p>Water deficit and mismanagement plant nutrition are the most important factors that limiting the growth of. The use of soil amendment supplements that keep moisture and have nutritional effects is one of the best choices to reduce the adverse effect of mentioned factors. In two separate experiments, the effect of soil supplementation Kizilsu brand was studied on the yield of <i>Rosa damascena</i> in Medicinal Plants Institute of ACECR. In the first experiment the nutritional effect of this supplement was investigated in four concentrations consist of 0, 50, 100 and 150 grams in each pot with weight of 3 kg of soil under completely randomized design with four replications. The second experiment was done to investigate the effect of 100 grams of Kizilsu as a water protector under three irrigation periods (5, 10, 15 days) with four replications. The results of the first experiment showed that the soil supplement had a significant effect on most traits including plant height, stem diameter, leaf length, internode number, SPAD value, but it had no significant effect on the number of stems and leaves and leaf width. The amount of 100 grams of Kizilsu had a positive effect on all traits. In second experiment results showed that the 100 gr/pot kizilsu soil supplement prevented of adverse effects water deficit significantly in all of morphology traits. According to the results of both experiments, the Kizilsu soil supplement with its nutritional and moisture absorbing effects has been able to improve the morphological characteristics of the <i>Rosa damascena</i>.</p>

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### Reducing the effects of water deficit by using soil amendment supplements in *Menta piperita*

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> <i>Menta piperita</i> Soil supplement Fertility Yield Growth index</p>	<p>The most limiting factor for medicinal plant cultivation in arid and semi arid area is water deficit. Application of Soil supplements is one of the best approaches to decrease the adverse effects of water deficit. Kizelso is kind of soil supplement that has been introduced recently. For investigation of kizelso soil supplement effects as nutrient and water conservator factors on yeild of <i>Menta piperita</i>. Two experiments conducted. In the first experiment the nutrinet effect of kizelso studied in four levels including 0, 50, 100, 150 gerams per each pot (3 Kg soil). In second experiments the water conservator effects of kizelso (100 g kizelso per each pot) studied in three period of irrigation including 5, 10 and 15 days. Both experiments were done in Completely randomized experimental design with four replications. Results of first experiment showed very significant effect (<math>p \leq 0.01</math>) of kizelso on morphologic traits of <i>M. piperita</i> consist of leaf lenth, petiole length, number of inter-nodes and significant effect (<math>p \leq 0.05</math>) on Plant height, crown diameter and leaf width but there was no significant effect on Stem diameter, number of leaves and Spad value. In other hands the results of second experiment showed that 100 g of kizelso eliminate of adwers effect of water deficit and there were no significant differeces between irrigation periods. In genrally application of 100 g of kizelso improved morphologic traits and prevented the adverse effects of water deficit in <i>Menta piperita</i>.</p>

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### Agro-morphological diversity among different Iranian populations of Nettle (*Urtica dioica* L.)

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#### ARTICLE INFO

Keywords:

*Urtica Dioica* L.

Diversity

Morphological

Domestication

#### ABSTRACT

Nettle (*Urtica dioica* L.) is a herbaceous perennial medicinal plant belongs to the Urticaceae family. The plant is a rich source of different phytochemicals especially triterpenoids and phytosterols. Recently, the plant is interested by pharmaceutical industry to develop herbal products to treat cancer, diabetes, joint's pain, and inflammation [1,2]. Nowadays, the plant materials are mainly collected from the natural habitat. The wild populations are phytochemically and genetically heterogenous, so the study of the plant diversity to select of the adequate populations for further exploitation in breeding and cultivation programs is urgently needed. In the present study, the rhizome of twenty individuals from two populations of the plant were collected from Mazandaran (Nowshahr) and West Azerbaijan (Mahabad) Provinces and cultivated in the same conditions in the greenhouse to study agro-morphological diversity. The studied traits were measured at full flowering stage. Based on the results, significant variation in terms of morphological traits was observed among the samples. Among the studied characteristics, shoot fresh weight (CV = 49.25%) and shoot dry weight (40.75%) had the maximum coefficient of variation. The plant height (PH) varied from 34 to 108 cm. Maximum and minimum levels of PH were observed in Mahabad and Nowshahr populations, respectively. The highest leaf length (13.5 cm), leaf width (6.83 cm), internode length (9 cm), and the number of internodes (23) was observed in Mahabad population. In addition, shoot fresh and dry weight varied from 12 to 56 g/plant and 2 to 22 g/plant, respectively. Also, a significant positive correlation was observed between PH with leaf length, internode length and the number of internodes. Outstanding diversity in terms of agro-morphological traits, gives to breeder the capability of selection and cultivation of the clones according to the purpose of breeding.

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Poster Presentation ID: 219

### Effect of *Vitex agnus castus* consumption on FSH hormone disorder - a case study

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#### ARTICLE INFO

*Keywords:*

FSH hormone  
Female fertility  
Vitagnos pill

#### ABSTRACT

*Vitex agnus castus* plant belongs to the category of phytoestrogens, which are estrogen-like compounds in plant products and have estrogenic and antiestrogenic properties (1). The compounds in the plant extract reduce testosterone, LH and FSH hormones by affecting dopamine receptors in the hypothalamus. Vitagnos herbal medicine is an extract of *Vitex* plant, which is available in the Iranian market in the form of tablets and drops (2). The current case study was conducted with the aim of determining the effect of *Vitex agnus castus* plant consumption on FSH hormone disorder. The patient was a 36-year-old married woman who referred to the gynecologist for weight gain, hot flushes, and mood changes, and it was found that she has FSH=20.67. The patient was prescribed Vitagnos medicine in the form of two pills in the morning and two in the evening and light exercise. After three months, the patient's FSH level reached 3.46. Considering the role of FSH hormone in women's fertility, it is suggested to correct the hormone with drugs such as *Vitex agnus castus* before starting treatments such as receiving donated eggs.

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Poster Presentation ID: 220

### Optimization of Moringa leaf chlorophyll and polyphenolic compounds extraction using subcritical fluid

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#### ARTICLE INFO

##### Keywords:

Subcritical fluid  
extraction  
Moringa tree leaves  
Chlorophyll  
Polyphenol

#### ABSTRACT

Moringa is a plant belonging to the Moringaceae family [1]. which contains chlorophyll, polyphenol, vitamins and etc [2]. The chlorophyll in moringa leaves have different health benefits. In this thesis, three different methods were investigated for the optimal extraction method. The highest polyphenol content of the ultrasound method was 27.42 µg gallic acid/mg sample, chlorophyll a 17.47 mg/liter, and chlorophyll b 12.09 mg/liter, as well as in the soaking extraction, the highest amount of polyphenol was 37.65 µg gallic acid/mg sample, chlorophyll a 9.71 mg/liter, and chlorophyll b 5.53 mg/liter was obtained. Since the amount of chlorophyll was better in the subcritical fluid method, this method was optimized. conditions of temperature 200 °C, time 22 minutes and solvent ethanol (96%) with total phenol 36.18 µg gallic acid/mg sample, chlorophyll a 14.19 mg/liter, and chlorophyll b 7.88 mg/liter was considered as the optimal condition. Based on the obtained data the maximum extraction of phenolic and chlorophyll compounds were obtained 139.67 µg gallic acid/mg sample, chlorophyll a 67.43 mg/mg, chlorophyll b 44.81 mg/liter, and total chlorophyll 112.24 mg/liter was calculated for it. Also, the total flavonoid value of the optimal sample was reported as 6.1 micrograms of rutin/mg. Based on the DPPH test, the antioxidant property of the optimal extract was also evaluated, which showed IC<sub>50</sub>=4.58 micrograms/ml. The results show that moringa leaves can be a good source of polyphenols and chlorophyll.

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Poster Presentation ID: 221

### Impact of seed treatment by gamma radiation on vincristine content of *Catharanthus roseus*

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#### ARTICLE INFO

##### Keywords:

Gamma irradiation  
*Catharanthus roseus*  
Vincristine

#### ABSTRACT

*Catharanthus roseus* L. is a perennial plant with medicinal properties. More than 135 types of alkaloids are produced in this plant. Since the pharmaceutical industry's increasing demand for vincristine and low quantities of vincristine in raw materials extracted from the *C. roseus* [1], in this study the effect of low-dose gamma radiation on the *C. roseus* seeds was carried out in order to increase the production of these compound. Alba variety seeds (Pakan<sup>TM</sup>) were surface disinfected and irradiated at (0, 10, 20, 30, 40, 50 and 60Gy) doses using Gammacell 220 irradiator (Cobalt <sup>60</sup>, MDS Nordion, Ottawa, Canada) with a dose rate of 4.5 kGyh<sup>-1</sup> at the Nuclear Science and Technology Institute- Atomic Energy Organization of Iran. Morphological and biochemical parameters and amount of vincristine was measured. The results showed that seed treatment at a dose of 60Gy significantly increased Morphological and biochemical traits such as plant height, fresh and dry weight of leaves and roots, total chlorophyll and carotenoid, antioxidant capacity, and total flavonoid in the plant. The highest amount of vincristine was observed in plants obtained from seed treatment with a dose range of 50 Gy and 60 Gy using HPLC with C18 column and UV detector. The results of this study showed that the treatment of *C. roseus* seeds with a range of 50-60Gy can lead to an increase in the accumulation of vincristine and production efficiency of this valuable medicinal substance, in addition to increasing the growth characteristics.

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Poster Presentation ID: 222

### A comparative study of the antiparasitic effects of micro-encapsulated *Ziziphora clinopodioides* essential oil and metronidazole on *Trichomonas gallinae* in vitro

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#### ARTICLE INFO

Keywords:

*Ziziphora  
clinopodioides*  
Metronidazole  
*Trichomonas gallinae*  
Trichomoniasis  
Encapsulation

#### ABSTRACT

*Trichomonas gallinae* protozoa is found in chickens and pigeons. *Ziziphora clinopodioides* is known “Kakuti” in Iran and has effects such as anti-parasitic properties. The purpose of this study was to compare the antiparasitic effects of microencapsulated *Ziziphora clinopodioides* essential oil (dilutions of 100, 50, 25, 10) and metronidazole on *Trichomonas gallinae* in 3 hours. The results showed that in different dilutions, the highest values of parasite growth inhibition (GI) belonged to metronidazole, kakuti and negative control, respectively. In terms of comparison between the 4 concentrations of micro-encapsulated essential oil, dilutions of 100, 50, 25, and 10 had less inhibition of parasite growth in all hours, and there was a significant difference between them ( $P < 0.01$ ). Based on the total data of three hours, there was a decrease in parasite growth inhibition values from dilution 100 to 10, but the difference in GI between dilutions 10 and 25 and also between dilutions 50 and 100 was insignificant. Also, dilutions 10 and 25 had significant differences with dilutions 50 and 100 ( $P < 0.01$ ). However, in the values of the percentage of live parasites, the findings in each of the dilutions showed that the highest values of the percentage of live parasites (L) belonged to the negative control, Kakuti and metronidazole, respectively, and there was a statistically significant difference between the above three groups in all the dilutions. ( $P < 0.05$ ). Also, in all hours and three hours in total, the values of the percentage of living parasites in metronidazole were significantly the lowest and in the negative control it was the highest, and these two groups had a significant difference with all Kakuti dilutions ( $P < 0.01$ ). In terms of comparison between the four dilutions of Kakuti, in all hours and also in the total data, the dilutions of 100, 50, 25 and 10 respectively had a higher percentage of live parasites and there was a significant difference between them ( $P < 0.01$ ). In the first hour of measurement, there was no significant difference between dilutions of 25 and 50 and in the second hour of measurement, between dilutions of 25, 50 and 100 essential oils. Based on the total data of three hours, there was no significant difference between the dilutions of 25, 50 and 100 essential oils. Also, there was no significant difference between dilutions 10, 25 and 50 in terms of the percentage of live parasites, but the difference between dilutions 10 and 100 was significant ( $P < 0.01$ ).

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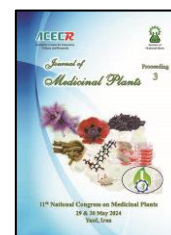
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Poster Presentation ID: 225

### Effect of salinity stress on some growth characteristics of four landraces of thistle (*Silybum marianum*) under greenhouse condition

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Growth parameters Medicinal plants Salinity stress <i>Silybum marianum</i></p>	<p>The success of plants in arid environments depends mainly on environmental factors [1]. Soil salinity is a significant abiotic stress that affects crop growth and development through alterations in plant morphology and physico-biochemical and molecular processes [2]. This study aimed to examine how different salinity levels affect the growth characteristics of different landraces of thistle (<i>Silybum marianum</i>), as a medicinal plant. Therefore, a factorial pot experiment was conducted based on completely randomized design with three replications in research greenhouse of Yazd University. The experiment involved two factors: salinity stress with four levels (0.44 (control), 3, 6, and 9 dS/m) and four thistle landraces including (Golestan, Fars, Isfahan, and Ardabil). The results indicated that all the studied traits were significantly reduced due to the application of salinity stress. At a salinity level of 9 dS/m, the height of the plant, its dry weight, and seed yield were reduced by 61%, 70%, and 35%, respectively, when compared to the control. The increase in salinity from the control to 9 dS/m also significantly diminished the potassium-to-sodium ratio of plant aerial parts. Results also showed that different landraces indicated various responses to salinity stress. In general, it can be concluded that thistle plants use different morpho-physiological mechanisms to withstand salinity stress.</p>

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### Morphological Response of Chicory (*Cichorium pumilum* Jacq.) to the Use of Three Types of Plant Probiotic Bacteria under Water-Deficit Stress Conditions

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#### ARTICLE INFO

##### Keywords:

Asteraceae  
Morphological  
characteristics  
Medicinal plants  
Plant growth promoting  
bacteria  
Water shortage

#### ABSTRACT

Plants respond differently to water-deficit stress conditions in the soil [1]. In order to study water-deficit stress and plant probiotic bacteria effects on some morphological characteristics of chicory, an experiment was conducted as split plot based on randomized complete block design with three replications at research farm, agricultural faculty of Azarbaijan, Shahid Madani University, Tabriz-Iran in 2022. Three irrigation regimes (irrigation at the field capacity, irrigation at the 35% and 15% of total available soil water content) as the main plot and probiotic bacteria (*Azospirillum* spp. + *Pseudomonas* spp., *paenibacillus polymyxa* App1, and *Serratia odorifera* AzSo1) as the subplot were applied on chicory plants. Results indicated that different irrigation regimes had a significant effect on the morphological characteristics in chicory ( $p \leq 0.01$ ). The lowest lateral roots number, dry weight of roots, height, and lateral shoots number were related to severe water-deficit stress in the soil. In contrast, the highest main root length resulted from severe water-deficit stress in the soil. Application of plant growth promoting bacteria especially *Azospirillum* spp. + *Pseudomonas* spp. and *P. polymyxa* caused a significant increase in morphological characteristics compared with control. Interaction effects between irrigation regimes and plant growth promoting bacteria on morphological characteristics was significant; however, lateral shoots was not affected significantly ( $p \leq 0.05$ ). Minimum reduction in morphological characteristics occurred when by using *P. polymyxa* and *Azospirillum* spp. + *Pseudomonas* spp. were applied on chicory plants even at the severe water-deficit stress in comparison with due to induced tolerance to water-deficit stress conditions.

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### Investigating the effect of light wavelength on the growth of rosemary (*Salvia rosmarinus*) medicinal plant

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#### ARTICLE INFO

##### Keywords:

Secondary metabolites  
Physical growth  
Medicinal effect  
Wavelength

#### ABSTRACT

Rosemary plant is one of the important plants of Iran, which has various uses in the pharmaceutical industry and medicinal plants. The essential oil of this plant is used to relax nerve cells and treat skin inflammations. In this study, we examined the effect of light with different wavelengths on the growth and essential compounds of this plant. We treated rosemary plants propagated through cuttings for 12 and 20 days with blue, orange and yellow wavelengths. The results showed that yellow light is more effective than blue and orange light, and the wavelength of 650 nm has a greater effect on plant growth and increasing secondary metabolites. This light caused the plants to have the best wet weight and dry weight in 12 and 18 days of treatment with this light. On the other hand, blue color with a wavelength of 450 nm compared to the experimental wavelengths caused less growth in plants, so the plant did not change significantly. The measurement of essential oil of rosemary plant showed that in a period of 12 days, yellow light significantly changed the production of essential oil in plants compared to other light treatments, and also in a period of 18 days, treatment of yellow light with a wavelength of 550 nm caused more production Essential oil in plants. The examination of the secondary metabolites of the essential oil treated with these three wavelengths showed that the yellow color causes the presence of a higher variety of secondary metabolites than other light treatments. As a result, the use of yellow light for the growth of rosemary can play a large role in the cultivation of this important medicinal plant.

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Poster Presentation ID: 229

### Effects of foliar application of spermidine, citric acid and proline on medicinal and nutritional value of *Calendula officinalis* L. under drought Stress conditions

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#### ARTICLE INFO

Keywords:

*Calendula officinalis* L.

Carbohydrate

Phenol

Rutin

Quercetin

#### ABSTRACT

Drought is one of the most important limiting factors for production of plants and compounds such as polyamines, organic acids and amino acids play an important role in increasing plant resistance to environmental stresses, spermidine are known as anti-aging and anti-stress compounds [1] and citric acid has positive role in antioxidants chelating free radicals and stimulation of plant growth [2] and also the role of proline as osmolyte, abductor of ROS, stabilization of protein structure and protect cells from stress damage has been reported [3]. To evaluate the effect of foliar application, spermidine, citric acid and proline (0, 50 and 100 mg l<sup>-1</sup>) on some phytochemical traits of pot marigold under drought stress (control, 25, 50 and 75% field capacity (FC)) a factorial experiment was conducted in a completely randomized design with 3 replications. The foliar application was performed in three stages with an interval of about 20 days, including six-leaf stage, full tillering and first bud emergence. The results showed that all treatments had a significant effect on the measured variables. The highest carbohydrate, quercetin and phenol content in 75% FC treatment and 100 mg l<sup>-1</sup> proline foliar application, the highest rutin content in 75% FC treatment and 100 mg l<sup>-1</sup> spermidine foliar application treatment and the highest total antioxidant activity (DPPH) was obtained in the treatment of 75% FC and 100 mg l<sup>-1</sup> of citric acid. The results of this study showed that the application of 100 mg l<sup>-1</sup> spermidine, citric acid and proline with 75% FC improved the biochemical characteristics of pot marigold.

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### Evaluation of Immunohematological and Biochemical Protective and Modulating Effects of *Falcaria vulgaris* Hydroalcoholic Extract Caused by Silver Nanoparticles Cytotoxicity in Male Rats

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#### ARTICLE INFO

*Keywords:*

Nanoparticles  
Liver toxicity  
Immune  
Blood  
Biochemistry  
*Falcaria vulgaris*

#### ABSTRACT

Due to their antimicrobial, catalytic and disinfectant properties, nanoparticles are the most used compounds in common consumer products such as cosmetics, household items, air fresheners, water treatment and paint. These particles with high potential depend on the shape, size and concentration in the stages of production, recycling and disposal in the environment in interaction with organisms and ecosystem through skin, digestive, respiratory absorption through the blood and lymphatic system in the liver, kidney, heart, Lungs, brain, thyroid, lymph nodes are distributed, causing toxicity, changing gene expression, occurrence of oxidative stress and damage to cell membranes. On the other hand, many medicinal plants of traditional medicine have strengthening effects, regulating the immune-biochemical system in the biological balance of the body. The aim of this study was to evaluate the immunohematological and biochemical protective and modulating properties of the hydroalcoholic extract of *F vulgaris* after consuming the hepatotoxic amount (200PPM) caused by silver nanoparticles in male rats. 40 Wistar rats were divided into 4 treatment groups with concentrations of 180, 60, 30 mg/kg and the control group. The results showed that the hydroalcoholic extract of *F vulgaris*, especially in concentrations of 180 and 60 mg/kg, in the groups under investigation compared to the control group, causes a significant induction in modulating the changes in the level of parameters effective in immunity, blood and biochemical ( $p < 0.05$ ). The use of *F vulgaris* plant with various antioxidant properties is probably effective in controlling the side effects of silver nanoparticles.



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### Chemical Compositions and Anti-inflammatory Effects of *Mentha pulegium* L. Extract

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Herbal medicine Hydro-ethanolic extract <i>Mentha pulegium</i> L. Inflammation</p>	<p>There is great interest in determining and evaluating the chemical compositions and anti-inflammatory effects of new herbal products. The fresh flowering aerial parts of the <i>Mentha pulegium</i> L. plant were harvested at the onset of the flowering period in spring from the Kurdistan Province. Harvested plants were dried in a dark place at room temperature and then powdered using an electric machine. Hydro-ethanolic extract was prepared using the maceration method (1). Briefly, dried powdered leaves were suspended and macerated in 800 mL of 70% ethanol (HPLC grade, Sigma-Aldrich Chemie GmbH, Germany) for 72 h with occasional shaking at room temperature. Then, the solution was passed through the filter paper and evaporated to dryness. The solution was concentrated using a rotary evaporator vacuum system (Rotavapor<sup>®</sup> R-100, BÜCHI) at 40 °C until the solvent evaporated and dried. The extract was then directly dissolved in distilled water and kept in a closed, dark, airtight glass bottle and stored at -20 °C until use. The analysis of <i>Mentha pulegium</i> L. extract by Gas Chromatography System (GC-FID &amp; GC-MS, Agilent technology (HP) 6890 system) was done. Finally, the gene expressions and protein levels of pro-inflammatory mediators were measured. The main ingredients of <i>Mentha pulegium</i> L. in different countries have the following components: pulegone, piperitone/piperitenone, and isomenthone/neoisomenthol. <i>Mentha pulegium</i> L. extract from Iran contains 12 compounds that make up more than 92% of <i>Mentha pulegium</i> L. extract. The other compounds found respectively were <math>\gamma</math>-sitosterol, Benzene, 1-methoxy-4-(2-propenyl), 3-octanol, <math>\alpha</math>-amyrin, <math>\alpha</math>-pinene, <math>\alpha</math>-terpineol, <math>\beta</math>-pinene, Germacerene-D, and Mint furanone. The phytochemical studies also showed that flavonoid, phenolic, and terpenoid compounds were seen in the water and methanolic extracts (2, 3). The major components of Iranian <i>Mentha pulegium</i> L. extract were pulegone (40.5%), isomenthone/neoisomenthol (35.4%), and piperitone/piperitenone (5.2%). <i>Mentha pulegium</i> L. extract decreased the expression and biosynthesis of pro-inflammatory mediators. These effects are mediated by signaling pathway suppression.</p>

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Poster Presentation ID: 232

### Comparing decontamination of *Thymus vulgaris* by irradiation methods (gamma rays and cold plasma)

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#### ARTICLE INFO

##### Keywords:

Gamma irradiation

Cold plasma

*Thymus vulgaris*

#### ABSTRACT

*Thymus vulgaris* is of the (Lamiaceae) commonly known as thyme, is a plant renowned for producing monoterpenes which contains 0.8 and 6.2% of essential oils containing muricides, monotriene hydrocarbons and alcohols, which are among the ten famous essential oils. Thymol is the main component of phenolic compounds of thyme. Which is used in food products and beverages and pharmaceutical, health and cosmetic industries. Thyme oil has properties such as antispasmodic, windbreaker, antifungal, antibacterial, antiseptic, antiparasitic, antirheumatism, expectorant, antioxidant, natural food preservative, and delaying aging. . One of the problems of thymol production is the microbial contamination of thyme, and irradiation is an effective solution without side effects in decontamination of this medicinal plant. In this study, 5 levels of gamma radiation treatment (1, 2, 3, 4 and 5 kGy) and time levels of 60 and 120 Sec. of cold atmospheric plasma treatment (DBD) at were used in order to reduce the microbial load of thyme [2]. Based on the results 3 kGy treatment of gamma irradiation remove all contamination but reduce 30% of the thymol content. However, the cold atmospheric plasma treatment didn't decrease in thymol content, but could not able to sterilize the *Thymus* biomaterial and is not a suitable method for decontamination.

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Poster Presentation ID: 233

### Utilizing *Rhus coriaria* L. polyphenols as promising antityrosinase agents

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#### ARTICLE INFO

Keywords:

*Rhus coriaria*

Polyphenols

Antityrosinase activity

#### ABSTRACT

Medicinal plants rich in polyphenols offer promising natural remedies with potent antityrosinase properties. Polyphenols inhibit the activity of tyrosinase, an enzyme crucial for melanin production, making them effective in managing skin hyperpigmentation issues [1, 2]. Sumac (*Rhus coriaria* L.), rich in polyphenols [3], is a promising candidate for studying its ability to inhibit tyrosinase, the enzyme involved in melanin production. In this study, we explored the extraction of polyphenol compounds using different ethanol-water ratios from the fruit of Sumac. Among different hydroethanolic extracts, the extract obtained using 70% ethanol exhibited the highest total phenol content, equal to 325 mg/g. Thus, this polyphenol-rich extract was selected for further bioactivity investigation. Its antityrosinase activity indicated that at a concentration of 50 ppm, this extract demonstrated a 75% inhibition of the tyrosinase enzyme. Additionally, its antioxidant activity, evaluated using the DPPH method, revealed an IC<sub>50</sub> value of approximately 52 mg/ml. Future research could delve into optimizing extraction methods to enhance the yield of polyphenolic compounds and further investigate the extract's efficacy in skincare formulations for managing hyperpigmentation disorders.

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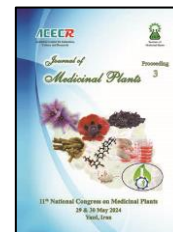
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Poster Presentation ID: 234

### ***In vitro* direct micropropagation of *Vanilla Planifolia* Andrews. (Orchidaceae): The impact of explant size and position**

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#### ARTICLE INFO

##### Keywords:

Tissue culture  
Vanilla  
Regeneration  
Nodal segment  
MS medium

#### ABSTRACT

*Vanilla planifolia* Andrews. (Orchidaceae) is an evergreen vine native of the neotropical realm, from southern Mexico through Central America, Colombia, and the northern portions of Brazil. The plant is a highly demanded product with high economic value in the world markets as flavoring and medicinal use[1]. Despite the high demand of the plant, its reproduction in nature and cultivation systems is limited due to the low seed germination rate and propagation difficulties. *In vitro* culture techniques can be used to overcome these limitations. In the present study, the effect of explant type (shoot tip and nodal segments) and cultured position (horizontal and vertical) on the regeneration rate of *V. planifolia* was studied. According to the literature, *in vitro* cultures were performed on the Murashige and Skoog (MS) medium supplemented with 2 mg/l 6-benzylaminopurine (BAP). Based on the obtained results, the nodal segments showed higher growth and multiplication rate compared with shoot tip explants. The cultured position of the nodal segments did not show a significant difference although horizontal culture had a positive effect on the bud dormancy breaking. Rooting formation capacity in the nodal segments was also higher than shoot tip explants. This information can be considered for the *in vitro* clonal mass propagation of vanilla for further exploitation in cultivation systems.

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Poster Presentation ID: 236

### Effect of Different Plant Growth Regulators on Callus Induction of Saffron (*Crocus sativus* L.)

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#### ARTICLE INFO

##### Keywords:

Plant growth regulators  
Callus  
Saffron  
*In vitro* culture

#### ABSTRACT

Saffron (*Crocus sativus* L.) is a sterile, triploid, herbaceous, perennial plant in the Iridaceae family, reproducing vegetatively through corms. Saffron contains pigments and bioactive compounds with medicinal value as well as wide application in different industries such as food, medicine and spices [1]. The slow growth of saffron and contamination of corms with different soil pathogenic microbes highlight the importance of the *in vitro* tissue culture of the plant. Development of the efficient protocol for callus induction of saffron are crucial for both genetic engineering and improvement the secondary metabolites production [2]. In the present study, surface disinfected corms were exposed to different plant growth regulators (PGRs) such as NAA, BAP and 2, 4-D for callus induction in the MS basal medium. The results of this study showed that the combined application of 1 mg/L 2,4-D + 2 mg/L BAP and 1 mg/L 2,4-D + 4 mg/L BAP were the suitable PGRs concentration for callus induction. These media can be used for further study to desirable metabolite production and indirect regeneration of cormlets.

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Poster Presentation ID: 237

### Investigating the protective effect of herbal extracts mixture against high glucose-induced oxidative stress in PC12 cells

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#### ARTICLE INFO

Keywords:

PC12 cells

Herbal extracts mixture

High glucose

Cell culture

#### ABSTRACT

Diabetic polyneuropathy is one of the commonest long-term complications of diabetes and the commonest form of neuropathy in the developed world [1]. The present study was conducted to evaluate the protective effect of *Silybum marianum*, *melissa officinalis*, *vaccinium arctostaphylos*, *Trigonella foenum*, *Urtica doica*, and *citrullus colocynthis* extracts mixture against high glucose-induced oxidative stress in PC12 cells as a well-known model of nerve cells. Alcoholic extracts was prepared using Spray Dryer. PC12 cells were seeded into 96-well plates at a density of  $10^4$  cells per well. For evaluating neuroprotective effect analysis of herbal extracts mixture against high glucose induced neurotoxicity, PC12 cells were co-treated with different concentration of herbal extract (1000, 500, 250, 125, 62.5, 31.25, 15.625, 7.813, 3.906 and 1.953  $\mu\text{g/ml}$ ) and high glucose (13.5 and 25 mg/ml glucose) for 24, 48 and 72 hours, followed by MTT assay for cell viability [2]. According to our findings, the survival rate of cells in the high glucose group was significantly reduced compared to the control group. There was a significant improvement in high glucose-induced PC12 cell viability that were treated with 1000  $\mu\text{g/ml}$  of the herbal mixture in 24, 48 and 72 hours of experiment. ( $p$ -value  $<0.05$ ). It seems that, the herbal mixture has potential for using as treatment for diabetic neuropathy.

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Poster Presentation ID: 238

### Investigation of chemical composition of *Eryngium* aromatic water, purchased from market and comparison of its essential oil and aromatic water composition

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#### ARTICLE INFO

Keywords:

*Eryngium*

GC.MS

Phthalate derivatives

Standardize

Packaging

#### ABSTRACT

One of the problems related to the *Eryngium* plant is the presence of different species of *Eryngium* in the market, which also makes it difficult to standardization. In this study, different compounds of aromatic water of *E. billardieri* have been studied. The results of this study were compared with the results of five aromatic water samples available in the market. The comparative results of GC-MS analysis of aromatic water of samples 1, sample 2 and 3 with the aromatic waters available in the market showed that only in Haghghat dadjou sample, Carvone substance in the amount of 5.9% and in the Ghadah sample - (-) - 1S Verbenone in the amount of 2.27% was present. In some samples, the presence of the 4-Amino 1,2,4-triazole compound is probably due to the separation of this substance from the steel containers used in the aromatic water production process. The compound 4-Tert-buthyl cyclo hexyl acetate is used as an aromatic substance for non-therapeutic uses, possibly as a cheat, to create a good odor for aromatic waters. Phthalate derivatives were also present in all aromatic waters which are probably related to product packaging. The results of this study showed that none of the effective compounds for the therapeutic effects of *Eryngium* are present in any of the aromatic waters and not only are they not useful for therapeutic purposes, but their consumption of these samples can possibly cause irreparable harm to the health of patients.



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Poster Presentation ID: 239

### Potassium nitrate priming improves seed germination and seedling indices in coriander (*Coriandrum sativum* L.) under salinity stress

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#### ARTICLE INFO

##### Keywords:

Coriander  
Germination indices  
Osmotic potential  
Seed treatment

#### ABSTRACT

Salinity stress inhibits seed water uptake by increasing osmosis activity. This negatively affects germination rate, delaying seed germination, as well as subsequent plant establishment, growth, and final yield [1]. Seed priming, particularly with Potassium nitrate ( $KNO_3$ ), can enhance the uniformity and speed of seedling emergence, especially in unfavorable environmental conditions like salinity [2]. To evaluate the impact of seed priming with  $KNO_3$  on germination and seedling indices of Coriander (*Coriandrum sativum* L.), a factorial experiment was conducted using a completely randomized design with three replications. The experiment included four levels of priming (0 or non-primed, 0.5%, 1%, and 1.5%) and two levels of salinity stress (0 or without stress, and -4 bar imposed by NaCl). The results showed that seed priming, salinity stress, and their interaction significantly affected germination percentage, seedling length, and seedling vigor index. The highest germination percentage (78.66%), germination rate (15.61 seed.d<sup>-1</sup>), seedling length (8.26 cm), and seedling vigor index (6.50) were observed in the  $KNO_3$  1.5% treatment without salinity stress (0 bar). Conversely, the lowest values for germination percentage (32%), germination rate (6.64 seed.d<sup>-1</sup>), seedling length (5.83 cm), and seedling vigor index (1.86) were recorded in the non-primed treatment under -4 bar salinity stress. These findings suggest that seed priming with  $KNO_3$  can enhance germination and seedling indices of Coriander under salinity stress conditions. Therefore, it can be recommended as an alternative treatment for improving germination and vigor of medicinal plants.

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### Comparing the antiparasitic properties of *Ziziphora clinopodioides* essential oil in free and encapsulated states on *Leishmania major* protozoa in vitro

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> <i>Ziziphora clinopodioides</i> <i>Leishmania major</i> Essential oil Leishmaniasis Encapsulation</p>	<p>Leishmaniasis is one of the common diseases between humans and animals (zoonosis) and is caused by a protozoan called <i>Leishmania</i> that is known “Salak” in Iran. <i>Ziziphora clinopodioides</i> is known “Kakuti” in Iran and has effects such as anti-parasitic properties. In this study, the effect of <i>Ziziphora clinopodioides</i> essential oil in free and encapsulated states on <i>Leishmania major</i> protozoa was investigated. The encapsulation of essential oil was done using maltodextrin and gum arabic (1:1 ratio) and spray drying method. In this study, broth microdilution method and Minimum Inhibitory Concentration (MIC) were used to perform this experiment. <i>Ziziphora clinopodioides</i> essential oil (free and encapsulated states) was used with concentrations of 1.100, 1.200, 1.400, 1.500, 1.800 µg/ml. Parasite survival rates were investigated in 4 groups: negative control, positive control (amphotericin), essential oil (free) and essential oil (encapsulated) after 72 hours of incubation at 25°C. The results showed that the highest parasite survival rate belonged to the negative control, positive control (amphotericin), essential oil (free) and essential oil (encapsulated) group, respectively, and there was a significant difference between them (P&lt;0.01). In terms of comparing essential oil concentrations (free), the lowest parasite survival was related to essential oil with a concentration of 1.500, which had a significant difference with all other concentrations. Also, there was no significant difference between essential oils with concentrations of 1.100, 1.200, 1.400 and 1.800. In terms of comparing essential oil concentrations (encapsulated), the lowest parasite survival was related to essential oil with a concentration of 1.500, which had a significant difference with concentrations of 1.400 and 1.800, but no difference with concentrations of 1.100 and 1.200. It was meaningful. The average survival of the parasite in the groups of essential oil (free) and essential oil (encapsulated) with different concentrations has been compared with the control groups. The lowest parasite survival belongs to the group of essential oil (encapsulated) with concentration of 1.500, which has no significant difference with the concentrations of 1.100 and 1.200, but it has a significant difference with all other groups.</p>

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Poster Presentation ID: 241

### Ultrasound application reduces seed dormancy in *Physalis alkekengi*

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#### ARTICLE INFO

Keywords:

*Physalis alkekengi*

Seed dormancy

Ultrasonic treatment

#### ABSTRACT

*Physalis alkekengi*, commonly known as Chinese lantern or bladder cherry, is of great value due to its medicinal properties. It has been extensively utilized in Traditional Chinese Medicine and Ayurveda. This plant exhibits seed dormancy, a characteristic that hinders germination, resulting in delayed germination, lower crop productivity, and economic losses in agriculture. While ultrasound application has demonstrated potential to enhance seed germination in various plant species, research on *P. alkekengi* is limited. Therefore, this study aimed to investigate the efficacy of ultrasonic waves in overcoming dormancy in *P. alkekengi* seeds. The seeds were immersed in an ultrasonic bath operating at a frequency of 28 kHz for durations of 5, 10, 15, 30, or 60 minutes. The results revealed a significant increase in germination-associated parameters following ultrasonic treatment compared to controls. The most significant improvement in cumulative germination occurred with a 60-minute ultrasonic treatment. Overall, ultrasonic waves effectively mitigated dormancy mechanisms and promoted the growth of *P. alkekengi* seeds in a time-dependent manner. In conclusion, ultrasound technology emerges as a promising tool for facilitating the germination process in *P. alkekengi* seeds, offering a way to improve crop yield without detrimental effects on seedling development.

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Poster Presentation ID: 242

### Ultrasound application reduces seed decay in roselle (*Hibiscus sabdariffa* L.) seeds

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#### ARTICLE INFO

*Keywords:*

Decontamination

Roselle

Ultrasonic treatment

#### ABSTRACT

Roselle (*Hibiscus sabdariffa*) is a tropical plant used in traditional medicine with a variety of nutritional and health benefits. In addition, roselle seed is a rich source of dietary fiber. Seed rot limits roselle production that could affect seed storage reserves. *Fusarium solani* is the major pathogen causing the roselle wilt disease. In recent decades, synthetic chemicals have been widely used to control seed-borne diseases. The application of systemic fungicides is considered a routine strategy for disease management and decontamination of seeds. However, there have been some concerns about the side effects of fungicides. Therefore, nowadays, the need for new, safe and effective methods for seed decontamination is increasing. Here, the effectiveness of ultrasonic treatment at 28 KHz for 60 minutes was evaluated to decontaminate roselle seeds. *F. solani* was identified as the causal agent of roselle seed rot according to morphological and molecular characteristics. Ultrasound treatment for 60 min could remarkably reduce the seed decay by 3.33%, while the fungal infection caused the highest seed rot in the control seeds (56.67%). Also, ultrasound treatment for 60 min reduced the fungal load (6.99 Log CFU ml<sup>-1</sup>). In addition, ultrasonic treatment showed no negative effects on the seed germination and seedling growth characteristics of roselle plants. In general, ultrasonic treatment for 60 minutes could successfully decrease roselle seed rot and fungal load without changing the quality of seeds and seedlings.

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Poster Presentation ID: 243

### The Wnt conserved disulfide bond 183-190 as a target of plant derived compounds: Insights from molecular dynamics simulations

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#### ARTICLE INFO

##### Keywords:

Wnt signaling  
Disulfide bond  
Cancer

#### ABSTRACT

Wnts are lipid-modified proteins rich in cysteine, regulating developmental processes, and are involved in various pathological conditions. Wnts structure resembles a hand, with a palmitoleylated thumb and an index finger-like domain interacting with frizzled (FZ) receptors. Previous research shows the palmitoleyl group and the disulfides importance in Wnt folding, secretion, and function, but the structural basis is not fully understood. Here, we utilized classical molecular dynamics simulation (800-ns in total) to investigate how the thumb palmitoleyl and its close conserved disulfides (183–190, 181–195) regulated Wnt-FZ interaction and structural dynamics. Using Steered molecular dynamics experiment followed by a relaxing procedure, we also explored if these disulfides are important in Wnt-FZ complex formation. According to our results, the palmitoleyl group contributes significantly to stabilize Wnt-FZ interaction, and the disulfides modulate this contribution. We also demonstrated that disulfide 183–190 regulates the Wnt thumb fluctuation, hydrogen bond network, and secondary structure. The pulling-relaxing experiment showed that both the disulfides, and especially, the disulfide 183–190, are highly important for long-range salt-bridge interaction establishment between Wnt Lys182 and FZ Glu64, led palmitoleyl group appropriate positioning to FZ, suggested this disulfide essential role in Wnt-FZ complex formation. Together, our findings provide new insights to how thumb-positioned disulfides contribute to Wnt-FZ complex formation, structural dynamics, and stability, introducing disulfide 183–190 as a consequential element to target in natural compound drug design against Wnt signaling.

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Poster Presentation ID: 244

### Evaluation of *Aloe vera* physiological responses to the application of zeolite and biofertilizers

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> <i>Aloe vera</i> Drought stress Biofertilizers Zeolite</p>	<p><i>Aloe vera</i>, recognized for its drought resistance and efficient water use, may exhibit reduced growth and productivity under low soil moisture conditions. This study aimed to investigate the potential for optimizing the physiological responses of <i>A. vera</i> plants through the application of zeolite and/or biofertilizers. The study was conducted using a factorial design within a complete randomized block setup comprising four replications. The first factor was the application of zeolite at rates of 0, 1, and 2 kg per square meter of soil, while the second factor involved the utilization of bio fertilizers (applied or not applied). Uniform <i>A. vera</i> pups were planted in rows in soil mixed with composted manure and zeolite (for treated samples). Biofertilizer treatments were applied every 15 days, and sampling was done 10 days after the final treatment. The results indicated that gel production in all treated plants increased significantly compared with control samples (290 g). The highest gel production was observed in samples receiving treatments of both biofertilizers and either one kg (312 g) or two kg of zeolite per square meter (310 g). Moreover, the protein concentration in samples treated with biofertilizers and one kg zeolite per square meter (3.3 mg. g DW<sup>-1</sup>) or two kg zeolite per square meter (3.3 mg. g DW<sup>-1</sup>) was higher than the control samples (2.7 mg. g DW<sup>-1</sup>). In conclusion, the application of these two compounds (biofertilizers and zeolite) led to improved plant growth and performance.</p>

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Poster Presentation ID: 246

### Investigating the antioxidant capacity of the *Falcaria vulgaris Bernh* extract for use in the treatment of skin diseases

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#### ARTICLE INFO

##### Keywords:

Antioxidant  
Falcaria vulgaris  
Skin diseases  
Extract

#### ABSTRACT

One of the most important skin aging is cell destruction by free radicals. Free radicals, which are very active, attack the cellular structure of the body and destroy them. Antioxidants, by combining with harmful oxides (radicals), protect body cells against damage caused by the activities of free radicals. After examining the medicinal plants, *Falcaria vulgaris* Bernh was selected due to its effect on skin wound healing. This study focuses on investigating the effectiveness of extract of this plant for treating skin problems. Ghaziaghi or Paghaze is a native plant of Iran. This plant is that it is placed in umbelliferae family, its height is 30 to 70 cm. Its poultice which has drying properties, is used to remove the effects of pimples on the skin and This plant is anti-inflammatory. In the beginning, after extracting the methanolic extract using a Soxhlet apparatus, the diphenylpicrylhydrazyl (dpph) method was chosen to evaluate the antioxidant capacity. In this method, the composition of a stable lipophilic radical was used, the maximum absorption of which is 517 nm. In this experiment, the ability to carry hydrogen atom or electron by different chemical compounds and extracts can be measured from the colorless level of our violet solution in methanol. The calibration curve was drawn for dpph and we obtained the value of the half maximum inhibitory concentration of 240. This shows that our plant has good antioxidant properties so it can be useful for skin.

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Poster Presentation ID: 247

### The effect of acidic copigments at different concentrations on the total anthocyanin content in sour tea (*Hibiscus sabdariff*)

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#### ARTICLE INFO

##### Keywords:

Anthocyanin

Sour tea

Copigmentation

#### ABSTRACT

Color is known as one of the main quality parameters of food products. Anthocyanins are one of the most important natural structures that play a role in creating natural colors. Anthocyanins are a source of red food colors and are known for their health-promoting properties, including anticancer, bacteriostatic, anti-inflammatory, and antioxidant activity [1]. Sour tea (*Hibiscus sabdariff*) is potentially a good source of anthocyanins and natural antioxidants. To determine the content of anthocyanin [2], two buffers of potassium chloride with pH 1 and sodium acetate with pH 4.5 were used. In this way, 1 ml of the mentioned buffers were mixed with anthocyanin extracted from sour tea, then the absorbance was measured at 520 and 700 nm wavelengths. The amount of anthocyanin was 2.28 by measuring the absorbance of the samples using a spectrophotometer at a wavelength of 520 nanometers. The concentration of total monomeric anthocyanin, which is expressed as cyanidin-3-glucoside equivalent, was calculated as 21.099 by measuring the absorption of the samples at two wavelengths of 520 and 700 nm. In the second experiment, five increasing concentrations (0, 120, 240, 480 and 960 mg/liter) of two organic acids, tannic and gallic acids, were prepared as copigments. Sour tea anthocyanin sample was adjusted with an approximate absorption value of 1 and at a pH equal to 3.5. All copigmentation reactions were investigated at 20°C. In addition, in all relevant experiments, the molar ratio of anthocyanin to copigment was the same. In order to investigate the copigmentation reactions, the absorption of the samples was recorded using a spectrophotometric device at a wavelength of 400-700. The results of adding copigments to anthocyanin extracts extracted from sour tea showed that the intensity of copigmentation depends on anthocyanin concentration. In both complexes of anthocyanin + copigmentation (A-D), the intensity of copigmentation and hyperchromic effect increased with increasing the concentration of copigment from 120-960 mg/liter.

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### A Morphological investigation on species complexes of *Pyrus* L. in Iran

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Pear Leaf Fruit</p>	<p>Wild pear taxa are distributed across the eastern and western parts of Eurasia [1]. Iran is geographically positioned at the intersection of these distributional regions [2]. Their fruits have long been used as both folk medicines and healthy food [3]. The flora of Iran hosts representatives of both Occidental and Oriental species groups in its xerophytic and humid regions. About 25 species of <i>Pyrus</i> occur in Iran. Some taxonomically problematic taxa have been located in three main groups, including <i>P. bioessieriana</i>, <i>P. salicifolia</i> and <i>P. syriaca</i> species complexes [2]. In this study, we investigated numerous herbarium samples of the genus collected from its entire habitat range in Iran to find the most meaningful morphological traits among samples distributed in different regions experiencing different climates. We employed morphological traits of leaves and fruits as they contain taxonomically important characters. The results indicated that, properties such as size and shape of the fruit, fruiting pedicel length, leaf length to width ratio and blade to petiole length ratio could be used as taxonomic tools for delimitation of taxa within such species complexes.</p>

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Poster Presentation ID: 249

### New amide and diterpene alkaloids with anticholinesterase activity from *Delphinium cyphoplectrum* roots

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#### ARTICLE INFO

Keywords:

Diterpene                   alkaloids  
Alzheimer's disease  
Cholinesterase Inhibitors  
Molecular                   docking  
simulation

#### ABSTRACT

The cholinergic hypothesis posits a robust correlation between the onset of Alzheimer's disease and a pronounced deficit in acetylcholine, a pivotal neurotransmitter crucial for the central cholinergic nervous system's function, pivotal for memory and learning. Diterpene alkaloids exhibit intricate and distinctive chemical structures that facilitate their passage through the blood-brain barrier. Moreover, their potent pharmacological attributes render them promising candidates for addressing central nervous system disorders and Objectives is This investigation aims to scrutinize the alkaloidal composition of *Delphinium cyphoplectrum* (Ranunculaceae) roots, further exploring their anticholinesterase inhibitory activity and mode of inhibition. The phytochemical analysis conducted on the roots of *Delphinium cyphoplectrum* yielded the identification of eight alkaloidal compounds including one C-18 diterpene, five C-19 diterpene, one pyrrolidine and one amide alkaloids. AChE inhibition assay and molecular simulations unveiled remarkable significant potency attributed to the C-19 diterpene alkaloids by the order of 1>2>3,6>4>5. Presence of hydroxyl group on C-1, C-7, C-8, C-14, and C-18 increased the effect. The best in vitro activity was recorded for compound 1 able to bind to Asp<sub>72</sub> in the narrow region of PAS, while interacting by pi-sigma with Phe<sub>330</sub> at the hydrophobic region of the gorge involving the acyl and choline binding site. This observation underscores the substantial promise of this category of natural products in the realm of drug discovery for Alzheimer's Disease, offering a compelling avenue for further research and therapeutic development.

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Poster Presentation ID: 250

### Exploring the habitat suitability condition for *Coriandrum sativum* farming in Iran

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#### ARTICLE INFO

*Keywords:*

Medicinal species  
*Coriandrum sativum*  
Farming  
Iran

#### ABSTRACT

The distribution and habitat suitability of plant species are greatly influenced by climatic variables. Understanding these factors and their proportional contribution is valuable as it enables us to identify new habitats and farms for the cultivation and transfer of plant species, leading to increased production of important crops. Species distribution modeling (SDM,s) play a crucial role in predicting and comprehending the range of plant communities. Among these algorithms, the MaxEnt model has gained substantial popularity and is extensively utilized to assess the ecological needs, environmental responses, and habitat suitability of species [1]. *Coriandrum sativum* L., commonly known as Coriander, is a highly valuable medicinal plant extensively used in the production of medicines and food industries [2]. Understanding the key influencing factors in the spread of this species is essential for identifying suitable areas to establish new farms and expand its cultivation. So, the current study aimed to identify the effective climatic factors that significantly impact the distribution of coriander in Iran, utilizing the MaxEnt model. The study findings revealed that the distribution of coriander is influenced by several key factors, namely BIO12 (Annual Precipitation), BIO10 (Mean Temperature of Warmest Quarter), BIO7 (Temperature Annual Range), BIO2 (Mean Diurnal Range), BIO15 (Precipitation Seasonality), BIO6 (Min Temperature of Coldest Month), and BIO18 (Precipitation of Warmest Quarter Participation). The research indicated that coriander thrives in areas with annual precipitation ranging from 350-500 mm, a mean temperature of the warmest quarter between 17-27 °C, a temperature annual range exceeding 35 °C, a mean diurnal range greater than 14 °C, and a minimum temperature of the coldest month falling within the range of -12 to -2 °C. By considering these factors, suitable areas for coriander cultivation can be identified, helping establish new farms and expand the cultivation of this valuable medicinal plant in Iran.

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### Investigating the effect of irradiation with gamma rays on some phytochemical properties and reducing the microbial load of pomegranate skin

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#### ARTICLE INFO

Keywords:

*Punica granatum* L.

Total tannin

Total phenol

Microbial content

#### ABSTRACT

Pomegranate fruit (*Punica granatum* L.) peel is very suitable anti-diarrhea agent in terms of having high phenol, tannin and alkaloids. Its main polyphenolic compounds including Ellagic acid, Gallic acid and Punicalagin (1, 2). It is difficult to dry Pomegranate peel in the post-harvest stage that leads to increase microbial content. In this study, the peel of pomegranate was dried in an industrial dryer at 70-75 degrees Celsius and then the effects of gamma rays (5-15 kGy) in reducing the microbial load of raw peel and peel powder were investigated. In addition, the effect of superior treatment (with highest effect in reducing microbial load and no organoleptic effect), was investigated on total phenol and tannin contents of the raw peel and powder peel by spectrophotometric method. The results showed that the highest amount of total phenol content was found in the irradiated raw peel that didn't show significant difference with control (17.76 mgGA/gDW), while the lowest content of total phenol was observed in the sample of irradiated peel powder (12.6 mg/g). The highest amount of total tannin content was observed in the control (4.32 mg/g) whereas, the lowest total tannin content was observed in the irradiated peel powder (3.36 mg/g). Finally, the application of gamma radiation has a significant effect in reducing the microbial load in the samples of pomegranate peel and peel powder, but it causes a significant decrease in total phenol and total tannin in the sample of pomegranate peel powder.

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Poster Presentation ID: 254

### Study of Medicinal Plant Species of Bakhtegan National Park

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#### ARTICLE INFO

##### Keywords:

Bakhtegan  
National Park  
Medicinal Plants

#### ABSTRACT

Bakhtegan National Park in Fars province has an area of 160000 hectares. Bakhtegan region was declared as a protected area for the first time in 1968 and then it was approved as a wildlife sanctuary in 1975. In 1995, a part of the shelter was declared as Bakhtegan National Park. There are 16 water springs in this area and dominant tree species in this area include *Amygdalus* and *Pistacia* [1]. The study of the medicinal species of this region was conducted in 2016 by conducting field operations and sampling from different altitudes, After collecting and transferring the species to the university herbarium, the species was identified using valid identification keys [2]. Based on the species collected and identified in this research, 65 plant families were identified in this area that among them Asteraceae, Lamiaceae, Apiaceae, Fabaceae, Brassicaceae, and Boraginaceae families had the highest number of medicinal species. These researches, In addition to demonstrating the importance of botany in applied research, can leads to the proper environmental planning, and being the basis for sustainable exploitation of natural resources.

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Poster Presentation ID: 255

### Protective effects of *Pterocarya fraxinifolia* hydroalcoholic extract against acetic acid-induced Colitis, an *in-vivo* observation

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#### ARTICLE INFO

##### Keywords:

Gastrointestinal tract,  
Tumor necrosis factor  
(TNF)- $\alpha$ , Interleukin  
(IL)-1 $\beta$ ,  
Myeloperoxidase  
(MPO), Inflammation

#### ABSTRACT

Inflammatory bowel disease (IBD) is a chronic disease of the gastrointestinal tract. Chron's disease is the most prevalent type of IBD. *Pterocarya fraxinifolia* was shown to exert anti-oxidant, anti-inflammatory, and anti-cancer activities. In this study, the anti-inflammatory properties of the hydroalcoholic extract *P. fraxinifolia* (leaves) were assessed in an acetic-acid-induced model of colitis *in vivo*. Following the plant extraction, the extract was administrated at 100, 200, 300 mg/kg for 5 consecutive days starting one day after the disease induction following intra-rectal administration of acetic acid. Inflammatory and oxidative stress-associated mediators' levels i.e. tumor necrosis factor (TNF)- $\alpha$ , interleukin (IL)-1 $\beta$ , myeloperoxidase (MPO), and reactive oxygen species (ROS) as well as macroscopic and microscopic changes were assessed. Macroscopic and microscopic scores revealed that the herbal extract attenuated inflammation and colon injury. Moreover, it reversed acetic acid-induced alterations in the mentioned parameters, especially at 300 mg/kg. In conclusion, *P. fraxinifolia* alleviated experimental colitis in Wistar rats. This study indicated that *P. fraxinifolia* could be considered a novel therapeutic approach for IBD. Further studies are warranted to fully understand the mechanism and proper dosage of this plant versus the inflammatory process.



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Poster Presentation ID: 257

### *Varthemia persica* alleviates Ulcerative colitis by reducing Inflammation, an *in-vivo* model

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#### ARTICLE INFO

##### Keywords:

Inflammation  
Gastrointestinal  
diseases  
Tumor necrosis factor  
(TNF)- $\alpha$   
Interleukin (IL)-1 $\beta$

#### ABSTRACT

Inflammatory bowel disease (IBD) is one of the most prevalent disorders of the gastrointestinal tract which is categorized into two main subtypes, Crohn's disease and Ulcerative colitis (UC). *Varthemia persica* is a plant endemic to Iran. Its anti-microbial, anti-oxidant, and analgesic properties have been elucidated in several studies. In this study, the anti-inflammatory effects of the hydroalcoholic extract *V. persica* (flowers) were evaluated in an acetic acid (4%, intrarectal)-induced model of colitis. Following the plant extraction, animals were divided to the experimental groups as the control (only treated with acetic acid 4%), sham group (treated with normal saline), standard group (receiving Dexamethasone), and treatment groups (various doses of 100, 200, and 300 mg/kg of *V. persica*). Colitis was induced in all groups, except sham. Animals were assessed for microscopic and macroscopic damages as well as expression levels of inflammatory mediators (tumor necrosis factor (TNF)- $\alpha$ , and interleukin (IL)-1 $\beta$ ). At 300 mg/kg, the herbal extract significantly alleviated macroscopic and microscopic changes induced by acetic acid. It also attenuated inflammation by reducing levels of TNF- $\alpha$ , and IL-1 $\beta$ . *V. persica* extract exhibited anti-inflammatory properties in current *in vivo* study, making it a qualified candidate for further clinical experiments.



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Poster Presentation ID: 258

### Study and identification of alkaloid compounds of medicinal plant *Nepeta glomerulosa*

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#### ARTICLE INFO

**Keywords:**  
Napeta  
Lamiaceae  
Alkaloid  
Coculine  
Tetrandrine

#### ABSTRACT

Plants are able to synthesize secondary metabolites such as terpenoids, terpenes, flavonoids and alkaloids. Alkaloids are the main group of these plant compounds that contain nitrogenous heterocyclic compounds and are obtained from amino acids and have many therapeutic properties such as pain reliever, antimicrobial, antimalarial, antipyretic, and antihypertensive, protection from Heart, anti-cancer and anti-arrhythmia. The Nepta genus is a plant belonging to the Lamiaceae, and there are more than 67 species of this plant in Iran. Most species of this genus are used in traditional medicine due to their therapeutic effects and have antibacterial, fungicidal and antiviral activities. In this research, the alkaloids of *Nepeta glomerulosa* plant collected from Sarbidjan-Sardoye area in the north of Jiroft city in Kerman province were studied and identified by LC-MS. The results showed that this plant has eight alkaloids, which are Coculine, Tetrandrine, Berbamine, Dauricine, Isotetrandrine, Cepharanthine, Tubocurarine chloride, and Tubocurarine in order of concentration.

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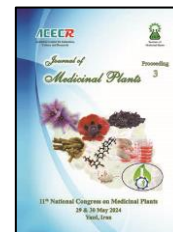
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Poster Presentation ID: 259

### A micromorphological study on the indumentum of some selected species of the genus *Verbascum* L. in Iran

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#### ARTICLE INFO

##### Keywords:

Scrophulariaceae  
Trichome  
Morphology

#### ABSTRACT

*Verbascum* L. comprising about 465 species worldwide is one of the largest genera of the family Scrophulariaceae. This genus is represented in the flora of Iran with 44 species, of which 21 are endemic [1,2]. Its main distribution occurs in the Irano-Turanian phytogeographical region of the country [3]. *Verbascum* contains well-known medicinal herbs, whose curative characteristics could be attributed to their biologically active compounds such as saponins, iridoids and flavonoids. In the current investigation, different quantitative and qualitative micromorphological characteristics of trichome coverage of 33 species were studied using both light and scanning electron microscopes. As a whole, trichome coverage of *Verbascum* could primarily be divided into two main groups, including a. branched-haired (stellate and dendroid hairs) and b. simple-haired (tubular, conical and lorate hairs) indumenta. Characteristics such as type (glandular or non-glandular), branching pattern, size, and density of trichomes can be used in delimitation of the species. According to the results, different traits of trichomes could be used as taxonomically important tools at the specific rank within the genus.

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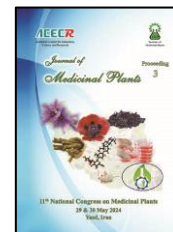
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Poster Presentation ID: 260

### Quantitative and qualitative comparison of essential oil and extract of ginger leaves cultivated in different conditions

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#### ARTICLE INFO

##### Keywords:

Ginger  
Waste  
Essential-oil  
GC-MS  
TPC

#### ABSTRACT

Ginger (*Zingiber officinale* Roscoe.) is a widely used spice from the Zingiberaceae family. Ginger cultivation produces a significant amount of biomass from its aerial parts, which are often either buried or utilized as an ingredient in animal feed [1]. To explore this further, ginger was grown in an open field in Talesh, Gilan province, as well as in the research greenhouse at Tarbiat Modares University using the hydroponic system. After harvesting, the aerial parts from both cultivation methods were shade-dried, powdered, and extracted for essential oil through hydrodistillation, and for aqueous extraction using ultrasonication. GC-MS was used to identify the constituents of the essential oil. The total amount of phenolic compounds was measured with the folin ciocalteu method. The results revealed that the essential oil yield from aerial parts harvested from the field (0.43%) was higher than that of the greenhouse (0.25%). In total, 59 and 44 different compounds were identified for the field and greenhouse samples, respectively. The essential oil extracted from the field leaf comprises three main components: Dehydrolinalool (13.54%),  $\alpha$ -Bergamotene (18.54%), and sesquithujene (17.94%). These compounds represent 5.23%, 22.48%, and 21.8% of the total oil of greenhouse-grown leaves, respectively. In addition, an analysis of the data reveals that the leaves harvested from the field contain a higher concentration of total phenolic content (34.11 mg GA/g DWA) than the extract obtained from the greenhouse (21.18 mg GA/g DWA). Hence, it can be inferred that the method of cultivation significantly influences the chemical composition of the leaf essential oil.

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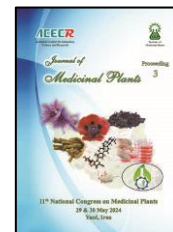
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Poster Presentation ID: 261

### Identifying the main components of turmeric (*Curcuma longa* L.) leaves essential oil grown hydroponically using GC/MS

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#### ARTICLE INFO

##### Keywords:

Turmeric  
Agro-waste  
Essential oil  
Monoterpene

#### ABSTRACT

Turmeric (*Curcuma longa* L.) as a perennial herb is the member of the Zingiberaceae (ginger) family [1]. Primarily, the rhizomes of these plants are utilized in medicine and food. Traditionally, the leaves of turmeric are used in culinary preparation, are aromatic and contain essential oil. Although the leaves of the plants are usually considered as an agro-waste. Hence, the management of these agro-wastes is emerging as an important concern [2]. The present study was conducted to analyze the chemical compounds of leaf essential oil from turmeric plant. To explore this, turmeric plants were grown in the research greenhouse of Tarbiat Modares University, Tehran, through hydroponic system. After a nine month of growth, the main yield was harvested. The leaves were collected as well and shade dried in room temperature and then grounded. The essential oil was extracted through hydrodistillation method using Clevenger apparatus for 3.5 hours. The yield of turmeric leaf essential oil was calculated with three replicates equal to 1% (W/W). The identification of the chemical compounds of the essential oil was done using GC-MS system with a DB-5 column. 93% of the identified compounds in Turmeric leaves essential oil were Monoterpene compounds. The two major constituents were terpinolene (29.20 %) and  $\alpha$ -Phellandrenene (28 %). The total sesqui terpenoids and diterpenoids accounted for about 5%. The results showed that the leaves of *Curcuma longa* can be used as well as its rhizome due to the useful compounds in the essential oil.

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Poster Presentation ID: 262

### Investigating the effect of harvesting frequency on the essential oil extracted from *Ferula persica* oleo-gum-resin

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#### ARTICLE INFO

##### Keywords:

*Ferula persica*  
Essential oil  
Oleo-gum-resin

#### ABSTRACT

*Ferula persica* is an endemic species in the Apiaceae family, traditionally used in Iranian medicine for its diverse pharmacological properties [1,2]. The oleo-gum-resin (OGR) of *F. persica* is collected from the root. In southern Iran, the OGR is obtained by making approximately 14 or more cuts on the top of the root during the harvesting period, with a four-day interval between each cut. The OGR from the first cut, locally known as Kokh, is collected and sold separately. Subsequent OGRs from later cuts are collected, mixed, and sold as a product called Shir. The objective of this study was to compare the essential oil content and composition in OGR from the first cut (Kokh) with that from subsequent cuts (Shir). Both types of OGR were purchased from local collectors in the Sepidan region of Fars Province, Iran. Essential oils were extracted from the OGR through hydro-distillation and analyzed using gas chromatography and gas chromatography-mass spectrometry to determine their chemical composition. The results indicated that the essential oil content in Shir was significantly higher than in Kokh. Twenty-eight compounds were identified in Kokh, while thirty compounds were identified in Shir. The major components of the essential oils from Kokh and Shir were as follows:  $\alpha$ -pinene (41.8% and 27.3%, respectively),  $\beta$ -pinene (9.9% and 10.5%, respectively), and (Z)-1-propenyl sec-butyl disulfide (11.1% and 20%, respectively).

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Poster Presentation ID: 263

### Study and identification of alkaloid compounds of medicinal plant *Nepeta glomerulosa*

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Napeta Lamiaceae Alkaloid Coculine Tetrandrine</p>	<p>Plants are able to synthesize secondary metabolites such as terpenoids, terpenes, flavonoids and alkaloids. Alkaloids are the main group of these plant compounds that contain nitrogenous heterocyclic compounds and are obtained from amino acids and have many therapeutic properties such as pain reliever, antimicrobial, antimalarial, antipyretic, and antihypertensive, protection from Heart, anti-cancer and anti-arrhythmia. The Nepta genus is a plant belonging to the Lamiaceae, and there are more than 67 species of this plant in Iran. Most species of this genus are used in traditional medicine due to their therapeutic effects and have antibacterial, fungicidal and antiviral activities. In this research, the alkaloids of <i>Nepeta glomerulosa</i> plant collected from Sarbidjan-Sardoye area in the north of Jiroft city in Kerman province were studied and identified by LC-MS. The results showed that this plant has eight alkaloids, which are Coculine, Tetrandrine, Berbamine, Dauricine, Isotetrandrine, Cepharanthine, Tubocurarine chloride, and Tubocurarine in order of concentration.</p>

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### Factors influencing the distribution of *Zhumeria majdae*: using MaxEnt algorithm for more information achievement

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ARTICLE INFO	ABSTRACT
<p><i>Keywords:</i> Habitat suitability <i>Zhumeria majdae</i> Conservation Medicinal plant</p>	<p>Understanding the key factors that influence the distribution of plant species is essential for determining the ecological niche and conservation programs of a particular plant. In the case of <i>Zhumeria majdae</i> Rech.f. &amp; WendelboL., an endemic medicinal plant with a restricted distribution in Hormozgan province, it is crucial to gather information about its habitat conditions [1]. The species faces threats from overharvesting and climate change, which jeopardize its survival. Therefore, a study was conducted to identify the primary variables that affect the distribution of this species and to determine more suitable habitats using the Maxent model method [2]. The findings of the study reveal several factors that significantly influence the distribution of <i>Z. majdae</i>. This species tends to grow in locations with a pH index greater than 7.5, summer precipitation exceeding 50mm, solar radiation exceeding 12,000 kJ m<sup>-2</sup> day<sup>-1</sup>, winter precipitation ranging between 100-200 mm, and summer mean temperatures between 25-35 °C. Based on these factors and the modeling results, it is evident that <i>Z. majdae</i> has a narrow ecological niche, and suitable habitats for this species are limited to small areas in Hormozgan province. The destructive effects of indiscriminate harvesting and climatic changes will have a negative impact on the population of <i>Z. majdae</i>, posing a risk of extinction for this species in the future. Urgent conservation efforts are needed to mitigate the negative impacts of overharvesting and climate change on this species. Implementing both in-situ and ex-situ conservation measures will be crucial for ensuring the long-term survival of <i>Z. majdae</i>. In-situ conservation involves protecting the species within its natural habitat, while ex-situ conservation refers to the preservation of the species outside its natural habitat, such as in botanical gardens or seed banks. Both approaches are necessary to ensure the long-term conservation of <i>Z. majdae</i>.</p>

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Poster Presentation ID: 266

### Introduce new suitable areas to *Ferula gummosa* Boiss. cultivation in Iran

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#### ARTICLE INFO

##### Keywords:

Climate factors  
Cultivation  
Distribution range  
*Ferula gummosa*  
Suitable habitats

#### ABSTRACT

Galbanum, scientifically known as *Ferula gummosa* Boiss., is a valuable perennial herbaceous plant indigenous to Iran. Its resin has diverse applications in perfumery, traditional medicine, and various industries [1]. This research utilized a species distribution model (SDM) to identify the crucial climatic factors influencing the distribution of *F. gummosa* and to identify potential new areas suitable for cultivating this species [1]. The study found that Galbanum thrives in arid and semi-arid climates, particularly in regions characterized by hot summers and relatively mild winters. However, excessive heat during the growing season can have negative effects on its growth and resin production. The distribution and cultivation of *F. gummosa* in Iran are influenced by specific climatic variables, including annual mean temperature (BIO1), mean diurnal range (BIO2), min temperature of coldest month (BIO6), temperature annual range (BIO7), annual precipitation (BIO12), and precipitation of warmest Quarter (BIO18). Additionally, the species tends to be found in elevated areas, preferably at altitudes ranging from 1,000 to 2,000 meters above sea level, where cooler temperatures and more favorable moisture conditions prevail. Currently, the distribution areas for Galbanum are concentrated in the central and northeastern parts of Iran, encompassing regions such as Bojnourd, Neyshabur, Gonabad in Khorasan Province, Semnan Province, Tehran Province, Markazi Province, and Fars Province. However, the modeling results indicate that certain regions in Yazd (e.g., the city of Taft), West and East Azarbayegan, Zanzan, Esfahan, Chahar Mahal and Bachtari, and Kerman provinces are also suitable for cultivating Galbanum. These areas experience arid conditions with normal winter precipitation ranging from 200 to 400mm, creating a favorable environment for the plant's growth.

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Poster Presentation ID: 267

### The effect of light intensity on the photosynthetic pigment and its relationship to the fresh and dry matter yield of *Ziziphora clinopodioides* L.

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#### ARTICLE INFO

##### Keywords:

Chlorophyll  
Light intensity  
Yield  
*Ziziphora*  
*clinopodioides*

#### ABSTRACT

Plant growth and development are highly dependent on light intensity, as light is a limiting factor for plant growth, yield, physiological and phytochemical processes. *Ziziphora clinopodioides* is a well-known aromatic and culinary species of the genus *Ziziphora*. It has been used in Iranian folk medicine to treat digestive problems and fever, and is distributed worldwide, especially in Iran [1-3]. Field experiments were conducted to measure chlorophyll a and chlorophyll b content, carotenoid content and yield of *Z. clinopodioides* under three light intensities (full sunlight, 75% and 50% of full sunlight). The results showed that plants exposed to low shade (75% light intensity) had increased chlorophyll a, chlorophyll b and decreased carotenoid content and total dry yield. The results showed that as light intensity increased, carotenoid content increased and the amount of dry matter also increased, but chlorophyll and fresh matter content decreased. This disruption in photosynthesis led to a significant decrease in both fresh and dry matter yield of the plants. In general, the results showed that *Z. clinopodioides* showed a negative response to the intensity of low and high light and its yield was reduced because of the photosynthetic pigment.

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Poster Presentation ID: 268

### Investigations on the anticancer properties of Sorafenib loaded nano drug delivery systems containing natural compounds against triple negative breast cancer cells

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#### ARTICLE INFO

##### Keywords:

Drug Delivery System  
Breast Cancer  
Nanoformulation  
Nanoemulsion

#### ABSTRACT

Novel drug delivery systems (DDSs) are becoming increasingly popular due to the fast-growing demand in the field of research and development of new molecular entities (NMEs)<sup>1</sup>. In the current study, complex nanoformulation has been devised to modify various properties of sorafenib tosylate (SFB). SFB is a multikinase inhibitor and a FDA-approved chemotherapy agent to treat breast cancer tumors. However, SFB is classified as a biopharmaceutical class II (BCS II) drug with low bioavailability. It also often comes with multiple side effects and drug resistance in the prescribed doses. In a try to address such issues, SFB-loaded bioactive *Lavandula angustifolia* essential oil and castor oil nanoemulsions (O/W) were prepared through a high-energy method using a rotor-stator homogenizer and characterized for particle size ( $96.99 \pm 7.23$  nm and  $111.82 \pm 4.34$  nm, respectively). The cytotoxicity of nanoemulsions was evaluated via MTT cell viability assay on a triple-negative breast cancer cell line (MDA-MB-231) for 24 hours. Our results showed that the SFB-loaded lavender nanoemulsion ( $IC_{50}$ :  $230 \pm 28$  ng/mL) and SFB-loaded castor oil nanoemulsion ( $292 \pm 2$  ng/mL) were significantly more cytotoxic against MDA-MB-231 cells compared to the SFB per se ( $470 \pm 14$  ng/mL). It seems that, the droplet dimension effect is more significant than the effect of linalool presence as a cytotoxic<sup>3</sup> ingredient of lavender essential oil.

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Poster Presentation ID: 269

### What are limiting factors can impact expansion of Damask Rose cultivation in Iran?

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#### ARTICLE INFO

Keywords:

*Rosa damascena*  
Modelling    Cosmetics  
industries  
Cultivation  
Edaphic condition  
Iran

#### ABSTRACT

*Rosa damascena* Mill., commonly known as the Damask rose, is a fragrant flower that is extensively grown for its essential oil, which finds applications in the perfume and cosmetics industries [1]. The use of species distribution modeling methods can provide valuable insights into the edaphic factors that potentially impact the cultivation and distribution of *R. damascena* in Iran [2]. Modeling results indicate that the distribution of *R. damascena* is influenced by various significant edaphic variables. This particular species thrives in a moderate climate, characterized by average temperatures ranging between 15°C and 25°C throughout the growing season. Several climatic variables, including Bio1 (Annual Mean Temperature), Bio2 (Mean Diurnal Range), Bio5 (Max Temperature of Warmest Month), Bio6 (Min Temperature of Coldest Month), and Bio7 (Temperature Annual Range), play key roles in determining the distribution of *Rosa* plants. Changes in climate, such as rising temperatures or irregular rainfall patterns, can have an impact on the growth and quality of these roses. Also, Bio12 (Annual Precipitation) and Bio18 (Precipitation of Warmest Quarter) are important factors for Damask rose growth. For optimal cultivation of *R. damascena*, the annual rainfall range of approximately 500-800 millimeters is considered suitable for dry farming. Altitude also plays a crucial role in the successful cultivation of the Damask rose, with the plant favoring higher altitudes between 800 and 1,500 meters above sea level. Therefore, the most suitable areas for cultivating *R. damascena* are typically found in the mountainous regions of central, northeastern, western, and northwestern parts of the country. Additionally, apart from soil-related factors, economic conditions, including market demand and prices, can influence the cultivation and distribution of this species.

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Poster Presentation ID: 271

### Medicinal species at high altitudes: *Elwendia persica*'s distribution analysis by MaxEnt algorithm

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#### ARTICLE INFO

##### Keywords:

Medicinal Species  
*Elwendia persica*  
Black zira  
Black cumin

#### ABSTRACT

*Elwendia persica* (Boiss.) Pimenov & Kljuykov, commonly known as black zira or black cumin, is a valuable medicinal species that is widely used in the production of spices and flavorings in the food industry [1]. It is a threatened medicinal herb found in the high-altitude regions of Iran, Central Asia, and the Western Himalaya. The species is facing multiple threats, including overharvesting and climate change, which pose risks to its survival. To gather information about the habitat conditions of *E. persica*, a study was conducted using the Maxent model method [2]. The study aimed to identify the primary variables that influence the species' distribution and determine more suitable habitats. The findings of the study revealed several significant factors affecting the distribution of *E. persica*. These factors include slope percentage, precipitation of the warmest quarter (bio18), mean temperature of the warmest quarter (bio10), depth to bedrock, and minimum temperature of the coldest month (bio6). The study suggests that *E. persica* has a narrow ecological niche, and suitable habitats for this species are limited to small areas in high altitudes with a high slope percentage, high winter precipitation, and low minimum temperature in the coldest season. Activities such as overgrazing, deforestation, unsustainable harvesting, and climate change have led to the fragmentation and degradation of the natural habitats of *E. persica*, resulting in a decline in its populations. Urgent conservation efforts are necessary to mitigate the negative impacts on this species. Implementing both in-situ and ex-situ conservation measures will be crucial for ensuring the long-term survival of black zira.

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Poster Presentation ID: 272

### Chromatic signatures and phenolic profiles: unveiling the Flavonoid-Anthocyanin interplay in *Rosa canina* petals

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#### ARTICLE INFO

##### Keywords:

Flavonoid composition  
Anthocyanin diversity  
*Rosa canina* petals  
Phenolic profile  
Chromatography-  
Electrospray Ionization

#### ABSTRACT

The study of *Rosa canina* L. petals unveil a vivid narrative of flavonoid and anthocyanin diversity, correlating the spectral beauty of its blooms with their biochemical composition [1]. Utilizing liquid chromatography-electrospray ionization-tandem mass spectrometry (LC-ESI-MS) in both negative and positive ionization modes [2], the research delineates a detailed phenolic profile. This study, employing both negative and positive ionization modes, has meticulously detailed the phenolic profile of the petals. Rutin, myricetin, quercetin, kaempferol, and their derivatives are highlighted as the primary flavonoids, with gallic acid as the chief phenolic acid during the flower's growth phases. The structural complexity and antioxidant capabilities of these compounds are confirmed, with a special emphasis on the anthocyanins—cyanidin, delphinidin, and pelargonidin—which contribute to the petals' distinctive white and dark pink colorations. Spectrophotometric quantification revealed a higher total anthocyanin content (TAC) in dark pink petals, attributed to the diverse anthocyanin pigments that are part of the phenylpropanoid pathway and influence petal coloration. A comparative analysis across five developmental stages of white and colored *R. canina* cultivars showed a higher total phenolic content (TPC) in white-petaled cultivars. This comprehensive exploration not only augments our understanding of the flavonoid-anthocyanin interplay but also opens new avenues for their application in medicinal plant research, emphasizing the pivotal role of flower color in the study of plant bio actives.

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Poster Presentation ID: 273

### Comparison of the Effect of *Momordica charantia* Extracts from Flower, Fruit, and Leaf on Germination of Wheat and Barley Seeds

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#### ARTICLE INFO

*Keywords:*

Allelopathy

Germinationpercentageindustrial

Momordica charantia

#### ABSTRACT

In recent years, due to the increase in agricultural activities and continuous use of herbicides, weeds have become resistant to herbicides. Moreover, chemical herbicides have negative effects on human health and the environment, leading experts to seek alternatives to herbicides. The use of plant allelopathy can have a significant impact on weed control. This research was conducted in the seed laboratory of University of Torbat Heydarieh in 2023. The experiment was carried out as a factorial layout based on completely randomized design in three replications. The experiment factors included four levels of extract (leaf, flower, and fruit extract of *Momordica charantia*) and the second factor consisted of two seed species (wheat and barley). The parameters measured included germination percentage, germination rate, root and shoot length, and plant weight. In all traits except for one, the analysis of variance showed significant effects of different parts of *Momordica charantia* extracts on both plants. Leaf extract resulted in a significant decrease in germination percentage in both wheat and barley seeds. The greatest impact on all traits in both plants was observed with the use of *Momordica charantia* leaf extract, showing a significant decrease in all traits.

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Poster Presentation ID: 274

### ***In vivo* Assessments of the protective Effects of the Hydroalcoholic Extract of *Sumac Bercolite* Fruit against Ulcerative Colitis**

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#### ARTICLE INFO

##### Keywords:

Gastrointestinal tract  
Tumor necrosis factor  
(TNF)- $\alpha$   
Interleukin (IL)-1 $\beta$   
Myeloperoxidase  
(MPO)  
Sumac

#### ABSTRACT

Inflammatory bowel disease (IBD) is a chronic and recurrent disease of the gastrointestinal tract, which exists in two major forms: ulcerative colitis(UC) and Crohn's disease(CD). Studies have shown that the sumac plant with the scientific name *Rhus coriaria* has antioxidant and anti-inflammatory properties. Therefore, in this study, for the first time, the anti-inflammatory effects of sumac fruit extract on UC induced by acetic acid in male rats were investigated. Experimental animals were divided into 6 groups each containing 6 rats. Disease induction was done by intrarectal administration of 1 ml of 4% acetic acid to 5 groups, and one group was considered as a sham group that did not receive acetic acid or drug treatment. 24 hours after the induction of colitis, doses of 100 ,200 and 400 mg/kg of sumac were administered by oral gavage while the negative control group received normal saline as treatment and the positive control group was administered dexamethasone (1 mg/kg). Expression of interleukin (IL)-1 $\beta$ , tumor necrosis factor (TNF)- $\alpha$  and myeloperoxidase (MPO) enzymatic activity were compared among groups . Also, microscopic and macroscopic evaluations were performed. Sumac inhibited MPO activities and levels of TNF- $\alpha$  and IL-1 $\beta$ . It also exerted positive impacts in normalizing macroscopic and microscopic alterations. Given these, the fruit of the sumac plant is suggested as a possible treatment in inflammatory bowel diseases for further investigation in animal studies and clinical trials.



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### The Effect of SiO<sub>2</sub> Nanoparticles and Cadmium on safflower Seed Germination

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#### ARTICLE INFO

*Keywords:*

Heavy metals

Stress

Seed

#### ABSTRACT

Heavy metal pollution has been increasing since the beginning of the industrial revolution, and the toxicity of heavy metals disrupts the germination process and growth of plants. To evaluate of Si nanoparticles effect on eliminate of cadmium sulfate stress on safflower seed a factorial experiment was conducted in the laboratory of University of Torbat Heydarieh with four replications. The first factor was silicon nanoparticles at concentrations 0, 100, 50 m/l, and the second factor was cadmium at concentrations of 0, 100, 200, 300 m/l. The traits studied included germination rate, length, and weight of seedlings. The results showed that cadmium concentrations did not have a significant effect on all seedling traits compared to the control group, but Si nanoparticles had a significant impact on some seedling traits. The results showed that treatment with 300 m/l of cadmium and 50 m/l of silicon, along with 100 m/l of cadmium, showed the greatest increase in root length. This resulted in a 122% and 133% increase compared to not using them, respectively. The comparison results did not show any significant effect on stem weight at any of the levels.

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Poster Presentation ID: 276

### Comparison of the distribution of rhizobacteria associated with purslane plant roots in non-saline and saline soil

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#### ARTICLE INFO

**Keywords:**  
Purslane  
PGPRs  
Salt stress

#### ABSTRACT

Purslane (*Portulaca oleracea*) is an annual halophyte nutritional and medicinal species that is resistant to several abiotic stresses soil conditions and specially salt soil. Plant growth promoting rhizobacteria (PGPRs) increase nutrient absorption, plant performance and plant tolerance to salt stress. Considering the possible role of these bacteria in the resistance of purslane to salinity stress, in this study, we collected purslane samples from saline and non-saline soils. Root endophyte and rhizo bacteria were isolated (1, 2). The population density of rhizobacteria in non-saline and saline soil were determined by  $0.3 \times 10^7$  cfu and  $1.5 \times 10^7$  cfu respectively, while  $10^2$  cfu and 50 cfu were isolated as root endophyte bacteria respectively. Overall, 50 bacterial strains were isolated and subjected to 5, 10 and 15% salinity tests. According to the results, all isolates grew in 5% salinity. Also, 10 isolates from the non-saline region and 13 isolates from the saline region had the ability to grow in 10% salinity, whereas, one isolate from the non-saline region and 2 isolates from the saline region were able to grow in 15% salinity. Finally, it seems that the population density of bacteria in purslane rhizosphere didn't decrease in saline soil, and there is a possibility that the resistance of purslane plant to salt stress may influenced by rhizobacteria coexisting with it.

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### Investigating the effect of nanoemulsions produced from natural compounds against Influenza Virus

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#### ARTICLE INFO

##### Keywords:

Nanoemulsions  
Essential oils  
Antiviral activity  
Influenza A H1N1  
Natural products

#### ABSTRACT

The escalating threat of drug-resistant influenza A viruses necessitates the development of novel antiviral strategies. Essential oils (EOs), rich in diverse bioactive compounds, hold promise as alternatives, but their inherent limitations in water solubility and volatility restrict their clinical application. This study investigates the potential of nanoemulsions, a promising delivery system, to enhance the antiviral efficacy of EOs against Influenza A H1N1. We formulated nanoemulsions encapsulating various EOs (e.g., *Zataria multiflora*, *Pistachia atlantica* Desf) and evaluated their physicochemical properties (size, stability). *In vitro*, antiviral activity against Influenza A H1N1 was assessed by using a combination of antiviral tests, including Co-inoculation treatment (Simultaneous treatment assay), pre-inoculation treatment (Pre-penetration assay), post-inoculation treatment (Post-penetration assay) and percentage of protection and plaque formation assays. Additionally, cytotoxicity assays were conducted to ensure biocompatibility. The synthesized nanoemulsions displayed favorable characteristics, including small droplet size (80-200 nm) and high stability. Remarkably, certain EO nanoemulsions, particularly those containing *Pistachia atlantica* oil, demonstrated potent antiviral activity, achieving significant viral titer reductions of up to 80%. Our findings reveal the promising potential of nanoemulsions encapsulating specific EOs as antiviral agents against Influenza A H1N1. These findings pave the way for further *in vivo* investigations and formulation optimization to advance their potential clinical translation.

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

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Yazd, Iran



Poster Presentation ID: 278

### Effect of K<sup>+</sup>-Priming on salt tolerance of savory (*Satureja hortensis* L.) during in germination and seedling growth

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#### ARTICLE INFO

##### Keywords:

Germination indices

Salinity

Savory

Seed priming

#### ABSTRACT

Seed germination is a pivotal stage in the life cycle of plants, and the ability to tolerate salt during this process is vital for the successful establishment of plants that thrive in saline soils [1]. Seed priming is an effective technique for increasing seed vigor and enhancing germination and seedling growth in various environmental conditions, including salinity. Osmo-priming induces cellular, sub-cellular, and molecular alterations in seeds, thereby promoting seed vigor during the germination and emergence processes across different plant species [2]. To investigate the effects of seed priming with KNO<sub>3</sub> on the germination and seedling indices of savory (*Satureja hortensis* L.), an experiment was conducted as factorial using randomized completely design with four replications. Experimental factors were included priming in four levels (0 or non-primed, 0.5%, 1%, and 1.5%) and salinity stress in two levels of (0 or without stress, and -4 bar imposed by NaCl). The results of the study demonstrated that seed priming improved the germination and seedling indices of savory under salinity stress conditions. Among all the treatments, the highest values for germination percentage (80%), germination rate (17.19 seed.d<sup>-1</sup>), seedling length (9.40 cm), and seedling vigor index (7.52) were observed in the KNO<sub>3</sub> 1.5% treatment without salinity stress (0 bar). Conversely, the lowest values for germination percentage (41%), germination rate (8.02 seed.d<sup>-1</sup>), seedling length (6.65 cm), and seedling vigor index (2.71) were found in the non-primed treatment under -4 bar salinity stress. These findings suggest that priming savory seeds with KNO<sub>3</sub> can enhance germination and seedling growth, even under salinity stress conditions. This indicates that priming with KNO<sub>3</sub> 1.5% can be a recommended treatment to improve the germination and overall health of medicinal plants.

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Poster Presentation ID: 279

### Comparative phytochemical profiling and therapeutic potential of *Ferula* species: A GC-MS analysis of essential oils from leaves and seeds

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#### ARTICLE INFO

##### Keywords:

*Ferula* species  
Essential oils  
GC-MS  
Therapeutic potential.

#### ABSTRACT

The genus *Ferula*, encompassing a variety of species known for their medicinal properties, has been a subject of extensive research due to its potential therapeutic applications [1]. This study presents a comprehensive gas chromatography-mass spectrometry (GC-MS) analysis of the essential oils (EOs) extracted from the leaves and seeds of *Ferula* species, aiming to elucidate their chemical compositions and relative concentrations of bioactive compounds. The analysis revealed a significant presence of  $\alpha$ -Pinene, constituting 42.55% in leaves and 15.09% in seeds, which is known for its anti-inflammatory and bronchodilator effects [2]. The  $\beta$ -Pinene content was found to be 16.71% in leaves and 9% in seeds, adding to the oils' antimicrobial and antioxidant properties. Sabinene, at 1.58% in leaves and 3.24% in seeds, along with Germacrene D, at 3.322% in leaves and 3.04% in seeds, contribute to the spasmolytic and antimicrobial activities. The presence of  $\beta$ -Myrcene and  $\alpha$ -Humulene in varying proportions further diversifies the therapeutic profile of these oils, offering analgesic and anti-cancer potentials. Notably,  $\alpha$ -Copaene was predominantly found in seeds at 8.06%, while 1,8-Cineol was detected at 2.82% in leaves, both imparting significant pharmacological interests. The distinct phytochemical profiles of the leaves and seeds suggest a versatile range of applications for *Ferula* EOs, warranting further exploration into their pharmacokinetics and synergistic effects in holistic medicine. This study underscores the importance of *Ferula* species as a reservoir of natural compounds with promising health benefits, paving the way for novel therapeutic agents in the pharmaceutical industry.

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Poster Presentation ID: 280

### Comparison of the effects of hydroalcoholic extract of *Dracocephalum kotschyi* and silymarin on diclofenac-induced hepatotoxicity in rats

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#### ARTICLE INFO

##### Keywords:

Diclofenac  
*Dracocephalum  
kotschyi*  
Silymarin  
Liver  
Rats

#### ABSTRACT

**Background:** Hepatotoxicity is one of the most important side effects of diclofenac sodium. In this research, the protective effect of the hydroalcoholic extract of *Dracocephalum kotschyi* was investigated on hepatotoxicity induced by diclofenac in rats. **Methods:** 42 male Wistar rats were divided into 6 equal groups. Group 1: did not receive any medicine. Group 2: daily intake of diclofenac sodium (50 mg/kg) intraperitoneally. Groups 3, 4, and 5: First, they received daily diclofenac sodium (50 mg/kg) intraperitoneally, and one hour later, they received hydroalcoholic extract of *Dracocephalum kotschyi* (40, 80, and 120 mg/kg) by gavage. Group 6: daily intake of diclofenac sodium (50 mg/kg) intraperitoneally and one hour later silymarin (100 mg/kg) by gavage. The treatments were done for 7 days. At the end of the experiment, blood was taken from the animals under anesthesia to determine the amount of liver enzymes, and a piece of liver tissue was removed for histopathology tests. The data were analyzed with SPSS18 one-way analysis of variance and Tukey's test. **Results:** In the experimental groups, after administration of the extract and silymarin, the amount of liver enzymes (ALT, AST, ALP) decreased significantly compared to the diclofenac group. Histopathological injuries were also improved by hydroalcoholic extract of *Dracocephalum kotschyi* and silymarin administration. **Conclusion:** The hydroalcoholic extract of *Dracocephalum kotschyi* can prevent the adverse effects of diclofenac on tissues and liver enzymes in a dose-dependent manner. The resulting effect is equivalent to the effect of silymarin.

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Poster Presentation ID: 281

### Wound healing assay of *Aloe vera* extract encapsulated into natural alginate polymer

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#### ARTICLE INFO

##### Keywords:

Encapsulation  
*Aloe vera* extract  
Alginate  
Controlled release

#### ABSTRACT

Herbal products are appropriate for application in wound healing systems due to their wound treatment properties and low side effects [1]. Encapsulation of plant extracts plays a positive role in increasing their durability as well as controlling their release during a certain time [2]. In this work, a wound healing system was prepared through encapsulation of *Aloe vera* into alginate polymer using an ultrasound-based process. Characterization of the prepared wound healing system was evaluated by antimicrobial, cytotoxicity and wound healing assays. Based on the obtained results, the encapsulated *Aloe vera* extract indicated good antimicrobial activities with the microbial reduction of 95, 94 and 92% against *E. coli*, *S. aureus* and *C. albicans*, respectively. Also, cell viability of 99% shows the fabricated wound healing system is a nontoxic product against human fibroblast cells. Wound Healing Assay was carried out using a scratch assay through measuring the proliferation and migration of human fibroblast cells. The average migration rates of 74.32% after 24 h and 96.86% after 48 h were obtained using the alginate nanocapsules containing *Aloe vera*. Wound healing property of *Aloe Vera* can be attributed to its compounds such as  $\alpha$ -bisabolol which reduces wound healing time through its effect on migration of cells to the wound. Also, it can facilitate wound healing using regulation of proteases [1].

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Poster Presentation ID: 282

### Effects of clove liquid gel (*Syzygium aromaticum*) on epidermal wound healing in the rabbit

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#### ARTICLE INFO

##### Keywords:

Wounds

*Syzygium aromaticum*

Antimicrobial

Anti-inflammatory

#### ABSTRACT

Wounds are damaging to quality life of confined animals, causing dysfunction in spinal, members injuries, and reduction in productive performance [1]. The use of natural products rich in bioactive substances has promoted the growing interest of pharmaceutical industries. Species of cloves (*Syzygium aromaticum*) have been reported to possess antibacterial, antiviral and anti-inflammatory activity [2]. The antimicrobial activity of cloves essential oil has been studied against multi-resistant (*Staphylococcus epidermidis*). In addition, the clove has been defined against *E. coli* [3]. This research investigated the clove antimicrobial on the healing of decubitus wounds (pododermatitis) of rabbits. To perform this experiment, fourteen adult rabbits were randomly divided into two groups of seven, each of which represented treatment and control, respectively. A pair of wounds measuring 2.5 cm x 2.5 cm each was created on the back of each rabbit on the side of the spinal cord. The wounds were treated with homogenized liquid gel with clove powder and the wounds of the control group were treated with normal saline. Wound contraction was measured on days 5, 9, and 12, respectively, indicating the inflammatory, proliferative, and mature phases of wound healing. Animals treated with fluid gel with of clove powder had significantly ( $p < 0.05$ ) faster rates of healing with shorter days of scab fall off than the control and showed significant ( $p < 0.05$ ) changes in the packed cell volume, mean corpuscular volume, lymphocyte and neutrophil counts.

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Poster Presentation ID: 283

### Application of mutated consortium of microorganisms on morpho-physiological characteristics of *Hibiscus sabdariffa*

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Gamma irradiation <i>Pseudomonas</i> <i>Trichoderma rifai</i> Rosell</p>	<p>In recent decades the production of medicinal and aromatic plants without chemical fertilizers has been considered by many researchers and manufacturers [1]. A number of bacteria and fungi, as growth-promoting microorganisms (GPMs), can stimulate plant growth. <i>Hibiscus sabdariffa</i> is produced organically in Iran, and to increase the yield of this valuable medicinal plant without the use of chemical compounds, the use of GPMs is considered a biocompatible solution [2]. In order to measure the nutritional effect of three species of <i>Pseudomonas</i> bacteria (<i>P. fluorescens</i>, <i>P. putida</i>, <i>P. aeruginosa</i>) and two strains of <i>Trichoderma rifaii</i> (un-irradiated and gamma irradiated mutant type) on the morphophysiological characteristics of <i>H. sabdariffa</i>, a factorial experiment was conducted in a randomized block design with Four replications in two locations. The results showed that plant height, number of fruits, fresh/dry weight of fruit were significantly increased by <i>Pseudomonas</i> and <i>T. rifaii</i> compared to the control. Anthocyanin content and catalase activity Increased by bacteria and fungi compared to the control. Combined use of <i>Pseudomonas</i> spp. and <i>T. rifaii</i> had a greater effect on improving the properties of <i>H. sabdariffa</i> than using them alone. In general, combined use of growth-promoting bacteria has a synergistic stimulant with mutated fungal strains and is a suitable solution to increase the yield of medicinal plants such as <i>H. sabdariffa</i>.</p>

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Poster Presentation ID: 284

### Effects of humic acid on quality and quantity of saffron (*Crocus sativus* L.) flower

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#### ARTICLE INFO

##### Keywords:

Corm weight  
Humic acid  
Picrocrocin  
Safranal  
Stigma

#### ABSTRACT

This work investigated the effects of humic acid as liquid form and corm weight on flower yield and quality of saffron stigma. A field experiment was conducted as factorial layout based on a randomized complete block design with three replications at saffron research farm of Aburaihan Faculty of Agricultural Technology, University of Tehran located in Pakdasht, east south of Tehran province. Experimental factors were consisted of four levels of humic acid (0, 25, 50 and 100 L.ha<sup>-1</sup>) and mother corm weights including small (3-5g) and large (8-10g). Humic acid was applied in early September companion with first irrigation. The results showed that number of flower, fresh weight of flower, and dry weight of stigma and number of days to flowering was significantly influenced by humic acid levels while stigma length was not affected by humic acid. The highest number of flowers (11.3 No.m<sup>-2</sup>) was obtained in 25 L.ha<sup>-1</sup> humic acid as well as large corms, while the lowest was recorded in control (2.3 No.m<sup>-2</sup>). Also humic acid application improved biochemical properties of stigma. The highest value of picrocrocin (92.2%) was obtained from 25 L.ha<sup>-1</sup> humic acid as well as large corms. The most safranal (44.81%) was obtained in 50 L.ha<sup>-1</sup> humic acid and the least content was observed in control (32.68%). Totally, the results indicated that use of humic acid, while improving soil properties, water saving, dissolution and release of elements, and subsequently more uptake by the roots of large corms led to improved flower characteristics and the active substances of saffron stigma.

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### Investigation of the antibacterial properties of Licorice root extracts from 21 genotypes collected from Northwest of Iran

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Medicinal plant Antibacterial properties Licorice <i>Escherichia coli</i> <i>Staphylococcus aureus</i></p>	<p>Medicinal plants are considered important genetic resources in the cultural heritage of countries and are of great global significance. These plants are considered primary and essential sources in medicine and pharmaceuticals in most parts of the world. Therefore, in the present era, there is a strong emphasis on using natural medicines for the treatment and maintenance of human health [1]. Licorice, a perennial herb known scientifically as <i>Glycyrrhiza glabra</i> L. from the Fabaceae family, has been used in traditional medicine worldwide since ancient times due to its anti-inflammatory, anti-ulcer, expectorant, anxiolytic, antibiotic, diuretic, and antimicrobial properties. This plant is used for treating various diseases ranging from coughs to cancer, hepatitis, edema, and stomach ulcers [3]. Given the importance of this plant, a study was conducted to investigate and identify superior genotypes of licorice for inhibiting bacterial activity. In this research, the antibacterial properties of licorice from 21 regions were evaluated against two bacteria, <i>Escherichia coli</i> (Gram-negative) and <i>Staphylococcus aureus</i> (Gram-positive), using the Kirby-Bauer disk diffusion method [2]. The results of this study were analyzed in a completely randomized design in three replications using SAS (9.3) software. The analysis of variance results showed that the plant root extract had a significant antibacterial effect on the studied bacteria at a 5% level of significance. As per the study findings, the Salmas region exhibited the most significant impact on <i>Escherichia coli</i> bacteria, as indicated by an inhibition zone diameter of 11.71 mm. In contrast, the Anganeh region displayed the least effect, with a diameter of 7.10 mm. Furthermore, the root extract from the Zanzan region showcased a substantial inhibition of <i>Staphylococcus aureus</i> growth, outperforming the Oshnavieh region (which exhibited the lowest inhibitory efficacy) by 38%.</p>

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Poster Presentation ID: 286

### The effect of *Nigella sativa* against kidney damage in rats with Rhabdomyolysis

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#### ARTICLE INFO

*Keywords:*

Rhabdomyolysis

*Nigella*

Acute Kidney Failure

#### ABSTRACT

Rhabdomyolysis, or destruction of skeletal muscle, is the release of the contents of skeletal muscle cells into the plasma, which can be filtered through the glomeruli and lead to acute renal failure by various mechanisms. One of the experimental models for inducing rhabdomyolysis in laboratory animals is intramuscular injection of glycerol. Oxidative stress plays an important role in the pathophysiology of kidney damage caused by rhabdomyolysis. Forty male Wistar rats were randomly divided into five groups: control, rhabdomyolysis, *Nigella sativa* extract (200 & 400mg/kg) + rhabdomyolysis, thymoquinone (15 mg/kg) + rhabdomyolysis. The duration of the study was seven days and on the third day of the study, 50% glycerol (10 ml/kg) was injected intramuscularly into both legs. Serum and urine samples were collected at the beginning and end of the study and serum samples were collected on day four of the study. In the rhabdomyolysis group, on day four, serum levels of CPK, urea and creatinine showed a significant increase compared to the control group. On the last day of the study, in rhabdomyolysis group serum CPK levels did not differ significantly, but serum urea and creatinine concentrations, GFR and urea clearance showed a significant decrease and urinary output a significant rise compared to the control animals. The present study showed that total *Nigella sativa* extract and thymoquinone had a good protective effect on renal function in animals with rhabdomyolysis. It is possible that part of these beneficial effects of *Nigella sativa* extract and thymoquinone is due to their antioxidant effect.

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Poster Presentation ID: 288

### A report on fatty acids profile of leaves in some species from *Serratuloides* section of *Cousinia* Cass. genus in Iran

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#### ARTICLE INFO

##### Keywords:

Asteraceae

*Cousinia*

Fatty acid

Iran

*Serratuloides*

#### ABSTRACT

*Cousinia* is a large genus of Asteraceae family. Studies have been conducted on various aspects including morphology [1] of species in *Serratuloides* section of this genus. A little research has been done on fatty acid composition of *Cousinia* species. Therefore, the aim of this study is report on fatty acids profile in leaves of five species of *Cousinia* from *Serratuloides* section, including *C. concolor* Bunge, *C. serratuloides* Boissier, *C. olivieri* DC., *C. rechingeriae* Bornmueller (endemic of Iran) and *C. pterocaulos* (C. A. Meyer). Rechinger f. (sub-endemic of Iran and Republic of Azerbaijan). In this study, samples collected from their natural habitats and they identified based on Flora Iranica. The modified method of Rodriguez Ruiz [2] was used to prepare extracts. By using the gas chromatography method, ten fatty acids identified. Linoleic acid was the most abundant fatty acid detected in these plants with (53.96%) in *C. concolor* and (47.85%) in *C. rechingeriae*. The second highest amount of fatty acids was related to oleic acid and its positional isomer i.e. petroselinic acid (35.34% in *C. olivieri* and 25.46% in *C. concolor*). The third main identified fatty acid was palmitic acid, which ranged from (3.99%) in *C. olivieri* and (9.2%) in *C. pterocaulos*. Considering the fact that more than 85% of the identified fatty acids in each species are from the unsaturated type, thus these plants could be recommend as a new source of natural unsaturated fatty acids for the pharmaceutical and food industries [3].

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Poster Presentation ID: 289

### Evaluation of *Heracleum persicum* essential oil nanoemulsion's antibacterial efficacy against Gram-negative and Gram-positive bacteria

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#### ARTICLE INFO

##### Keywords:

*Heracleum persicum*  
Antimicrobial activity  
Nanoemulsion  
*B. subtilis*  
*E. coli*

#### ABSTRACT

The antibacterial activity of a nanoemulsion prepared from *Heracleum persicum* essential oil against a Gram-negative (*E. coli*) and a Gram-positive (*B. subtilis*) bacteria was evaluated. The mechanism of antibacterial activity was investigated by measuring protein, and nucleic acid leakage from the cells, and electron microscopy[1]. The MIC and MBC values for *E. coli* and *B. subtilis* were 0.2 and 1.6 mg/mL, respectively. Evaluation of the kinetics of microbial deactivation showed that the nanoemulsion killed all the *E. coli* bacteria in about 45 min, whereas gram-positive bacteria were not completely destroyed by the nanoemulsion after 45 minutes. The nanoemulsion appeared to amplify the antibacterial activity of essential oils against *E. coli* and *B. subtilis* by increasing their ability to disrupt cell membrane integrity. *B. subtilis* seemed to be more resistant than *E. coli* to the nanoemulsion treatment, perhaps due to different cell wall structures[2].

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Poster Presentation ID: 290

### Synthesis of Nickel and Cobalt Nanoparticles Using *Trachyspermum ammi* Seed Extract

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#### ARTICLE INFO

*Keywords:*

Medicinal plants

Nanotechnology

Green synthesis

#### ABSTRACT

Today, one of the most important and frequently used materials is nanomaterials [1]. There are several methods for synthesizing nanoparticles which are an important group of nanomaterials including physical and chemical methods. Among different chemical methods based on chemical reactions, green synthesizing methods have significant advantages rather than classical and common chemical methods. The green synthesizing of nanoparticles can be done by medicinal plants. Therefore, today, the tendency to use plant resources as one of the most appropriate methods of nanoparticle synthesis has been considered by researchers [2]. *Trachyspermum Copticum* is one of the most important medicinal plants in Iran and the world with potential for synthesis of nanoparticles from its seed extracts [3]. Therefore, in this study, synthesis of nickel and cobalt nanoparticles using seed extracts of *Trachyspermum Copticum* medicinal plant was investigated. The extracts were prepared by fresh seeds of *Trachyspermum Copticum* and deionized distilled water by hydrodynamic method. Structural analysis of synthesized nickel and cobalt nanoparticles was performed by scanning electron microscopy (SEM). The results showed that the shape of spherical particles and their dimensions are in nanometer size.

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### Effect of Storage Condition of Rosemary Flowers on Their Essential Oil Content and Composition

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#### ARTICLE INFO

##### Keywords:

Essential oil  
Rosemary  
Steam distillation  
Extraction

#### ABSTRACT

Rosemary is one of the medicinal plants whose essential oil is used in the food, pharmaceutical and perfumery industries [1]. There is a gap time between harvesting herbal plant and extraction of essential oil of the plant due to the transportation and storage of the plant before extraction process. It is necessary to provide suitable storage conditions in such a way that the efficiency and quality of the final essential oil keep the initial quality of essential oil of rosemary [2]. In this study, petals were stored at refrigeration temperature ( $4\pm 0.5$  °C) temperature as well as ambient temperature (25 °C) for three periods of 1, 5 and 10 days. Essential oils were extracted by steam distillation and analyzed by GC and GC-MS. In the first case, the petals maintain their original quality when they are kept at low temperatures, Even the petals were stored at 4°C for 10 days, the essential oil obtained was similar in content and quality to the essential oil obtained from the petals immediately after harvesting. The results indicated that the storage time has a negative effect on the quality of the extracted essential oil, so that the concentration of  $\alpha$ -pinene and 1.8-cineole in the essential oil decreased by 20% and 34%, respectively after 10 days storage at 25 °C.

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Poster Presentation ID: 292

### Green Synthesis of Silver Nanoparticles Using *Melissa Officinalis* Leaf Extract and Its Total Phenolic Content

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#### ARTICLE INFO

##### Keywords:

Silver nanoparticles

*Melissa officinalis*

Phenolic content

#### ABSTRACT

The synthesis of silver nanoparticles by green synthesis method and using plants has attracted a lot of attention, recently. Synthesis of nanoparticles by green method has less harmful environmental side effects than synthesis by other methods. This study aims to synthesize silver nanoparticles using *Melissa officinalis* leaf extract. *Melissa officinalis* plant extract was prepared using the soaking method and then nanoparticles were synthesized using silver nitrate solution. The amount of total phenol was measured using the Folin Ciocalto colorimetric method. Examining the results of the study showed that the total phenolic content in different concentrations of the synthesized nanoparticles has a significant decrease compared to the different concentrations of the extract at the level of  $p \leq 0.05$ . Total phenolic content in three tested concentrations of silver nanoparticles 0.1-0.2-0.4 mg/ml respectively: 2.16-2.56-2.96 mg/G GAE and in three plant extract concentrations 0.1-0.2-0.4 mg/ml respectively: 4.76-5.65 -6.47 mg/G GAE was obtained. In conclusion, *Melissa officinalis* secondary metabolites such as phenols have a high potential to neutralize free radicals. The antioxidant and cytotoxic activity of this plant is related to its phenolic compounds. Therefore, the decrease in the amount of total phenolic content in the synthesized silver nanoparticle compared to the *Melissa officinalis* extract can be proof of the correct synthesis of this nanoparticle.





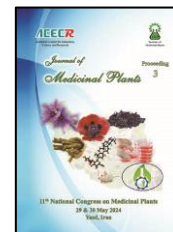
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Poster Presentation ID: 293

### Effects of Blue and red Light on *Physalis peruviana* L. plant performance under water stress conditions

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#### ARTICLE INFO

Keywords:

DPPH

Total phenol content

Total flavonoid content

Supplemental light

Drought stress

#### ABSTRACT

*Physalis* (*Physalis peruviana* L.) is a plant with many therapeutic uses and belongs to the Solanaceae family (1). The aims to investigate blue and red light radiation on yield and some morphological and biochemical traits of *Physalis* plant under drought stress conditions of 100, 75, and 50%. Morphological factors, number of flowers, fruits and plant height as well as phytochemical factors, total phenol content and antioxidant activity were measured by DPPH method. The results showed that the highest number of flowers and fruits is related to the control at the stress level of 100% and the lowest is related to the red and blue light treatment at the stress level of 50%. The height ranges from 48 to 83 cm, with the highest value for blue and red light treatment under no water stress (FC 100%) and the lowest value for the control group under 50% stress level. Phenol content ranges from 16.96 to 33.55, with the highest value observed for the control group (without supplemental light) under 50% stress level and the lowest value for blue and red light under 100% stress level. The DPPH value ranges from 35.02 to 14.69, with the highest value observed for the control group (without blue and red light) under 75% stress level and the lowest value for blue and red light under 50% stress level. It seems that blue and red light treatment enhances vegetative growth in all drought conditions, but delays reproductive growth. Each of the present studies identified the combined effect of supplemental blue and red light, however, additional studies are needed to clarify the detailed impact of red and blue light in drought conditions.

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### Study of phenolic compounds, flavonoids and anthocyanins of *Zataria multiflora* and *Thymus kotschyanus*

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#### ARTICLE INFO

##### Keywords:

Medicinal Plants  
Secondary Metabolites  
Phenolic Compounds

#### ABSTRACT

Phenolic compounds, flavonoids, and anthocyanins are groups of plant secondary metabolites known for their antioxidant, anti-inflammatory, and anti-cancer properties. Thyme is a medicinal plant from the Lamiaceae family used in traditional medicine to treat digestive disorders, respiratory infections, and colds. In this study, phenolic compounds, flavonoids, and anthocyanins were investigated in two types of thyme, *Zataria multiflora* and *Thymus kotschyanus*, using spectrophotometry. *Thymus kotschyanus* was collected from the Serbijan Sardoye region (Jiroft), and *Zataria multiflora* was collected from the Faryab mine area of Kerman province. The results indicated that the amount of phenolic compounds in *Thymus kotschyanus* was  $264.40 \pm 3.19$  mg/g dry weight, while in *Zataria multiflora* it was  $210.11 \pm 4.51$  mg/g dry weight. The flavonoid content in *Thymus kotschyanus* was  $791.41 \pm 3.57$   $\mu$ g/g dry weight, compared to  $737.28 \pm 3.43$   $\mu$ g/g dry weight in *Zataria multiflora*. Anthocyanin levels in *Thymus kotschyanus* were  $13.89 \pm 0.16$  mg/100 g dry weight, while in *Zataria multiflora* they were  $11.17 \pm 0.11$  mg/100 g dry weight. Overall, *Thymus kotschyanus* had significantly higher levels of all three compounds compared to *Zataria multiflora*. This difference was statistically significant."

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### Experimental Study of Operating Condition of Extracting Essential Oil from Damask Rose Flower Using Supercritical Carbon Dioxide

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#### ARTICLE INFO

##### Keywords:

Essential oil  
Damask Rose  
Supercritical fluid  
extraction

#### ABSTRACT

Supercritical fluid extraction is one of the extraction methods suitable for separation of temperature-sensitive compounds of medicinal and food plants [1]. In this research, the extraction of essential oil from the damask rose plant using supercritical carbon dioxide has been studied. Carbon dioxide has been used as a supercritical solvent due to its cheapness, non-toxic characterization, inflammability and compatibility with the environment [2]. Operating conditions were considered at 150-200 bar, 35-55 °C and time of extraction was set to 30 minutes. RSM method has been used to design the experiments. The compositions of the extracts were determined by GC/GC-MS. The best efficiency was obtained in the conditions of 200 bar and 45 °C in term of Citronellol and Geraniol percentage. The results show that in high pressure extraction, diffusion of supercritical CO<sub>2</sub> increase, improving the extraction processes, however increase in operating temperature above the 45 °C resulted in degradation of temperature sensitive compounds and consequently decrease the yield of extraction [2]. Moreover, the extraction efficiency of essential oil with supercritical carbon dioxide was compared with steam distillation method. The extraction efficiency using supercritical carbon dioxide was almost 3 times the extraction efficiency with distillation. It was demonstrated that the extraction with supercritical carbon dioxide provided a higher yield and a better quality of medicinal plants' essential oil [3].

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### Identification and introduction of some medicinal plants for wound healing in the Alborz Mountain Range

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#### ARTICLE INFO

##### Keywords:

Wound healing  
Medicinal Plant  
Alborz  
Botany

#### ABSTRACT

Wound is physical injury that result in the opening or breaking of the skin, leading to disruption in its anatomy and natural function. Out of approximately 250,000 species of flowering plants worldwide, 15% have been evaluated phytochemically and only 6% have been screened for biological activity. While a relatively small portion of all plants have been utilized as medicinal agents, their significance should not be underestimated, as nearly 65% of the global population incorporates them into their primary healthcare practices. It's noteworthy that around one-third of all traditional herbal medicines are considered for the treatment of wounds or skin disorders, whereas only 1 to 3% are modern drugs (1). Here, we present a taxonomical study of medicinal plants in Alborz mountain range. Among the identified plants, 16 families (22 species) have been found to be effective in wound healing. These families include Apiaceae, Asteraceae, Betulaceae, Brassicaceae, Caprifoliaceae, Cucurbitaceae, Fabaceae, Hypericaceae, Juglandaceae, Lamiaceae, Liliaceae, Poaceae, and Polygonaceae. The Asteraceae family, with 5 species (*Achillea millefolium* L. subsp. *millefolium*, *Anthemis tinctoria* L., *Lapsana communis* L., *Onopordum acanthium* L., *Sonchus asper* (L.) Hill), has the highest number (2). Leaves are used for treating wounds and skin itching. It has been reported that the essential oil of the leaves contains  $\alpha$ -pinene, borneol, camphor, thujone,  $\beta$ -pinene, bornyl acetate, numerous monoterpenes and sesquiterpenes, and small amounts of triterpenoids and steroids, which are somewhat common in the Asteraceae family (3). Therefore, this family holds significance, and the examination of other species within this family that are not medicinal plants is important.

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Poster Presentation ID: 297

### Evaluation of Phytochemical Factors in *Salvia officinalis* L. under Biological and Chemical Treatments

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#### ARTICLE INFO

##### Keywords:

Sage  
Phenolic compounds  
Essential oil  
Superabsorbent

#### ABSTRACT

Sage (*Salvia officinalis* L.) is a valuable medicinal and aromatic plants of the Lamiaceae family. This species is widely used in the pharmaceutical, cosmetics, perfumery, and food industries. Considering the growing need for medicinal plants in the mentioned industries and also the lack of water resources, optimal use of growth inputs is necessary for their production. In this regard, studies have shown that superabsorbent polymer and nutrients play an important role in increasing the yield or active constituents of medicinal plants. In this research, nitrogen (200 kg ha<sup>-1</sup>), superabsorbent polymer (1500 kg ha<sup>-1</sup>) and bacteria (*Pantoea agglomrans*) were used separately and together in a randomized complete block design (RCBD). Parameters such as total phenol, flavonoid, antioxidant capacity and essential oil content were measured and analyzed with statistical analysis software (SAS). The results showed there were no significant differences among treatments for essential oil content. In these cases, it is necessary to analyze other dependent components such as dry weight and essential oil composition and evaluate their results. The amount of total phenol showed a 34% increase compared to the control with the simultaneous use of superabsorbent, nitrogen and biofertilizer. Nitrogen consumption alone decreased the amount of flavonoids, but with the addition of other inputs, this decrease was compensated. The combined use of nitrogen and bacteria (*Pantoea agglomrans*) increased the antioxidant activity (34%) compared to the control.





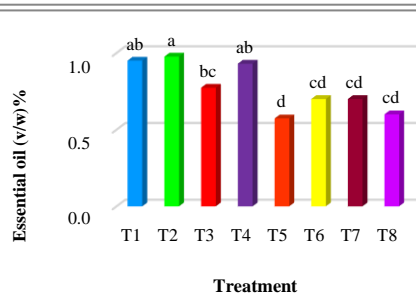
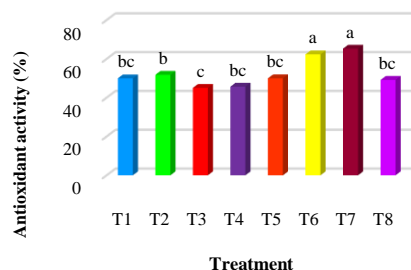
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Poster Presentation ID: 298

### Application of experimental design, vortex and extract of *Ferula asafetida* in biosynthesis of silver nanoparticles

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#### ARTICLE INFO

##### Keywords:

Experimental design  
Vortex  
Silver nanoparticles  
*Ferula assa foetida*

#### ABSTRACT

The research is mainly related to the monitoring of the biosynthesis of silver nanoparticles using experimental design, vortex and *Ferula assa foetida* plant extract in the biosynthesis of silver nanoparticles. In this work, to model and optimize the process conditions, the central composite design was used in a low-cost and affordable process. Aqueous extract of *Ferula assa foetida* plant was used as a coating and also as a factor for silver ion regeneration and green production of silver nanoparticles. In this design, the optimization of the conditions of the biosynthesis process of silver nanoparticles by *Ferula assa foetida* plant extract was followed according to the simultaneous effect and mutual influence of the factors. The independent variables of the model include synthesis time, concentration of *Ferula assa foetida* plant extract and pH, which are key and effective parameters on the process and were selected and optimized to increase the biosynthesis efficiency of silver nanoparticles. Also, the dependent variable of this model was the peak intensity of surface plasmon resonance caused by silver nanoparticles. Optimum conditions of key parameters using experimental design, vortex and *Ferula assa foetida* plant extract in the biosynthesis of silver nanoparticles in specific amounts of ultrasonic time 43 minutes, pH equal to 7.8, concentration of *Ferula assa foetida* plant extract equivalent to 4.4% volume-volume. Identification of biosynthesized silver nanoparticles with the help of *Ferula assa foetida* plant extract was followed through X-ray diffraction, transmission electron microscope, ultraviolet-visible spectrophotometer and the presence of synthesized silver nanoparticles was confirmed.

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### Isolation, purification and structure elucidation of compounds of *Apium graveolens*

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#### ARTICLE INFO

*Keywords:*

*Apium graveolens*

Chrysovariol

Diosmetin

#### ABSTRACT

The celery plant, or *Apium graveolens*, is an herbaceous, biennial plant of the umbellifera genus, which is a relatively large genus of flowering plants. In traditional medicine, good effects of the fruit have been seen and scientific evidence has shown that it can be effective in preventing cancer due to its antioxidant properties. Due to the numerous side effects caused by the use of synthetic drugs, much attention has been paid to the use of herbal drugs in the last decade. Since there have been few studies on the fruit extract of this plant, it was decided to separate and identify its compounds. Plant *A. graveolens* was collected in May 2018 from Tehran. The seeds of the plant were dried and ground, and extracted by methanol and water. Total extract was fractionated by solvents of hexane, chloroform, ethyl acetate and methanol. The compounds in ethyl acetate fraction and methanol fraction were separated and purified by different methods of chromatography. Eight pure compounds were isolated from this plant, and these compounds were in the category of flavonoid and coumarin compounds. Finally, with <sup>1</sup>H-NMR methods, three of the isolated compounds were fully identified. Identification of other compounds requires additional spectra including 2D NMR. The isolated compounds called 4'-hydroxy flavonol 3-o-glycoside, chrysovariol, and diosmetin, respectively. According to the special structure of this group of compounds, *Apium graveolens* has very diverse properties that can be used in the auxiliary treatment of many diseases.

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### Synergistic effects of the essential oils in Thymusin herbal veterinary drug against some important pathogenic bacteria

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#### ARTICLE INFO

##### Keywords:

Antibacterial  
*Escherichia coli*  
*Salmonella enteritidis*  
Herbal veterinary drug  
Thymusin

#### ABSTRACT

Today, with the increasing resistance of bacteria to antibiotics, the use of natural compounds to replace antibiotics has increased. The antibacterial effects essential oils have been reported [1,2]. Thymusin is an herbal veterinary medicine. It is made by the Pardis Daru Arvand company for treating poultry respiratory diseases. It contains several active substances from medicinal plants such as fennel, thyme, eucalyptus, etc. The present work aimed to compare the antibacterial effect of Thymusin and some essential oils including *Foeniculum vulgare*, *Thymus vulgaris*, *Eucalyptus sp.*, and *Satureja khuzestanica*. The in vitro antibacterial activity of Thymusin and essential oils against six pathogenic bacteria (*Salmonella enteritidis*, *Escherichia coli*, *Salmonella typhi*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Listeria monocytogenes*) was evaluated by agar dilution method. The result indicates that the lowest Minimum Inhibitory Concentration (MIC) was observed in Thymusin application on *S. typhi* and *S. enteritidis* bacteria. The Minimum Bactericidal Concentration (MBC) value of Thymusin indicates that *S. typhi* and *S. enteritidis* are more susceptible than other bacteria. This research showed that Thymusin had a stronger antibacterial effect than any of the essential oils examined in this research, which are the main components of Thymusin, which shows their synergistic effects in Thymusin. According to this research, Thymusin application is recommended to prevent the growth of pathogenic bacteria.

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### Ethnobotanical study (identification, therapeutic properties and how to use) medicinal plants of East Azarbaijan province

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#### ARTICLE INFO

##### Keywords:

Medicinal Plants  
Ethnobotany  
Traditional uses

#### ABSTRACT

Traditional Botany, or ethnobotany, was first used by an American botanist, John Williams Herschberger, who studies the methods of collection, processing, traditional consumption, causes of consumption, the extent to which Native or non-native plants affect human treatment in traditional societies rooted in the civilization of each region. In other words, the science, which is a branch of traditional biology or pathobiology, pays special attention to the relationships between plants and people's culture. This article examines and identifies some medicinal plants in East Azerbaijan province. After collecting the plants of the region, information on local and scientific names and medicinal properties and use cases of each plant species was given. Then, in the field method, important information about the properties, how to use and use cases of medicinal plants was collected and examined. The most medicinally important plant species were identified in the area. Most of the medicinal plants used in the area include the families of Lamiales, Apiaceae, Asterales and Capparaceae. Among the most well-known medicinal plants of the province are Capparis, Achillea, Echinophora, Ziziphora, Equisetum, Mentha, Stachys, Lavandula. It is significantly effective in treating a wide range of diseases and is used in a variety of ways. In three regions of East Azerbaijan province, the distribution of medicinal plants was also studied.

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### Identification and introduction of medicinal plants as emmenagogues in Eastern Alborz

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#### ARTICLE INFO

##### Keywords:

Emmenagogue  
Medicinal Plant  
Botany  
Alborz

#### ABSTRACT

Menstruation is one of the distinctive features of women during their reproductive years, starting with puberty and ending with menopause. Menstrual bleeding refers to the shedding of the uterine lining, which occurs regularly and rhythmically in women. Approximately one out of every four Iranian women experiences at least one menstrual disorder during their reproductive years. Disruption of menstrual regularity indicates significant disorders such as dysfunction in the hypothalamic-pituitary-gonadal axis, organic disorders, polycystic ovary syndrome, and obesity. Menstrual irregularities include increases or decreases in the interval between two menstrual periods (polymenorrhea, oligomenorrhea), increases or decreases in the duration of menstruation (hypomenorrhea), intermenstrual spotting, and increased menstrual bleeding (hypermenorrhea) (1). This study focuses on the introduction and identification of medicinal plants collected from Eastern Alborz. Among the plants collected and identified, 17 families (31 species) are effective in treating this condition. Among these families, we can mention the Apiaceae, Aspleniaceae, Asteraceae, Brassicaceae, Cucurbitaceae, Cupressaceae, Fabaceae, Lamiaceae, Malvaceae, Poaceae, Ranunculaceae, Rosaceae, Utricaceae, and Zygophyllaceae. In this list, the Lamiaceae family with 6 species including *Marrubium vulgare*, *Ocimum basilicum*, *Origanum vulgare*, *Salvia sclarea*, *Thymus carmanicus*, *Thymus fallax* has the highest number of species allocated to it (2). According to studies, flavonoids, eriodictyol, and apigenin isolated from the plant are estrogenic. The presence of these weak estrogens may be the reason for its common use in treating menstrual disorders as an emmenagogue and uterine relaxant (3). These compounds are somewhat common in the Lamiaceae family (2). For this reason, investigating this family and other species of this family is important.

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Poster Presentation ID: 305

### Extraction and Determination of Phenolic Compounds from Medicinal Plants, Comparison between *Ziziphora Clinopodioides* and *Mentha pulegium*

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#### ARTICLE INFO

##### Keywords:

Antioxidants  
Traditional medicine  
Phytochemistry

#### ABSTRACT

Phenolic compounds, which are widely distributed in many plants, are believed to account mainly for the antioxidant capacity of many plants. Antioxidants are substances that protect cells from the cellular damage caused by unstable molecules known as free radicals induced oxidative stress. Antioxidants neutralize free radicals as a natural by-product of normal cell processes [1]. *Ziziphora clinopodioides* Lam belongs to the Labiatae family and its dried aerial parts are used as flavors and also in the treatment of cold and cough [2]. *Mentha pulegium* (pennyroyal) is a species of medical herbs from Lamiaceae family that has grown in Europe, Asia, and North Africa. The pennyroyal is sometimes used in human food additives and also is a traditional medicine and has some advantages such as antibacterial, antioxidant, and insecticidal activity [3]. In the present study hydroalcoholic extracts of *Ziziphora* and pennyroyal were prepared by ultrasonic method. The extracts were analysed by a novel electrochemical technique and the concentration of total phenolic compounds were obtained. The extraction yield was measured as the ratio of gallic acid mass in milligram to dry plant mass in gram (mg/g). The results showed that in the best conditions for extraction of phenolic compounds the phenolic content of the *Ziziphora* was higher than pennyroyal. Therefore, it can be concluded that the antioxidant properties of *Ziziphora* is greater than pennyroyal. The good antiseptic effect of pennyroyal in traditional medicine also can be related to its high phenolic compounds content.

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Poster Presentation ID: 307

### Essential oil composition of fresh and dried roots of Vetiver (*Chrysopogon zizanioides*)

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#### ARTICLE INFO

##### Keywords:

Aromatic plant  
Vetiver oil  
Root yield  
Composition  
Khusimol

#### ABSTRACT

Vetiver (*Chrysopogon zizanioides* L.), also known as khus, is a perennial bunchgrass prized for its aromatic roots and soil-holding properties. The plant is native to tropical Asia, but due to its unique fragrance and practical uses, it is cultivated in many warm regions around the world, including Iran. The essential oil isolated from its roots is a highly viscous oil used in high-grade perfumes and cosmetics. In the current study, the essential oil content and composition of three-year-old vetiver cultivated in Gorgan were studied. The roots of the plant samples were collected, and essential oil was isolated using hydrodistillation from both fresh and ambient dried roots. The essential oil yield (w/w%) was found to be 2.24% for fresh roots and 1.82% for dried roots. GC-FID and GC-MS analyses enabled the identification of 45 components, accounting for 90.5-94.8% of the oils. In the dried root essential oil, khusimol (15.2%), alpha vetivone (6.2%), beta vetivone (4.7%), and iso-valencenol (3.4%) were found to be the main compounds. In the fresh root essential oil, khusimol (14.9%), alpha vetivone (5.4%), beta vetivone (4.2%), and iso-valencenol (2.5%) were present in the highest percentages. This study revealed that the essential oil yield was higher in fresh roots compared to dried roots. These findings suggest a trade-off between yield and composition when extracting vetiver essential oil.

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Poster Presentation ID: 308

### Morphological and molecular comparison of two species of *Drimia maritima* (L.) Stearn and *Bellevalia glauca* (Lindl.) Kunth. in Iran

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#### ARTICLE INFO

##### Keywords:

Asparagaceae  
Squill  
ITS

#### ABSTRACT

*Drimia maritima* (L.) Stearn, commonly known as the squill, typically features large bulbs, long, strap-like leaves, and dense spikes of white flowers, which are adaptations for surviving in coastal and dry environments [1]. In contrast, *Bellevalia glauca* (Lindl.) Kunth. has smaller bulbs, narrow leaves, and white flowers arranged in clusters, suiting its growth in various habitats including grasslands and open woodlands [2]. Molecular analyses, such as DNA sequencing, have demonstrated clear genetic distinctions between the two species, confirming their classification within different genera. These molecular differences underpin their varied adaptations and ecological niches, despite both species belonging to the Asparagaceae family. Understanding these morphological and molecular comparisons helps inform conservation strategies and provides insights into the evolution and ecological dynamics of these species in Iran [3]. In the present study, morphological and molecular comparison of two species was studied. Total genomic DNA was extracted and sequenced amplified nrDNA ITS region. The study revealed striking morphological discrepancies between the two species. Bulb diameter, scale size and thickness, root thickness, and root length all differed significantly. The nucleotide sequence comparison unveiled a notable genetic contrast between the two species, with *D.maritima* displaying an 850-base pair sequence and *B.glauca* presenting a 590-base pair sequence.

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### Total anthocyanin content of *Alcea rosea* var. *nigra* under the influence of different drying methods

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Anthocyanin Marshmallow Microwave Oven</p>	<p>Different drying methods, including microwave, sun, shade, and dry oven, can have varying effects on the anthocyanin content of medicinal plant materials. While microwave and dry oven drying methods may lead to faster drying times, they can also result in higher temperatures, potentially causing degradation of heat-sensitive compounds like anthocyanins [1]. Sun drying, although more traditional, may expose the plant material to prolonged exposure to sunlight, which can also lead to degradation of anthocyanins due to photochemical reactions. On the other hand, shade drying, which provides a more gentle drying environment with reduced exposure to light and heat, may better preserve anthocyanin content [2]. This experiment was conducted in order to investigate the effect of different methods of drying black marshmallow plant on anthocyanin content. The results showed that in the treatments, the lowest amount of total anthocyanin in drying with the power of 900 microwaves (7272 mg/liter) and the highest amount related to drying at 40°C oven (9531 mg/liter) compared to the control (drying in the shade) was reported to decrease by 24.86% and 1.52%, respectively. Overall, the choice of drying method should consider the balance between preserving anthocyanin content and achieving efficient drying of the plant material.</p>

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### The impact of UV-B radiation on performance, morpho-physiological, and biochemical responses of *Physalis peruviana* plants under drought stress conditions

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ARTICLE INFO	ABSTRACT
<p><i>Keywords:</i> Medicinal plant DPPH properties UV stress Drought stress Phenolic contents</p>	<p>Consumer interest in novel fruits and vegetables, such as <i>Physalis</i>, has been on the rise due to the growing awareness of the health benefits of a diverse diet. As a result, these <i>Physalis</i> members have gained attention, leading to preliminary studies to evaluate their nutritional and chemical profiles. The findings revealed that these crops are rich in essential minerals and vitamins, including potassium and Vitamin C, which supports the immune system and has antioxidant properties [1]. <i>Physalis peruviana</i> L. is a plant with many therapeutic uses and belongs to the Solanaceae family [2]. The aim is to investigate UV-B light radiation on yield and some morphological and biochemical traits of <i>physalis</i> under drought stress conditions of 100, 75 and 50%. Morphological factors, number of flowers, fruits and plant height as well as phytochemical factors, total phenol content and antioxidant activity were measured by DPPH method. The results showed that the highest number of flowers is related to UV-B treatment at 75% stress level and the lowest number is related to UV-B treatment at 50% stress level. The highest amount of fruit is related to UV-B treatment at the stress level of 100% and the lowest amount is related to the control treatment at the stress level of 50%. The highest height is related to control at 100% stress level and the lowest is related to UV-B treatment at 50% stress level. The highest amount of total phenol and antioxidant activity is in the control treatment at the stress level of 50%, and the lowest amount, respectively, in the UV-B treatment at the stress level of 100% and the control at 100% stress level. Phenol ranges from 18.4 to 40.35 mg rutin per g DW, with the highest amount for the control at 50% stress level and the lowest amount for UV-B at 100% stress level. The fruit number per plant ranges from 4 to 24, with the highest amount for UV-B at 100% stress level and the lowest amount for the control at 50% stress level. Increasing fruit yield and decreasing plant growth were associated with increased UV-B radiation at each level of drought. The results of this study could be used to induce flowering and increase yield in greenhouses after further complementary studies.</p>

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### Phytochemical and morphological diversity of naturally grown *Crataegus monogyna* in northwest of Iran

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#### ARTICLE INFO

**Keywords:**

Rosaceae  
West Azerbaijan  
Phenolic acids

#### ABSTRACT

*Crataegus monogyna*, commonly known as the common hawthorn, exhibits significant phytochemical and morphological diversity in northwest Iran. Morphologically, naturally grown hawthorn in this region displays variation in tree size, leaf shape, and flower and fruit characteristics, influenced by the diverse climatic and topographic conditions [1]. The trees may vary in height and branching patterns, with leaves ranging from deeply lobed to more rounded forms. In terms of phytochemical diversity, the fruits, leaves, and flowers of *C. monogyna* contain a wide array of bioactive compounds, including flavonoids, phenolic acids, and triterpenoids, which contribute to its antioxidant and anti-inflammatory properties [2]. This diversity in phytochemicals can be attributed to the plants' adaptation to local soil types, altitudes, and microclimates. Such variation offers potential for medicinal and nutritional applications and highlights the importance of preserving the natural genetic diversity of this species in northwest Iran. The present study was done to investigate the morphological and phytochemical diversity of 5 populations collected from West Azerbaijan. Morphological characteristics such as fruit length, fruit width, fruit fresh weight and phytochemical characteristics included total phenol, flavonoid and anthocyanin content (TPC, TFC and TAC), antioxidant activity (DPPH) and extraction yield was measured. The results showed that most of these characteristics are influenced by the growth region. The Baneh population had the highest fruit length (19.5 mm), fruit width (17.5 mm) and fresh weight (2.5 g), While, Mahabad population had the highest TPC (254.3 mg GAE/g DW), TFC (84.4 mg QE/g DW) and TAC (85.34 mg cyanidin 3-glucoside/100 g FW). Also, the maximum DPPH (37.5 µg/ml) and extraction yield (9.4%) belongs to Piranshahr population. Cluster analysis of morphological and phytochemical traits among populations of *C. monogyna* revealed distinct groupings indicative of local adaptation and genetic divergence and classified populations to 2 main groups and 3 independent populations. The populations of Piranshahr, Bane, and Marivan were grouped into one cluster, while the populations of Sardasht and Mahabad formed another distinct cluster.

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### Essential oil compositions of *Cannabis sativa* L. under drought stress

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Abiotic stress Cannabis Extraction GC-MS</p>	<p>Drought stress, a common environmental challenge for plants, can profoundly impact the medicinal plants (MPs) physiological processes including the essential oil content and compositions. The MPs often undergo a series of biochemical and molecular response when they are subjected to drought conditions [1]. The drought stress may influence the biosynthesis pathways of essential oils, which are composed of various volatile compounds with diverse biological activities. While some studies suggested that the drought stress led to an increase in essential oil content as a protective mechanism against environmental threats, others indicated a decrease in oil production due to limited resources and metabolic alterations [2]. This experiment was conducted to evaluate the effect of different levels of water deficit (including 100%; control, 80%; mild stress, 60%; moderate stress, and 40%; severe stress of field capacity) on essential oil content and composition of the Cannabis. The results showed that under drought stress, the essential oil content of the plant decreased, wherein the lowest content of essential oil was related to the severe stress (0.03%) treatment. <math>\beta</math>-myrcene, <math>\beta</math>-caryophyllene and <math>\beta</math>-ocimene were the three main ingredients of cannabis essential oil, which have sedative, anti-inflammatory and anticonvulsant properties. The highest content of <math>\beta</math>-myrcene, <math>\beta</math>-caryophyllene and <math>\beta</math>-ocimene were recorded in the treatments of 80% FC (50.49%) and 100% FC (13.07%) and (11.83%), respectively. The lowest value of abovementioned constituents was also observed in the water stress of 40% FC, wherein the <math>\beta</math>-myrcene, <math>\beta</math>-caryophyllene and <math>\beta</math>-ocimene were 7.19%, 4.20% and 1.74%, respectively.</p>

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### Economic analysis of marketing of medicinal plant "*Cyamopsis tetragonoloba*" in Qaleh Ganj city

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#### ARTICLE INFO

##### Keywords:

Marketing margin  
Marketing efficiency  
Wholesale price  
*Cyamopsis tetragonoloba*

#### ABSTRACT

Iran, with its diverse climate, has a significant relative advantage in the production of some medicinal and industrial plants, making economic studies crucial for adopting desirable policies to improve the marketing system and market distribution. The aim of this study is to conduct an economic analysis of the marketing of *Cyamopsis tetragonoloba* in Qaleh Ganj city. The required data for this study was collected through statistical and descriptive methods using interviews and questionnaire completion. The marketing status of *Cyamopsis tetragonoloba* was examined through marketing margin criteria, marketing efficiency, marketing margin functions, and marketing cost coefficient. Based on the results of the marketing analysis, six paths for *Cyamopsis tetragonoloba* were identified. The producer-wholesaler-manufacturer (consumer) path was selected as the most effective path. The margins for distributor, retailer, and total market were obtained as 24,500, 67,821, and 92,321 Tomans respectively. The marketing cost coefficient is 5.90 percent, and the shares of the producer, wholesaler, and retailer from the consumer price paid are calculated as 4.9, 4.66, and 0.24 percent, respectively, indicating an increase in the share of the wholesaler from the final price. In order to reduce the wholesale price and increase the share of producers, planning and establishing processing industries should help reduce marketing costs and increase farmers' income. Additionally, the government can encourage them to produce and market their products by providing low-interest loans to farmers.

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Poster Presentation ID: 314

### The Effect of nanosilicon on phenolic, flavonoid and antioxidant properties of *Cannabis sativa* L. under drought stress

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Abiotic stress Biostimulator Cannabis Phenolics</p>	<p>Nanosilicon application has emerged as a promising strategy to alleviate the detrimental effects of drought stress on plants, particularly through alterations in the phenolic and flavonoid contents, as well as antioxidant activity. Under drought stress conditions, plants experience oxidative stress due to reactive oxygen species (ROS) overproduction, leading to cellular damage [1]. The nanosilicon treatment has been proved to enhance the accumulation of phenolic and flavonoid compounds in the plants exposure to water deficit stress. These secondary metabolites act as an antioxidants, scavenging ROS and thus protect the cell homeostasis. Additionally, nanosilicon can increase antioxidant enzymes activity, further strengthening the plant's defense system [2]. This study aimed to understand the effect of nanosilicon application (0, 0.5 and 1.5 mM) on antioxidant parameters of <i>Cannabis sativa</i> under different drought stress condition (100, 80, 60 and 40% field capacity). The highest levels of total phenol (14.45 mg GAE/g DW), total flavonoid (80.71 mg RU/g DW), and antioxidant (65.23 <math>\mu</math>mol Fe(II)/g DW) were obtained with 1.5 mM nanosilicon application under 40% FC. Conversely, the lowest levels of total phenol (3.30 mg GAE/g DW) were found in the 0.5 mM nanosilicon application under 100% FC, and the lowest flavonoid content (21.03 mg RU/g DW) and antioxidant activity (37.82 <math>\mu</math>mol Fe(II)/g DW) were observed without nanosilicon treatment in the 100% FC. In conclusion, the nanosilicon treatment boosted the accumulation of total phenols, flavonoids, and antioxidants in the drought-stressed plants, enhancing their ability to cope the oxidative damage.</p>

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Poster Presentation ID: 317

### Investigating the antibacterial and antioxidant activities of different hydroalcoholic extracts of *Plantago ovata*

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#### ARTICLE INFO

Keywords:

*Plantago ovata*

Antioxidant

Antibacterial

#### ABSTRACT

*Plantago ovata* Forsk is one of two species of important medicinal Plantaginaceae family know as psyllium. Medicinal organs of psyllium have been used extensively in traditional medicine and is currently used in the treatment of constipation, diarrhea, irritable bowel syndrome (IBS), etc... According to the undeniable role of antioxidant and antibacterial factor in the process of many diseases, in the present study the antioxidant and antibacterial activity of different methanolic extract of psyllium seeds has been investigated. Extraction was done by two methods, Soxhlet and maceration with methanol. The extracts were evaluated in terms of the amount of phenolic compounds (based on gallic acid), flavonoids (based on rutin and quercetin), antioxidant activity (based on DPPH test) and Minimum inhibitory concentrations (MIC) was measured by agar dilution method on 8 bacterial strains that are responsible for common diseases in humans (antibacterial activity). According on the results obtained to these studies, the amount of total phenolic and flavonoids compounds and antioxidant activity in the extraction using the maceration method was higher than the Soxhlet method. significant antibacterial effects were shown in 2 of the 8 tested strains (Maceration had better antibacterial effects in the case of *Staphylococcus epidermidis*, while the effect was the same in the case of *Staphylococcus aureus*).

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Poster Presentation ID: 320

### The effect of sterilization methods on the biological and physiochemical properties of gum tragacanth

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#### ARTICLE INFO

##### Keywords:

Natural gum  
Tragacanth  
Sterilization methods  
Biological properties  
Physiochemical  
Properties

#### ABSTRACT

Tragacanth is a natural polysaccharide, which seeps from species known as *Astragalus*, growing in Asia's high altitudes. This gum is widely used in traditional medicine and food industry, and has excellent potential to be used in new food and biomedical applications. So, reliable and effective sterilization method is critical during development of the gum applications. In the present study, the effect of different industrial sterilization methods, including ionizing irradiation, autoclaving and ethylene oxide sterilization, on the physiochemical and biological properties of tragacanth gum was investigated. According to the results, ionizing irradiation of tragacanth solution and powders by 25 kGy irradiation dose, 21 min autoclaving at 121 °C and 2 atm as well as exposure to ethylene oxide, could effectively reduce gum contaminations. Whereas, ionizing irradiation of tragacanth solution led to dramatic decrease in tragacanth molecular weight and subsequent gum solution viscosity, ionizing irradiation of dry gum and autoclaving of gum solution resulted in tragacanth molecular weight and solution viscosity in moderate ratios. Also, ethylene oxide sterilization showed non-significant effect on tragacanth molecular weight and solution viscosity. Cytotoxic studies showed that autoclaving and ionizing irradiation of gum solution has not decrease tragacanth biocompatibility but other studied methods decreased tragacanth biocompatibility near 10-15%. According to FTIR analysis results, none of studied methods could introduce new chemical groups in chemical structure of the gum. Finally, It can be included that choosing of best sterilization method depends on expected characteristics of the material as well as technical and economic conditions.

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Poster Presentation ID: 321

### Enzyme-assisted extraction of volatiles from *Zataria multiflora*

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#### ARTICLE INFO

**Keywords:**

*Zataria multiflora*  
Enzyme-assisted  
extraction  
GC-MS  
Thymol  
Essential oil

#### ABSTRACT

Essential oils have been utilized as therapeutic and aromatic substances in traditional and modern medicine. Researchers have been exploring methods to increase essential oil yields, including the application of enzymes to break down cell walls and constituents. This study investigated the effect of adding pectinase, and cellulase enzymes to *Zataria multiflora* on essential oil production yield and thymol content. Essential oil extraction was performed using hydrodistillation, and the impact of enzyme addition was evaluated. Gas chromatography-mass spectrometry (GC-MS) was used to quantify thymol and carvacrol content. The results showed a significant increase in essential oil yield and thymol content after enzyme-assisted extraction (EAE). The highest thymol content was observed in the mixed sample of all three enzymes, followed by pectinase and cellulase enzymes. Our study demonstrated that the controlled use of cellulase and pectinase enzymes on a laboratory scale could enhance essential oil extraction and increase thymol and carvacrol content. The enzymatic effect was likely due to the breakdown of glycosidic bonds, increasing the amount of essential oil and volatile metabolites. These findings revealed significant implications for the development of efficient and sustainable essential oil production methods.

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Poster Presentation ID: 322

### Effect of physical and chemical disinfectants on the sterilization and *in vitro* bulb culture establishment of *Leucojum aestivum*: a valuable source of Anti-Alzheimer disease alkaloids

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#### ARTICLE INFO

##### Keywords:

Amaryllidaceae  
Summer snowflake  
Disinfection  
Galantamine  
Lycorine

#### ABSTRACT

Summer snowflake (*Leucojum aestivum* L.) is a medicinal bulbous plant from the Amaryllidaceae family, which has been proven to have anti-Alzheimer and anti-viral activity due to the valuable alkaloids galantamine and lycorine [1]. The wild populations of the plant have been greatly reduced due to indiscriminate harvesting and construction development by human [2]. Therefore, it is necessary to develop a protocol for *in vitro* culture of the plant to rapid bulbs reproduction and germplasm conservation. During the process of *in vitro* plant tissue culture especially for the bulbous plants, microbial contaminations reduce the establishment rate. So, disinfection of the plant materials is the most important establishment step *in vitro*. In the present study, the physical pretreatment with hot water (50 °C) for 1, 2, and 3 h and thirty-six combinations of chemical treatments were used to disinfect of *L. aestivum* bulbs for further *in vitro* establishment on Murashige and Skoog (MS) medium based on a factorial experiment in triplicates. According to the obtained results, the pretreatment with hot water for 2 h had the best effect on the elimination of the contaminants. The bulbs treatment with a combination of 100 ppm zinc nanoparticles (ZnO) and 1.5 mg/l copper sulfate (CuSO<sub>4</sub>) free fungicide Topsin-M followed by application of 100 ppm Topsin-M and 50 ppm ZnO without CuSO<sub>4</sub> were also resulted as the best disinfectant procedure. The explants fully grew and no color change was observed in the first abovementioned treatment, while a medium color change to red and lesser growth rate compared with first treatment was observed in the second one. These protocols can be efficiently used for disinfection of summer snowflake bulbs *in vitro* for further exploitation in the plant conservation and commercial production of galantamine and lycorine alkaloids.

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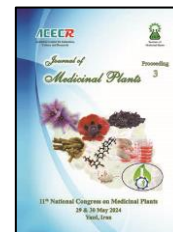
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Poster Presentation ID: 323

### ***In vitro* mass bulb proliferation of Summer snowflake (*Leucojum aestivum* L.) to produce anti-Alzheimer's compound galantamine**

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#### ARTICLE INFO

##### Keywords:

Amaryllidaceae  
Alkaloid  
Micropropagation  
*In vitro* culture  
Alzheimer's disease

#### ABSTRACT

The Amaryllis family has more than 1600 species belonging to 75 genera that are distributed in tropical and subtropical regions of the world [1]. *Leucojum aestivum* L. is one of the most important genera of this family, which contain valuable medicinal alkaloids galantamine and lycorine in its leaves and bulbs. These alkaloids have antiviral, anti-inflammatory activity [2]. Galantamine acts as a strong acetylcholinesterase (AChE) inhibitor for the treatment of Alzheimer's disease. In the present study, the impact of different plant growth regulators including ethphone (0, 1 and 0.5 mg/l), IBA, and NAA (0, 1 and 1.5mg/l) were used to proliferate plant bulblets cultured on MS medium *in vitro* condition. The cultured samples were kept in the dark and photoperiod 16/8 h light/dark and 24 h dark for 6 weeks. The maximum bulblet induction (100%) was observed from the four-scale bulb explants cultured on the MS medium containing 1 mg/l ethphone and 1.5 mg/l IBA kept in 24 h dark after 25 days. The highest rate of rooting was recorded on the culture medium supplemented with 0.5 mg/l ethphone and 1 mg/L IBA kept in the complete darkness. The lowest bulblets growth was observed by using the equal concentrations of ethphone and IBA (1 mg/l). Preliminarily phytochemical analysis of the *in vitro* proliferated bulblets showed a remarkable content of galantamine and lycorine. Our findings can be interestingly used for the plant mass bulb culture *in vitro* to produce these medicinally important alkaloids and to cover the pharmaceutical demands.

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Poster Presentation ID: 324

### Effect of Purified Municipal Sewage Sludge on the Yield of “*Calendula officinalis*”

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#### ARTICLE INFO

*Keywords:*

Morphology

Sewage Sludge

*Calendula officinalis*

#### ABSTRACT

Today, the proper disposal of sewage sludge as an organic fertilizer has caused many technical and environmental problems in the management of treatment plants in countries and Iran. Contamination with heavy metals and pathogenic microbes is an important limiting factor [1] in its use as an organic fertilizer, rich in nutrients to improve and improve soil quality in agricultural lands [2]. *Calendula officinalis* (L. *Calendula officinalis*) has been used for ornamental, dyeing and medicinal purposes since ancient times [3]. The format of randomized complete block design in three replications and three treatments including: control (no sewage sludge consumption), treatment of 10 tons per hectare and treatment of 20 tons per hectare of sewage sludge on the performance characteristics of marigold (in bold numbers) in a greenhouse in Cham village. It was implemented from the functions of Taft city in Yazd province. The results showed that the use of sewage sludge treatment caused a significant increase in plant height, number of flowers per plant, plant fresh weight, flower yield per plant, flower diameter per plant, number of pods per square meter, thousand seed weight and seed yield per plant. It is spring. And all the examined indicators, the 20 t/h treatment had the best performance, so the use of 20 t/h sewage sludge significantly increases the yield of marigolds.

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Poster Presentation ID: 325

### Using a combination of $\beta$ -cyclodextrin and sonication for the enhanced production of centellosides in *Centella asiatica* L. Urban hairy roots culture

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#### ARTICLE INFO

##### Keywords:

$\beta$ -cyclodextrin  
Elicitation  
Madecassoside  
Sonication

#### ABSTRACT

Abiotic elicitors have been widely employed to improve the production of valuable specialized metabolites such as triterpenoid centellosides (CTDs) in *in vitro* (controlled) culture techniques. *Centella asiatica* L. Urban, is a well-known source of CTDs that being utilized as an important component in cosmetic and pharmaceutical industries [1]. Bioprocessing through hairy roots culture has been currently introduced as an efficient strategy for production of valuable specialized metabolites [2]. In the present study, metabolic response of the two hairy root lines of the plant including wild type (HRLA4) inoculated with *A. tumefaciens* C58C1 (pRiA4) and transgenic line (HRLSQS) by *A. tumefaciens* C58C1 (pRiA4) (pBIs SS1) carrying the *Arabidopsis thaliana* SS1cDNA gene affected by abiotic elicitors (sonication,  $\beta$ -cyclodextrin) especially for the production of centellosides was investigated. The highest contents of madecassoside ( $1.55 \pm 0.03$  mg/g DW), asiaticoside ( $0.24 \pm 0.03$  mg/g DW), madecassic acid ( $0.12 \pm 0.03$  mg/g DW), asiatic acid ( $0.12 \pm 0.01$  mg/g DW), and total centellosides ( $2.04 \pm 0.05$  mg/g DW) were observed in the HRLA4 exposed to  $\beta$ -cyclodextrin. In HRLSQS, the highest content of madecassoside ( $1.02 \pm 0.15$  mg/g DW) was observed in the  $\beta$ -cyclodextrin treatment, while the highest content of asiaticoside ( $0.21 \pm 0.03$  mg/g DW), madecassic acid ( $0.31 \pm 0.03$  mg/g DW), asiatic acid ( $0.36 \pm 0.03$  mg/g DW), and total centellosides ( $1.87 \pm 0.14$  mg/g DW) was recorded in the combined application of  $\beta$ -cyclodextrin + sonication treatment. The results of this study could serve as a significant step towards semi-industrial production of these valuable compounds and scaling up their production in bioreactors.

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Poster Presentation ID: 327

### The effect of Saffron Crocin on the Beni (red color) of Koi fish (*Cyprinus carpio* L.)

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#### ARTICLE INFO

##### Keywords:

Koi  
Crocin  
Skin color

#### ABSTRACT

Saffron, as a natural source of crocin, a natural coloring agent, has attracted much attention from researchers in the field of nutrition and aquaculture. This study investigates the effects of crocin extracted from saffron on the red coloration of koi fish. The vibrant and attractive colors of ornamental fish play a crucial role in attracting attention to ornamental and decorative water bodies. Therefore, enhancing and improving the natural coloration of fish using natural coloring agents has received considerable attention. One of these agents is crocin extracted from saffron, known for its antioxidant and anti-inflammatory properties. In this study, saffron was extracted using the solvent extraction method (extraction with alcohol) to obtain crocin. Different concentrations of crocin were added to the koi diet. The red coloration of the fish was evaluated using laboratory methods and spectrophotometry. The results demonstrated that the use of crocin significantly improved the red coloration of koi fish. Higher concentrations of crocin resulted in greater red pigmentation in the fish, with a positive effect on skin coloration. Based on the findings, crocin extracted from saffron can serve as an effective natural coloring agent in enhancing and increasing the red coloration of koi fish. This research can contribute to the development of techniques and methods for improving fish coloration in the aquaculture industry, enhancing the skin health and beauty of ornamental fish.

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Poster Presentation ID: 328

### Introducing the medicinal plant Bilhar or Zou (*Dorema aucheri*): an endangered species

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#### ARTICLE INFO

Keywords:

Bilhar

*Dorema aucheri*

Ecology

Phonology

Zou

#### ABSTRACT

*Dorema aucheri* (Bilhar or Zou) is an Endemic plant of IRAN and distributed in zagross mountains from Kurdistan to Fars. This Plant has many ornamental uses and grazing. Root outing of Bilhar at vegetating initial stages by local people in Kurdistan and Kermanshah *Dorema aucheri* nearly exposed to decline but grown extensively in Kohgeloiah and Boyerahmad, Lorestan and some regions of Fars (central Zagross). *D. aucheri* is rich in flavonoids and has antioxidant properties. Consuming this plant increases monocytes and lowers blood triglycerides and cholesterol, and reduces the amount of platelets by inhibiting the production of thromboxane A2. The coumarin compounds of this plant are toxic in high doses, especially in fresh plants. This species is fed by livestock in the form of fresh and dry fodder.

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Poster Presentation ID: 331

### Comparison of trigonelline content in some ecotypes of *T. foenum-graecum* (L.) and *T. eliptica* by HPLC method

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#### ARTICLE INFO

Keywords:

*T. foenum-graecum* (L.)

*T. eliptica*

Trigonelline

Therapeutic properties

#### ABSTRACT

Trigonelline (TG) which is derived from the methylation of the nitrogen atom from nicotinic acid, is thoroughly known for hypoglycemic, hypolipidemic, anti-bacterial, anti-viral and anti-tumor properties and significantly remarkable as a recuperation agent for memory retention [1]. The present study was taken to analyze genetic diversity in respect to evaluation and fluctuation of trigonelline content between two species of genus *Trigonella* L. comprised of *T. foenum-graecum* (L.) and *T. eliptica* accompany with their five and four ecotypes for each one respectively. Hence the seeds of mentioned species, and their ecotypes were collected from different cultivation areas of Iran. By utilization of HPLC method, the quantitation of trigonelline was carried out on a Phenomenex luna column C18 (250×4.6 mm, 5μ particle size), mobile phase composition were SLS (pH adjusted to 3 with HCl): acetonitrile (50.0:50.0 v/v) which were delivered at a flow rate of 1.0 ml per min and also the detection wavelength was at λ=265 nm. Whereas injection volume was 10.0 μl, the column temperature maintained ambient too. Also, Empower 1154 chromatographic software was used for data acquisition [1]. The result showed significant variation in alkaloid TG ingredient among different two species and their ecotypes. Most of ecotypes were rich in trigonelline and it's recorded value was higher than standard pharmaceutical levels. Seeds ecotypes of *T. foenum-graecum* presented a higher level of trigonelline in comparison with other species. According our statistical analysis of quantitative data, Ge4, *T.foenum-graecum* (L.), local selected clone from Azarbayjan-e Gharbi-Makoo contained the highest amount of trigonelline (104.26) and the lowest one (29.97) belonged to *T.eliptica*, Ge8, which was cultured in Lorestan- Azna. In addition, the highest amount of trigonelline obtained between *T.eliptica* ecotypes, was belonged to Ge9, that was cultivated in Yazd-Nodoshan. No special and significant relationship was observed between region of cultivation and alkaloid (trigonelline) content in seeds. Based on the result of this experiment, it could be concluded that alkaloid content can influence by genotypic characteristic rather than environmental ones, however totally the resultant interaction between genotype and ecological factors impresses the content of alkaloid as a secondary metabolite.

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Poster Presentation ID: 332

### Investigation of drug release rate in Silymarin nano liposomal combined with zinc oxide nanoparticles: an in vitro study

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Liposome Silymarin extract Zinc oxide Encapsulation Efficiency</p>	<p>Liposome syrup containing silymarin extract containing 70% silibinin was made with different proportions of zinc oxide; Average particle size and particle size distribution, investigation of surface charge of nanoparticles, investigation of morphology of nanoparticles and investigation of drug distribution inside the particles showed that the liposome has a controlling structure in drug release. Studies on the stability of the drug at the time of production and 3 months of stability showed that the drug and the structure of the liposome are stable. Lecithin was determined to be the only component affecting the zeta potential of liposome particles, and increasing the ultrasound time increased the encapsulation efficiency in liposomes. Milk thistle (<i>Silybum marianum</i>) extract, silymarin (SM), is a polyphenolic flavonoid which has become so popular among herbalists throughout the world to maintaining liver health. SM is commonly used to treat liver diseases and has antioxidative, anti-apoptotic, anti-inflammatory, neuroprotective properties against neuronal damages and brain aging.</p>

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Poster Presentation ID: 333

### Established transgenic *Centella asiatica* cell suspension culture carrying the *Arabidopsis thaliana* SS1cDNA gene: a promising platform for the production of centellosides

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#### ARTICLE INFO

##### Keywords:

Asiatic acid  
Cell viability  
Madecassic acid  
Transgenic cells

#### ABSTRACT

*Centella asiatica* (L.) Urban (Apiaceae) is a commercial medicinal plant, which is rich in pentacyclic triterpenes named centellosides (CTDs) including asiaticoside and madecassoside as triterpene saponins in addition to their corresponding sapogenins (asiatic acid and madecassic acid). These are well-known bioactive compound in *C. asiatica* due to their extensive applications in medicinal and cosmetic industries [1]. cell suspension culture has been introduced as an efficient strategy for the production of valuable specialized metabolites [2]. In the present study, transgenic cell suspension culture of the plant carrying the *Arabidopsis thaliana* SS1cDNA gene was established for the first time. For instance, the plant transgenic hairy root segments induced by *Agrobacterium tumefaciens* C58C1 (pRiA4) (pBIs SS1) were cultured in liquid Murashige and Skoog (MS) medium fortified with different levels of 6-benzylaminopurine (BAP) and 2,4-dichlorophenoxyacetic acid (2,4-D). Based on the obtained results, the highest cell viability (96%), growth, and cell release rate were measured in the MS medium supplemented with 1 mg/l 2,4-D. The transgenic cells produced  $0.47 \pm 0.05$ ,  $0.16 \pm 0.02$ ,  $0.09 \pm 0.02$ , and  $0.11 \pm 0.02$  mg/l madecassoside, asiaticoside, asiatic acid, and madecassic acid after 21 days, respectively. The established transgenic cell culture can be considered as a promising biotechnological platform for the commercial production of centellosides.

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Poster Presentation ID: 335

### Effects of different harvesting treatments on soil, nitrogen, and phosphorus losses in the surface flow in Kheyroud forest

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#### ARTICLE INFO

*Keywords:*

Runoff  
Soil losses  
Nitrogen  
Phosphorus

#### ABSTRACT

Forest degradation and manipulation caused to disturbed water cycle, which in turn, has negatively impacted runoff and sediment production. As forests have an important role in mitigating runoffs, decreasing erosion and improving overall water quality, soil erosion and its consequences have become a new environmental and forest management challenge that seriously threaten water and soil resources. In general, the type of land use and erosion are closely related to each other, and if the land is used improperly, the rate of erosion will increase sharply. In the first year following forest harvesting, runoff in the skid trail (7.36 mm) were higher than the group selection, single selection, and unharvested treatments by 1.15-, 5.63-, and 48.1-fold, respectively. Results showed that sediment yield (3.85 g m<sup>-2</sup>) and concentration nitrate (2.89 mg l<sup>-1</sup>) and phosphate (0.221 mg l<sup>-1</sup>) were at highest level in the skid trail. Nitrate and phosphate concentration in the skid trail, group and single selection didn't recover within three years after treatment compared to unharvested treatment. phosphate in the group and single selection methods returned to the unharvested level over a 3-year period. A close relationship between runoff, sediment yield, and concentrations of nitrate and phosphate and amount of rainfall was observed especially in the first and second year after forest harvesting at all treatments. According to the results of current study, it can be concluded that silvicultural treatments such as single selection show the lowest impacts on hydrological characteristics that can be rapidly recovered within a few years.



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Poster Presentation ID: 336

### Characterization of essential oil constituents from vegetative and reproductive organs of *Salvia macrosiphon* Boiss. in natural habitat of Fars province

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#### ARTICLE INFO

##### Keywords:

Essential oil

Plant organ

Natural habitat

*Salvia macrosiphon*

#### ABSTRACT

This study represents a groundbreaking effort to examine the chemical makeup of essential oils derived from the flowers, leaves, and stems of *Salvia macrosiphon* Boiss., a wild plant from the Lamiaceae family found in Fars province [1]. Thirty fully bloomed plants were carefully chosen from the Jahrom region and divided into three groups of ten for extracting and analyzing essential oils from their respective organs. Using the Clevenger apparatus and hydro-distillation method, essential oils were extracted from each organ in triplicate, with 200 grams of plant material utilized in each extraction. The chemical composition analysis employed GC-FID and GC-MS techniques to identify and quantify the compounds present. Extraction yields varied among organs, with flowers yielding the highest (0.48%), followed by leaves (0.28%) and stems (0.06%). Flowers, leaves, and stems yielded twenty-five, eighteen, and twenty-one compounds, respectively, making up a significant portion of the total oil content. Linalool was predominant in flowers, while bicyclogermacrene + (*E*)-caryophyllene were major compounds in leaves, and germacrene D + bicyclogermacrene in stems. Sesquiterpene hydrocarbons were prominent in all organs, with leaves having the highest concentration (69.1%), followed by stems (68.0%) and flowers (34.5%). Flowers contained the highest oxygenated monoterpenes, primarily linalool at 27.3%. Overall, the quality and quantity of essential oils from *S. macrosiphon* varied significantly by organ, with flowers showing the most promise, especially in linalool content. This study provides the first comprehensive insight into the essential oil composition of all aerial parts of *S. macrosiphon*.

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Poster Presentation ID: 338

### Investigating the effect of salinity stress on some morphological traits of *Rosa damascene*

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#### ARTICLE INFO

##### Keywords:

Morphological  
characteristics  
*Rosa damascene*  
Salinity stress

#### ABSTRACT

Salinity is a major challenge in cultivating crops in arid and semi-arid regions [1]. Different researchers have proposed various solutions to overcome this challenge. One of the ways to mitigate the damage caused by salinity stress is to identify plants that are resistant to salinity [2]. This study investigated the impact of varying levels of salinity stress (0, 2, 4, and 6 dS/m) on the morphological characteristics of *Rosa damascene* seedlings. The study was carried out using a completely randomized design with four replications in the research greenhouse of Yazd University. The study results showed that as the salinity level increased, the collar diameter, plant height, wet weight, and dry weight of *R. damascene* decreased. The highest collar diameter value of 31 mm was observed at 0 dS/m, while the lowest value of 27.32 mm was observed at 6 dS/m. The highest wet weight of 39.1 gr was observed in the control group, whereas the lowest value of 30.45 gr was observed at a salinity of 6 dS/m. The highest dry weight value of 16.8 gr was observed in the control, while the lowest value of 13.1 gr was observed at a salinity of 6 dS/m. Based on the research, it was observed that salinity had a significant impact on the plant's morphological characteristics. However, the plant was able to tolerate salinity up to the level of 6 dS/m. Thus, it can be concluded that this plant has a good capacity to withstand salinity.

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Poster Presentation ID: 339

### Preparation of topical gel containing Henna and *Aloe vera* extract and its effect on dermatitis caused by radiotherapy: a double-blind randomized clinical trial

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#### ARTICLE INFO

*Keywords:*

*Aloe vera*

Dermatitis

Radiotherapy

Henna

Burns

#### ABSTRACT

Burn is damage to the skin or underlying tissues caused by heat, electricity, chemicals, friction, or radiation. Separate studies had shown the effect of Henna extract and Aloe vera on dermatitis, wound healing, burns, and inflammation. Skin burns and dermatitis, as well as more minor side effects than chemical drugs, prepare a topical gel containing Henna extract and Aloe vera and evaluation of its effect on the dermatitis caused by radiotherapy in breast cancer (1). This study was a double-blind clinical trial in which 56 patients with dermatitis were selected by the available sampling method from among the patients referred to Shahid Ramezanzadeh Radiation Therapy Center and entered to this study. Twenty-eight participants were randomly divided into two groups' control (zinc oxide) and intervention (hydrogel containing hydroalcoholic extract of Henna and Aloe vera). The intervention lasted for 15 days, and during these 15 days, the dermatitis improvement process was evaluated and recorded by a checklist on the first, fifth, tenth, and fifteenth days. Data were analyzed by using of SPSS software version 26 and independent Student T-test and Mann-Whitney U tests. The results of the present study showed that the rate of burns in the group that used the gel containing hydroalcoholic extract of Henna and Aloe vera was significantly lower than the control group ( $P < 0.03$ ), and in fact, the healing process in this group happened faster. Henna and Aloe vera gel can effectively improve and reduce the treatment costs of patients with radiotherapy-induced dermatitis.

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### Yield and antioxidant activity of essential oil obtained from *Ferula persica* oleo-gum-resin collected from two regions of Iran

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#### ARTICLE INFO

##### Keywords:

*Ferula persica*  
Essential oil  
Oleo-gum-resin

#### ABSTRACT

The genus *Ferula* belongs to the Apiaceae family, which has fifteen endemic species in Iran, including *Ferula persica* [1]. This species has been considered in Iranian traditional medicine due to its therapeutic effects on diabetes, back pain, rheumatism, and blood pressure, and as a carminative, anti-hysterical, laxative, antispasmodic, and expectorant. Several medicinal properties such as the chemopreventive effect of cancer, anti-inflammatory and lipoxygenase inhibitory activities, reversal of multidrug resistance, and antimicrobial activity have been reported for this plant [2]. The essential oil of *Ferula persica* oleo-gum-resin collected from two different regions of Iran including Sepidan and Darb-e-Behesht, located in Fars and Kerman provinces, respectively were isolated by hydro-distillation using a Clevenger-type apparatus for 4 h. Then the extraction yields of essential oil were calculated. The antioxidant activity of the essential oils was measured based on their inhibition of 2, 2-diphenyl-1-picrylhydrazyl (DPPH) radical activity. The sample concentration causing 50% inhibition of DPPH radical formation (IC<sub>50</sub>) was calculated. Analysis of variance indicated that the effects of region significantly affected the yield of isolated essential oils. The essential oil yield obtained from oleo-gum-resins from Darb-e-Behesht was higher than Sepidan's. In addition, IC<sub>50</sub> values of isolated essential oils were significantly affected by the oleo-gum-resin collected area. More antioxidant activity (i.e. less IC<sub>50</sub> values) was recorded for isolated essential oils from the oleo-gum-resin of Darb-e-Behesht.

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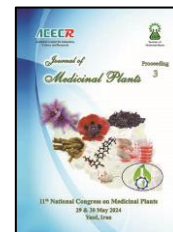
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Poster Presentation ID: 342

### Green synthesis of Zinc oxide nanoparticles using *Vitis vinifera* fruit seed extract

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#### ARTICLE INFO

##### Keywords:

Green synthesis  
Nanoparticle  
Plant extract  
Characterization

#### ABSTRACT

The Zinc oxide (ZnO) nanoparticles (NPs) have garnered significant attention in the life science research due to their distinct characteristics. A wide range of applications for ZnO NPs in different sciences such as food and agriculture have been reported [1]. The positive effect of ZnO NPs on the growth-related characteristics of plant has been previously approved. In this study, a straightforward and environmentally-friendly method was used to synthesis of ZnO NPs using *Vitis vinifera*-based aqueous fruit seed extract [2]. The synthesized ZnO NPs have been characterized via different techniques including UV-Vis absorption, Fourier transform infrared (FT-IR), scanning electron microscopy (SEM), and X-ray diffraction (XRD). A broad absorption band around 390 nm in the UV-Vis absorption spectrum clarified the successful biosynthesis of ZnO NPs. In addition, characterization of the biosynthesized ZnO NPs was carried out by XRD and SEM techniques. Based on XRD patterns, the observed peaks at  $2\theta$  position of 31.87, 45.59, 56.63, 66.35 can be related to reflection from (1 0 0), (1 0 2), (1 1 0), (2 0 0) crystal planes confirm that ZnO NPs were produced in Wurtzite structure. According to the SEM results, the average size of the synthesized ZnO NPs was around 75 nm.

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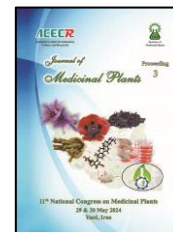
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Poster Presentation ID: 343

### Characterization of silver oxide nanoparticles synthesized by the extract of *Thymus daenensis*

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#### ARTICLE INFO

##### Keywords:

Green synthesis  
Ag<sub>2</sub>O Nanoparticle  
Ultrasonic Assisted  
Extraction  
*Thymus daenensis*

#### ABSTRACT

Green synthesis of metal-based nanomaterials have been of significant interest due to their numerous applications in biology and medicine. In the present study, ultrasonic assisted extraction (USAE) was applied as an efficient and rapid approach to prepare the aqueous extract of *Thymus daenensis* plant [1]. The extract was obtained at 45 °C, after 30 min ultrasonic process. In addition, the synthesis of silver oxide nanoparticles (Ag<sub>2</sub>O NPs) was performed in the presence of the plant extract. The synthesized Ag<sub>2</sub>O NPs have been characterized via different techniques including UV-Vis absorption, Fourier transform infrared (FT-IR), scanning electron microscopy (SEM), and X-ray diffraction (XRD). A broad absorption band around 410 nm in UV-Vis absorption spectrum clarified the successful green synthesis of Ag<sub>2</sub>O NPs. In addition, the crystal size was estimated from the XRD patterns using the Debye–Scherrer equation [2], and taking the full width at half maximum (FWHM) of peaks located at  $2\theta = 38.55, 46.50, 65$  and  $78$  are found, which represent the Bragg reflections of the Ag<sub>2</sub>O (111), (200), (220), and (311) reflection planes. The average size diameter of the particle was obtained equal to 63nm. The intense and known peaks indicated the successful synthesis of Ag<sub>2</sub>O NPs with high crystalline single phase as well as the cubic structure. The SEM images demonstrated the uniform and spherical nano-scaled particles with narrow size distribution and regular shape.

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### Status of soil characters of felty germander (*Teucrium polium* L.) in natural habitats: A wild-growing with high value aromatic medicinal plant

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#### ARTICLE INFO

##### Keywords:

Erosion

Multivariate analysis

Lamiaceae

*Teucrium polium*

#### ABSTRACT

*Teucrium polium* L. is a perennial aromatic plant from Lamiaceae family that grows wild in Iran [1]. Soil quality and nutrients are crucial environmental factors influencing plant growth and secondary metabolite production. In the current study, characteristics of 12 habitats in Kerman province (including Dehbakri, Mehrouye, Kondar, Chahshahi, Janatabad, Esfandaghe, Ramoun, Rayen, Narrab, Roudar, Sardouye and Anjirak), four habitats in Hormozgan province (including Geno, Ziyarat-Ali, Siyahoo and Hemag) and one habitat in Bushehr province (Kangan) as well as one habitat in Kohgiluyeh & Boyer-Ahmad province (Dena) were studied. From each habitat, three soil samples were taken from a depth of 0-30 cm. The percentage of clay, silt, sand, pH, electrical conductivity (EC), organic carbon, absorbable phosphorus, absorbable potassium, total nitrogen, calcium carbonate equivalent (CCE), absorbable iron, absorbable zinc, absorbable manganese and absorbable copper were measured. To analyze the studied environmental factors and the measured soil parameters, the multivariate analysis method including Pearson correlation coefficient of traits, decomposition into principal components and cluster analysis was used by SPSS ver. 26 software. The results revealed that *T. polium* grew in soils characterized by loamy, silt loam, or sandy loam textures with a tendency towards weak to moderately alkaline conditions (pH ranging from 7.7 to 8.3). Analyzing the soil chemical characteristics across various habitats revealed the exceptional adaptability of this plant to flourish in non-saline to low-saline conditions, slightly alkaline soils, and environments characterized by limited organic carbon and nitrogen content. Upon comparing the soil analysis results from various habitats where the chickpea plant thrives with established plant growth benchmarks, it becomes evident that the soil in these habitats exhibits notable deficiencies in absorbable phosphorus, potassium, nitrogen, and organic carbon. These deficiencies pose significant limitations on the growth potential of *Teucrium* plants like *T. polium*.

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### Rediscovery of *Eranthis hyemalis* from W Azerbaijan, Iran

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#### ARTICLE INFO

*Keywords:*

Ranunculaceae  
Flora of Iran  
Rare species

#### ABSTRACT

*Eranthis* Salisb. (Helleboroideae, Ranunculaceae) comprises of 12 herbaceous perennials with tuberous rhizomes distributed from Southern Europe to Eastern Asia. Different classes of biologically active compounds such as flavonoids, chromones and coumarins have been extracted from these herbs. The genus is divided into two geographically separated western and eastern sections, including respectively *E. sect. Eranthis* and *E. sect. Shibateranthis* (Nakai) Tamura [1]. The infrageneric division of *Eranthis* is also supported by morphological and molecular evidence. *Eranthis* is represented with *E. longistipitata* Regel and *E. hyemalis* (L.) Salisb. in the flora of Iran. These species have the most extensive distribution ranges within the genus. *E. hyemalis* has also been introduced to North America and North Europe. However, Flora Iranica accounted it only from North Iraq, while recently Flora of Iran has reported this species from Iran based on old specimens collected from a narrow range [2, 3]. During a botanical excursion to W Azerbaijan, a population of peculiar *E. hyemalis* from a new habitat (South Urmia) was recorded after nearly 5 decades since its last observation. The species in the area grows in woodlands of *Malus orientalis* Uglitzk., *Rosa canina* L., *Prunus microcarpa* C.A.Mey. and *Pyrus syriaca* Boiss. This population blooms in early spring on deep soils concurrent with other geophytes such as *Puschkinia scilloides* Adams, *Ranunculus kochii* Ledeb., *Iris reticulata* M.Bieb., *Colchicum szovitsii* Fisch. & C.A.Mey. and *Scilla siberica* Andrews. Such new and currently generative records of very rare species remain noteworthy as they will be promising in conservation of vulnerable biodiversity.

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### Evaluation of the effect of herbal essential oil on mycobacterium.

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#### ARTICLE INFO

##### Keywords:

Mycobacterium

*Thymus daenensis*

*M. smegmatis*

#### ABSTRACT

Across the globe, tuberculosis (TB) is the second leading cause of death from infection, following COVID-19 and surpassing HIV/AIDS. Treating TB poses a therapeutic challenge due to the high natural resistance of *Mycobacterium tuberculosis* to antibiotics. Prolonged treatments often lead to the emergence of *M. tuberculosis* strains resistant to existing anti-TB drugs. Medicinal plants and herbal products offer an attractive alternative not only for eliminating bacteria but also as potential aids in reducing the side effects of standard anti-mycobacterial drugs. Essential oil (EO) is a hydrophobic fluid extracted from selected parts of plants. Due to their antibacterial, antifungal, antioxidant, antiseptic, and anti-inflammatory properties, EOs are extensively utilized in food processing and pharmaceutical treatment. Many studies have revealed that EOs exhibit antibacterial effects against Gram-negative and Gram-positive bacteria. In light of drug-resistant strains' development, thymus essential oil against *Mycobacterium smegmatis* was investigated using in vitro techniques. Various in vitro techniques, namely the extraction and identification of main volatile components from thymus essence using gas chromatography-mass spectrometry, were analyzed. Furthermore, the antibiogram method was determined to evaluate bacterial resistance to existing drugs. The efficiency of the essential oil showed a bactericidal concentration against *M. smegmatis*. Therefore, the essential oil of the thymus acts as a new strategy for anti-mycobacterial activity against TB. Moreover, it may introduce a novel therapeutic approach against various pulmonary infections.

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### Exploring the potential of winter rye antifreeze proteins as a versatile material for creating multifunctional gels

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#### ARTICLE INFO

##### Keywords:

Winter Rye Antifreeze  
Proteins  
Ice Crystal Formation  
Biomedical Applications  
Bioinformatic analysis

#### ABSTRACT

Hydrogels are widely used in various applications such as soft robotics, drug delivery, and tissue engineering due to their biocompatibility, viscoelasticity, and hydrophobicity. However, their fragility when exposed to freezing temperatures can limit their use. Researchers have found a solution to this problem by using Winter Rye Antifreeze Proteins (WRAPs) to modify ice crystal formation, demonstrating the potential for freezing applications. The study utilized a comprehensive approach that combined advanced bioinformatics analysis with laboratory investigations to identify subtle structural attributes that underlie Wraps' gelation capacity. The team successfully synthesized multifunctional gels through meticulous protein sequence analysis, with far-reaching applications across essential sectors such as medicine, pharmaceuticals, and food industries. By incorporating experimental and computational approaches, new possibilities for gel-based technologies have been opened up, redefining their potential in diverse fields.

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Poster Presentation ID: 349

### Application of Polymeric Macroporous Resins for Optimal Enrichment of Sennosides from *Cassia angustifolia*

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#### ARTICLE INFO

##### Keywords:

Sennosides  
LXA-10 resin  
Adsorption-desorption  
process  
Freundlich model  
Antioxidant activity

#### ABSTRACT

Senna (*Cassia angustifolia*) plant extract is a widely used remedy in traditional medicine in various countries for treating constipation, primarily due to its laxative properties. The main laxative attribute of this plant is associated with its anthraquinone compounds known as sennosides (1). Extracting and enriching these substances is crucial for the pharmaceutical industry. To achieve this, the maximum sennoside extraction was initially performed using the maceration method. Subsequently, the appropriate macroporous resin for enriching sennosides from undesirable compounds was evaluated among LXA-10, AB-8, and D-101 resins through statistical testing. To maximize enrichment efficiency, the adsorption-desorption process was optimized. Based on the obtained data, LXA-10 resin, with the highest adsorption capacity (2.4 mg sennoside/g sample), was chosen as the preferred resin. Optimal parameters included a contact time of 10 minutes and a resin quantity of 20 mL in 50 mL of extract, with a solvent volume 7.5 times the resin bed volume. Under these conditions, 84.6% adsorption and 96.7% desorption rates were achieved. Isotherm studies indicated that the Freundlich model, with an  $R^2$  value of 0.90, aligns well with the experimental data (2). Additionally, kinetic studies demonstrated that the adsorption data followed the pseudo-second-order model, with an  $R^2$  value of 0.99. The antioxidant activity was assessed using the DPPH and FRAP methods. Moreover, FTIR-ATR spectra and SEM analysis of the studied resin confirmed sennoside adsorption on the resin surface and nearly complete resin recovery.

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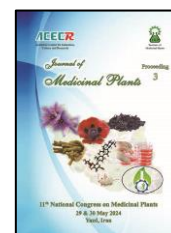
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Poster Presentation ID: 350

### Synergistic effects of *Ziziphus Jujube* Extract and *Pistacia Atlantica* Gum in treatment of Ulcerative Colitis

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#### ARTICLE INFO

##### Keywords:

Ulcerative colitis  
Inflammation  
*Ziziphus jujube*  
*Pistacia atlantica*  
Mesalazine

#### ABSTRACT

**Background:** Existing therapies for UC address symptoms but come with constraints. Herbal Remedies are garnering interest as complementary approaches. This investigation assessed the effects of hydroalcoholic extract of *Ziziphus jujuba* and *pistacia atlantica* gum on clinical and inflammatory aspects in an ulcerative colitis model. **Materials and Methods:** In this study, male BALB/c mice were utilized and divided into six groups (n=5 each). The first group Healthy (negative control), The second group Colitis without treatment (positive control), The third group Treatment with hydroalcoholic extract of *Ziziphus jujuba* extract, The fourth group *pistacia atlantica* gum, The fifth group Combined treatment with *pistacia atlantica* gum and *Ziziphus jujuba* hydroalcoholic extract, the sixth group Treatment with Mesalazine. We initiated the treatment plan on the 10th day after the UC's induction and the emergence of symptoms. After 40 days of treatment, various parameters were assessed, including MPO, NO, IL-1 $\beta$ , IL-6, TNF- $\alpha$  levels and gene expression. Moreover, the colon tissue underwent microscopic pathological evaluation. P<0.05 was considered significant in statistics. **Results:** Our results revealed that *Ziziphus jujuba* extract and *Pistacia atlantica* Gum extract significantly decrease level of NO, MPO and inflammatory cytokines such as IL-1 $\beta$ , IL-6 and TNF- $\alpha$  in compared with positive control group. Also, its significantly decreased the expression of inflammatory cytokines, iNOS, and COX2 genes in treatment groups. According to the data obtained from microscopic examinations, is effective in reducing the intensity of inflammation, mucosal ulcers, the involvement of the digestive system's layers, and the infiltration of inflammatory cells was also assessed in the experimental model of ulcerative colitis. **Conclusion:** *Ziziphus jujuba* extract and *Pistacia atlantica* show promising anti-inflammatory properties, potentially reducing colitis symptoms and tissue damage.





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### Biochemical Responses of *Centella asiatica* (L.) Urban Plantlets Subjected to Induced Osmotic Stress *In Vitro*

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#### ARTICLE INFO

##### Keywords:

Centellosides  
ROS  
Antioxidant  
Sucrose  
Biotechnology

#### ABSTRACT

Plants show a wide range of physio-biochemical and metabolic responses for a variety of essential functions in their growth and development, but their main role is chemical protection against biotic and abiotic stresses in the interaction with their surrounding habitats. To minimize the effects of oxidative stress, plants have developed a complex enzymatic and non-enzymatic antioxidant system, such as low molecular weight antioxidants (glutathione, ascorbate, carotenoids) and ROS-eliminating enzymes superoxide dismutase, catalase, and ascorbate peroxidase [1]. *Centella asiatica* (L.) Urban, a medicinal plant from the family Apiaceae found in tropical regions and parts of northern Iran, around the Anzali wetland at Guilan province [2]. The plant contains triterpenoid saponins and their sapogenins named centellosides with anti-inflammatory, antioxidant, and wound-healing properties. In the present study, the impact of drought stress using osmotic agents including polyethylene glycol (PEG) 4000 (1, 2 and 4%), sucrose (45, 60, and 80 g/l), and sorbitol (20, 30 and 40 g/l) on the biochemical traits *i.e.* total soluble protein and antioxidative enzymes (catalase, ascorbate peroxidase, guaiacol peroxidase, and superoxide dismutase) activity of the plant cultured on Murashige and Skoog (MS) medium was studied. The results revealed significant changes in total soluble protein and antioxidative enzymes activity under osmotic stress. The most significant effect was found in the plantlets subjected to sucrose (80 g/l). The highest activity of catalase and ascorbate peroxidase was determined in the plantlets cultured on the MS medium with 1% PEG and 40 g/l sorbitol, respectively. Guaiacol peroxidase level was increased with 1% PEG and 45 g/l sucrose but decreased with 40 g/l sorbitol. Superoxide dismutase activity was significantly increased in the plantlets cultured on the medium containing 40 g/l sorbitol treatment. Further studies on the metabolic responses will lead to the better understanding of the induced stress for future exploitation of the plant in biotechnological programs.

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### Introducing the most common plants for food and health treatment in the parts of the Zagros mountains

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#### ARTICLE INFO

*Keywords:*

Ethnobotany

herbal therapies

Traditional medicine

Iran

#### ABSTRACT

Kurdistan Province (Iran) has a great diversity of habitats and plant diversity and the people living in this province have a good knowledge of herbal therapies. Ethnobotany is at once a vital key to preserving the diversity of plants as well as to understanding and interpreting the knowledge. Thus, ethnobotany is the science of survival (1). A total of 331 herbs belonging to 65 families have been identified which are used in the treatment of ailments in West Iran. Some species are used as edible plants. This study has revealed that Asteraceae, Lamiaceae, Apiaceae, and Rosaceae (with 48, 43, 30, and 26 plant taxa, respectively) are the most dominant families in the region. Locals use leaves, aerial parts, stems, roots, bark, resin, seeds, bulbs, whole plant, tubercles, flowers, and fruits. However, leaves rank first (18%), followed by aerial parts (16%), flowers (15%), fruits (12%), and branches (10%). Some plants are used for fresh consumption or making local foods and bread. *Allium tripedale* and *A. ampeloprasum* are used here by some ethnic groups for making delicious bread –“Kalaneh.” Most frequent application method is decoction (18%) followed by distillation (15%), edible (14%), and infusion (14%). Almost 9% of the plants are mixed with other plants or agents, including honey and milk, and used for medicinal purposes or consumed as food. All 1100 uses of medicinal plants have been noted, grouped in 16 medicinal use categories. Majority (41%) are applied to cure digestive disorders, followed by general (36%), urological (28%), and skin (23%)-related disorders (2).

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Poster Presentation ID: 354

### The effect of different concentrations of sodium chloride on the production of *Arthrospira* cyanobacterial pigments

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#### ARTICLE INFO

Keywords:

Arthrospira  
pigment  
Phycocyanin  
Carotenoid

#### ABSTRACT

The genus *Arthrospira*, also known as *Spirulina*, belongs to the Microcoleaceae family. This cyanobacterium is multicellular and filamentous. *Spirulina* is easy to grow and can tolerate a wide range of stresses including salinity, pH, light intensity, etc [1]. Due to the presence of pigments such as phycobilins, carotenoids and chlorophyll, *spirulina* has special antioxidant properties and is used today as a commercial substance in the food, health and pharmaceutical industries [2]. In this study, the effect of different concentrations of sodium chloride (control, 7, 14, and 21 ppt) on the production of cyanobacteria pigments of *Spirulina* was investigated using a randomized complete block design. The pigments were analyzed with a spectrophotometer at the respective wavelengths. The obtained results showed that different concentrations of sodium chloride had a significant effect ( $p < 0.01$ ) on the production rate of phycocyanin, allophycocyanin and carotenoid pigments, as well as a significant effect ( $p < 0.05$ ) on the production rate of phycoerythrin, However the production rate of chlorophyll a and chlorophyll b did not show a significant effect.

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Poster Presentation ID: 355

### Molecular Docking Analysis of Natural Compounds as Inhibitors of Neuroinflammation Pathways in Ischemic Stroke

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#### ARTICLE INFO

##### Keywords:

Ischemic stroke  
Neuroinflammation  
Molecular docking  
Rutin  
IL-1R1

#### ABSTRACT

Ischemic stroke is a leading cause of death and severe disability worldwide. Loss of function after stroke is primarily due to inflammation-mediated neuronal death in the ischemic penumbra, which is often accompanied by the primary injury. Suppressing inflammation is an effective strategy for treating stroke [1]. In this study, we investigated the potential of natural compounds for inhibiting five key proteins in ischemic stroke neuroinflammation signaling pathways. To this end, we downloaded the structures of TLR2 (PDB ID: 2Z7X), TLR4 (PDB ID: 4GLP), IL-6 (PDB ID: 1N26), MAPK3 (PDB ID: 2ZOQ), and IL-1R1 (PDB ID: 1IRA) proteins (2) from the Protein Data Bank and prepared them using Maestro 13.4 software. Subsequently, a selection of 105 anti-inflammatory natural compounds was collected from PubChem and prepared using Maestro (Schrödinger, LLC, New York) to investigate their interactions with selected targets. Molecular docking carried out using Glide extra precision (XP) and induced fit docking (IFD) studies. Among the 105 compounds, the top five with docking scores between -11.06 and -6.23 kcal/mol from XP docking were selected for each protein. Two natural compounds, with PubChem IDs 5280805 (Rutin) and 5280804 (Isoquercetin), demonstrated binding affinity with all five target proteins, highlighting their potential multifunctionality in the signaling pathways involved in ischemic stroke. In the next step, IFD studies were conducted on the most effective ligand, PubChem ID: 5280805. The results indicated that this ligand exhibited the highest inhibitory activity on the IL-1R1 protein, with an IFD score of -978.95 kcal/mol. In discussion, rutin showed strong coupling with the IL-1R1 receptor, suggesting its potential as a promising candidate for future studies in the treatment of ischemic stroke.

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### Utilization of absorbent polymers in *Thymus daenensis*, *Trachyspermum ammi* and *Thymus vulgaris* seed coating

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#### ARTICLE INFO

*Keywords:*

Germination

*Thymus daenensis*

film coating

#### ABSTRACT

Seed coating is one of the methods of seed strengthening with various goals such as increasing the speed and rate of germination, preventing damage from pests and diseases, facilitating seeding operations, uniform distribution of seeds especially in aerial seeding, maintaining moisture around the seed using Moisture absorbent materials increase yield, delay germination, prevent seeds from being eaten by animals, and increase the speed and power of plant establishment. This research was conducted with the aim of determining the effects of absorbent polymers synthesized in Research Institute of Forests and Rangelands on the germination and emergence of *Thymus daenensis* Celak., *Trachyspermum ammi* (L.) Sprague and *Thymus vulgaris* L. seedlings in the form of laboratory and greenhouse studies. Seed coating hydrogel polymers were prepared with the desired specific protocol in Research Institute of Forests and Rangelands. Seed coating was done on each species with 14 treatments (including control and 13 types of seed coating) and germination percentage and seedling emergence were measured. Based on the obtained results and with the successful performance of absorbent polymers in the production of coated seeds with a high base, the small and light seeds of the mentioned species can be made larger and improve the performance of the seeds and facilitate the planting operation.

#### References

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Poster Presentation ID: 358

### Investigating ecophysiological compatibility of *Trachyspermum ammi* (L.) Sprague in dryland conditions of Damavand region

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#### ARTICLE INFO

##### Keywords:

Adaptability

Dry farming

*Trachyspermum ammi*

(L.) Sprague

Damavand

#### ABSTRACT

This research was carried out in order to evaluate the yield and phytochemical changes of 17 accessions of ajwain (*Trachyspermum ammi* (L.) Sprague) in the dryland conditions of Homand Absard pasture research station (Damavand). In 2019, according to meteorological and rainfall information, the seeds of 17 accessions were planted as spring crops in early March. Due to the failure of establishment and growth of 17 ajwain accessions planted in March 2019, according to meteorological and rainfall information, the seeds were planted again on December 2020 as the expected autumn planting date. Observations and evaluations in May showed very slow growth and pale color of the plants, and finally in June we saw all the bushes dry up. Improper distribution and insufficient and uncertain amount of rainfall in dryland agriculture has caused the yield of dryland crops to have severe fluctuations. Although the average annual rainfall in the study area seems favorable, its large changes from year to year, as well as the occurrence of a small amount in the three months of the spring season, are the main limitation of rainfall for dryland farming.

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### Induction of Hairy Roots in Chicory (*Cichorium intybus* L.): A Promising Biotechnological-Based Method for the Production of Inulin

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#### ARTICLE INFO

##### Keywords:

*Cichorium intybus*  
Hairy root culture  
*Agrobacterium rhizogenes*  
Inulin

#### ABSTRACT

Hairy root culture is an efficient *Agrobacterium*-mediated system to produce specialized metabolites. In fact, hairy roots are genetically stable transformed organ that are able to develop in bioreactors for further commercial exploitation [1]. Nowadays, many bioactive compounds and natural dyes are produced by hairy roots (HRs) culture. Chicory (*Cichorium intybus* L.) is one of the most important medicinal plants belonging to the family Asteraceae that is esteemed for its medicinal and industrial significance, notably as a source of inulin, a prebiotic extensively employed in the food and pharmaceutical sectors [2]. In the present study, the impact of different *Rhizobium rhizogenes* (Formerly *Agrobacterium rhizogenes*) strains on hairy root induction from various explants of *C. intybus* was investigated. 10 week old seedlings cultured on solid Murashige and Skoog (MS) medium were used as explant source and their leaf and internodes were then inoculated by two strains of *Rhizobium rhizogenes* (A4 and C58C1). The inoculated explants were cultured on solid ½ MS medium free antibiotics for 48h and were then sub-cultured on the medium containing 500 mg/L cefotaxime to eliminate the bacteria. Transformation efficiency was determined after two weeks. HRs were mainly observed in internodes but were rarely induced from the plant leaf segments. The highest frequency of HRs induction (60%) was obtained by A4 strain. Emerging time of the induced HRs was 45 days. Induced HRs were separately excised as hairy root line and transferred to half strength MS medium for one month. Morphological characteristics and growth index (GI) of HRs were then evaluated and the superior lines were selected for further experiments. This achievement can be considered as a promising biotechnological-based platform for the production of inulin and the other plant bioactive compounds such as phenolic acids especially cichoric acid.

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### Comparative Analysis of Carbohydrate Profiles in the Roots of the Two Iranian Populations of Chicory (*Cichorium intybus* L.) *in Vitro* Conditions

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#### ARTICLE INFO

##### Keywords:

Asteraceae  
Chicory  
Carbohydrate  
ELISA  
Inulin  
Root

#### ABSTRACT

Chicory (*Cichorium intybus* L.) is a perennial herbaceous plant from the family Asteraceae native to the Oldworld, but it is currently cultivated worldwide [1]. The plant is a well-known source of biologically relevant elements (K, Fe, Ca), vitamins (A, B1, B2, C) as well as bioactive compounds (inulin, sesquiterpene lactones, coumarin derivatives, cichoric acid, phenolic acids), which exert potent biological properties. The plant roots contain reducing sugars, and between 40–60% of inulin, a valuable polysaccharide, which has been widely used as a food supplement in dairy products, beverages, low-fat and low-calorie foods [2]. In the present study, the carbohydrate content of roots of the two Iranian chicory populations (Mashhad and Jahrom) was studied *in vitro* conditions. For instance, the plants seeds were aseptically cultured on Murashige and Skoog (MF) medium free hormone. The well-developed 2 month old roots of both populations were analyzed for their monosaccharide, oligosaccharide, and polysaccharide profiles using an ELISA device. Distinct variations in carbohydrate composition between the two studied samples were observed. The spectrophotometric absorbance values of the samples correspond to carbohydrate concentrations, measuring at 59 and 57  $\mu\text{g}/\text{mg}$  DW for the Mashhad and Jahrom population, respectively. This information can be interestingly applied for the production of the plant carbohydrate especially inulin through biotechnological approaches like hairy roots culture technique.

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### Changes in phenolics and antioxidant activity of *Glycyrrhiza glabra* L. transgenic hairy roots carrying the *Arabidopsis thaliana* SS1cDNA gene in short and long-term cultures

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#### ARTICLE INFO

##### Keywords:

Fabaceae

*In vitro* culture

Licorice

Squalene synthase

Tissue culture

#### ABSTRACT

Licorice (*Glycyrrhiza glabra* L.) is a perennial medicinal subshrub which has been used for centuries in traditional medicine for its wonderful properties. The plant contains a variety of phenolic and flavonoid compounds that donate outstanding antioxidant activity [1]. Hairy roots culture refers to an approach which combines the *in vitro* culture and DNA recombination strategy [2]. In the present study, the impact of culture duration (6 month and 3 years) on the total phenol content (TPC), total flavonoid content (TFC), and antioxidant activity of *G. glabra* transgenic hairy roots (THR) carrying the SS1cDNA gene were studied. A significant difference in the TPC, TFC, and antioxidant activity of the plant THR between both studied culture durations was observed. The highest TPC (19.66 mg gallic acid equivalent/g DW), TFC (5.92 mg rutin equivalent/g DW), and antioxidant property (4.23 mmol Fe (II)/g DW) were measured in the THR cultured in short period. Contrary to the subjective impression, our findings revealed that hairy roots of *G. glabra* have better metabolic potential in shorter *in vitro* culture period.

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Poster Presentation ID: 362

### Preparation and evaluation of vaginal cream containing SLN and Carvacrol liposome and evaluating their effectiveness on *C. albicans* and *S. agalactiae* strains

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Carvacrol Vaginal cream Nanoparticle Liposome</p>	<p>One of the most common conditions women faces are vaginal infections caused by <i>Trichomonas vaginalis</i>, <i>Candida albicans</i>, and anaerobic bacteria. Antibiotics such as metronidazole and antifungal medications such as fluconazole are commonly used to treat these infections. However, due to the side effects of these drugs, there is increasing interest in the use of herbal compounds. Carvacrol, an aromatic compound found in many plants, possesses antioxidant and anti-inflammatory properties. This study aimed to prepare and evaluate creams containing carvacrol in a liposomal formula and solid lipid nanoparticles (SLN) of carvacrol, as well as to assess their effectiveness in a microbial culture environment. All prepared formulations, including carvacrol liposome solution, carvacrol SLN solution, and creams containing SLN and liposomal forms of carvacrol, were effective in inhibiting the growth of <i>Trichomonas vaginalis</i> in culture media. These formulations also showed efficacy in the culture media of <i>Escherichia coli</i>, <i>Streptococcus</i> group B (<i>Streptococcus agalactiae</i>), and <i>C. albicans</i>.</p>

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Poster Presentation ID: 368

### Preparation of absolute and concrete from *Pelargonium Graveolens* plant and its quantitative and qualitative evaluation with semi-industrial production approach

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#### ARTICLE INFO

##### Keywords:

Absolute  
Concrete  
Aromatic Flowers

#### ABSTRACT

The production of concrete and absolute from aromatic flowers has the highest added economic value. With the aim of setting up a semi-industrial production line of native aromatic plants in Iran, a laboratory study was carried out on the extraction of absolute and concrete of the *Pelargonium graveolens* plant and a quantitative and qualitative analysis of its effective ingredients. In this research, the petals of the fresh scented *Pelargonium graveolens* were extracted with hexane solvent at 65 degrees Celsius for 60 minutes and after straining, the hexane solvent was recovered, and the material obtained (concrete) was degreased by adding pure ethanol and stirring at -15 degrees Celsius. And by evaporation of solvent, non-volatile, insoluble and non-polar compounds such as waxes are obtained by evaporation of alcohol and concentration of absolute, which is an aromatic substance. Gas Chromatography (GC) and Gas Chromatograph connected to Mass Spectrometer (GC/MS) devices were used to identify the essential compounds. The active ingredients in Absolut are the compounds of Linalool, Phenyl ethyl alcohol, Citronellol, Hexadecanol, Nonadecane, Heneicosane with percentages of 5.9, 34.5, 11.2, 3.8, 1.28, 9.8 respectively.

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Poster Presentation ID: 369

### Quantitative and qualitative investigation of the production of garlic-based products with an industrial production approach

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#### ARTICLE INFO

*Keywords:*

Garlic  
Essential oil  
Extract  
Distillate

#### ABSTRACT

Garlic (*Allium sativum*) 49 thousand tons are produced in Hamadan province every year. With the aim of setting up a semi-industrial production line for garlic-based products in Hamedan province, laboratory research was carried out to extract the effective ingredients of garlic-based products and quantitative and qualitative assessment of its effective ingredients. In this research, the optimal laboratory production points for garlic essential oil, garlic distillate, garlic powder and dry garlic extract were determined. Thus, the optimal temperature is 95 degrees Celsius, the percentage of garlic essential oil is 0.2%, the percentage of garlic powder is 35%, and the percentage of dry garlic extract is 20%. Then, gas chromatography (GC) and gas chromatograph connected to mass spectrometer (GC/MS) devices were used to identify essential oil compounds. Its most effective ingredients were Tirsulfide, De-2-propenyl and Diallyl Disulfide with a percentage of 25.36 and 20.91. Also, total phenol of garlic powder and dry garlic extract was measured by UV/In House method, and its value was 1.083 and 4.44 mg Thymol/gr, respectively.

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### Polyphenolic compounds regulated the hubgenes as proper management, early prognosis, and diagnosis in gastric cancer.

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#### ARTICLE INFO

##### Keywords:

Gastric cancer  
Complementary  
medicine  
Hub genes  
Polyphenolic  
compounds

#### ABSTRACT

Gastric cancer (GC) is a significant contributor to cancer-related fatalities globally, and it ranks in the top 10 among all types of cancer. (1). However, chemotherapy resistance and side effects have drawn more attention to complementary therapies and using supplements (2). Complementary medicine could be considered approaches for managing and improving pathogenesis statuses. Furthermore, polyphenolic compounds combined with anticancer drugs can enhance therapeutic efficacy and reduce the systemic toxicity of chemotherapeutic agents (3). six groups were divided (n=36), including Normal, mice with MNU treatment (GC group), mice with GC treated chemotherapy which received Paclitaxel (GC+chemo), mice with GC+chemo-treated polyphenolic which was received by gavage (GC+PoPh group). Proteomic analysis performed via the bioinformatics approach to identify the potential diagnostic or prognostic biomarkers and innovation of new treatment strategies. qPCR and ELISA techniques were used. the chemoinformatic analysis discovered new compounds in polyphenolic cocktails. we explored 17 genes' vital role in the GC via in-silico analysis. Data indicated that the IL6, IL10, LOX, COL1A1 improved in the GC+PoPh compared with the other groups. we explore novel biomarkers for proper management, early prognosis, and diagnosis. Hub genes are recognized as druggable proteins for drug design and discovery approaches.

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### Investigation into the Compatibility of Kojic acid and Methylparaben in semi-solid formulations

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#### ARTICLE INFO

##### Keywords:

Kojic acid  
Methylparaben  
Preservatives

#### ABSTRACT

Kojic acid is a natural compound that is used in skincare products to reduce hyperpigmentation. Assessment of the incompatibilities between the drug and excipients is a crucial matter that contributes to enhancing quality. This study examined the compatibility between kojic acid and methylparaben, a pharmaceutical preservative, using thermal and non-thermal methods [1]. A combination of kojic acid and methylparaben was prepared in equal proportions (1:1) using a vortex mixer. Then, a 20% w/v water was added and thoroughly mixed. The resulting samples were placed in an oven at 40°C for two months. Compatibility analysis was conducted using DSC and FT-IR techniques. Additionally, a validated HPLC-UV was used to measure the remaining amount of kojic acid [2]. The ethical number was TBZMED.REC.1394.496. The visual appearance of the mixtures containing kojic acid and methylparaben indicated a change in color. The fact that the DSC thermogram of azelaic acid did not show an endothermic peak at 159°C in the mixture indicated that the formulations were initially incompatible. Furthermore, the lack of stretching vibration peak at 1140 cm<sup>-1</sup> in FT-IR data refers to the degradation of azelaic acid. Additionally, the results of HPLC showed that approximately 42% of kojic acid remained in the samples after stress test. The incompatibility between kojic acid and methylparaben was confirmed by the findings of DSC, FT-IR, and HPLC analyses. It is advisable to refrain from using methylparaben as a preservative in a combination of kojic acid.

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Poster Presentation ID: 373

### Sparassis latifolia and exercise training as complementary medicine improved the in mice with colorectal cancer

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#### ARTICLE INFO

##### Keywords:

Colorectal cancer  
Complementary  
medicine  
Sparassis latifolia  
Aerobic training

#### ABSTRACT

Timely recognition and evaluation of the disease are crucial for mitigating the mortality rate linked to colorectal cancer (COL). Complementary medicine can be viable for enhancing and controlling CRC-related diseases (1). Therefore, engaging in physical activity and using supplement substances with anticancer medications have been proven to enhance the effectiveness of treatment and reduce the overall toxicity caused by chemotherapy drugs (2). Sparassis latifolia (SLPs) is a rare, medicinal, edible fungus with a fruiting body and a significant nutritional composition containing many bioactive chemicals (3). To achieve this objective, we administered organic compounds derived from Sparassis latifolia (SLPs) and conducted exercise training independently or combined with chemotherapy. In real-time, gene expression levels, specifically MSX2, MMP7, ITIH4, and COL1A2, were evaluated by qPCR. Data indicated that chemotherapy and colorectal cancer dysregulated the relative expression of the MSX2, MMP7, ITIH4, and COL1A2. Moreover, SLPs and physical exercise can augment and support chemotherapy therapies due to their practical and influential elements. Notable progress has been achieved in the management of COL. Nevertheless, the outlook for patients remains disappointing due to limitations such as resistance to several drugs and the recurrence of tumors. As a result, there has been a growing emphasis on alternative therapies and the utilization of supplements.

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### Development of Alginate-based nanocomposites incorporating Polygonaceae plant extract for enhanced antibacterial properties

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#### ARTICLE INFO

##### Keywords:

Polygonum cognatum  
Sodium alginate  
ZnO nanoparticle  
Antibacterial activity

#### ABSTRACT

*Polygonum cognatum*, a wild plant indigenous to northern Iran, has been studied for its favorable effects on oxidative stress markers and histopathological features [1]. Meanwhile, alginate-based nanocomposites have garnered attention for their potential applications in biomedical and environmental fields. In this investigation, we explore the synergistic effect of zinc oxide nanoparticles (ZnO NPs) and Polygonaceae plant extract on the antibacterial properties of alginate-based hydrogels. Common Gram-negative bacteria were used as the test organisms. Our findings reveal that the incorporation of ZnO NPs enhances the mechanical properties of the nanocomposite hydrogel. The improved mechanical properties are likely due to the high strength and surface area of ZnO nanoparticles. Additionally, the charge transfer between the hydrogel polymer matrix and nanoparticles is facilitated by hydrogen bonds and electrostatic interactions [2]. Furthermore, the combination of zinc oxide nanoparticles and Polygonaceae plant extract leads to a significant improvement in the antibacterial properties of the nanocomposite hydrogel. Overall, our study demonstrates that the combined use of ZnO nanoparticles and Polygonaceae plant extract presents a promising strategy for developing advanced materials with superior antibacterial properties.

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### Evaluation of the compatibility between kojic acid and ascorbic acid in semi-solid preparations

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#### ARTICLE INFO

##### Keywords:

Antioxidants  
Ascorbic Acid  
Kojic acid

#### ABSTRACT

Kojic acid is commonly used to treat melasma. Ascorbic acid is often utilized as an antioxidant. These ingredients are commonly used together in extemporaneous preparation [1]. A recent study aimed to evaluate the physicochemical compatibility of kojic acid with ascorbic acid. The mixture of kojic acid and ascorbic acid was combined at a 1:1 ratio using a vortex mixer. Next, 20% w/v water was added and thoroughly mixed. The resulting samples were then placed in an oven for two months. To assess compatibility, DSC and FT-IR methods were utilized. Furthermore, a validated HPLC-UV analytical procedure was used to measure the remaining amount of kojic acid [2]. The ethical code was TBZMED.REC.1394.496. The visual appearance of the mixture underwent a color change. The maintenance of the endothermic peak of azelaic acid at 147°C in the mixture illustrated the initial compatibility of the formulations. The absence of an endothermic peak (202°C) of ascorbic acid in the DSC thermogram of the mixture demonstrated that ascorbic acid was dissolved in the melted kojic acid. The FT-IR data also proved that kojic acid remained intact. The HPLC outcome, indicated 95% of kojic acid remaining in the samples after stress test. The results of DSC, FT-IR, and HPLC proved compatibility between kojic acid and ascorbic acid. In conclusion, using ascorbic acid as an effective antioxidant can be recommended.

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Poster Presentation ID: 376

### An Introduction to the Medicinal Plants of the Komehr Region (Fars Province)

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#### ARTICLE INFO

##### Keywords:

Fars  
Komehr  
Medicinal plants

#### ABSTRACT

Every year, many people turn to the use of medicinal plants. Medicinal plants are one of the most important genetic resources of any region, therefore knowing the medicinal plants of that region is a big step towards introducing and preserving them. The Komehr village is located in the Fars province and the Sepidan city. Collection and identification of plants in the area was done during two growing years of 2022 and 2023. The results showed that out of 113 species belonging to 39 genera and 90 genera in the region, 71 species are medicinal. Most of the medicinal species of the region belong to the family Fabaceae and Lamiaceae, respectively. Studying of the medicinal plants of the region showed that hemicryptophytes (41%) have the highest abundance, and most of the plants are perennial. Most species (58.4%) are of the Irano-Turanian origin, although elements of the Saharo- Sindian, Eurosiberian, and Mediterranean are also distributed in this region.

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### Green synthesis of carbon quantum dots from *Salvia hydrangea* DC. ex Benth. (Lamiaceae) cells: novel nanoparticles for future medicinal applications

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#### ARTICLE INFO

##### Keywords:

Nanoparticle  
Medicinal plant  
Hydrothermal method  
Photoluminescent

#### ABSTRACT

Carbon quantum dots (CQDs) are highly intriguing materials for their potential biological applications such as drug delivery, bio-imaging, disease and environmental stress management in agriculture [1]. Bioactive compounds found in medicinal plants with diverse biological activities can appear as functional groups on the surface of CQDs and give them special properties. *Salvia* species from the Lamiaceae family are well-known herbs in traditional medicine that showed strong antioxidant activity due to the high content of phenolic compounds, especially rosmarinic acid (RA)[2]. In the present study, RA high productive cells of *S. hydrangea*, a medicinal species native to Iran, was used for the green synthesis of CQDs by one-step hydrothermal method for the first time. For instance, the plant lyophilized powdered cells (1.5 g) were mixed with distilled water (30 ml) and were then ultrasonicated for 30 min. The suspension was then transferred into a Teflon-lined stainless-steel autoclave and heated at 270 °C, which was estimated based on the TGA/DTA analysis. The resulting suspension was then centrifuged at 10,000 rpm for 10 min and the supernatant purified with 0.22 µm filter membrane. The Photoluminescence Properties of the sample was confirmed by UV and the optical stability was also checked at different pHs. The water-soluble green-synthesized CQDs solution appeared yellow in ambient light while it emits blue visible light (420 nm) under uv excitation (360 nm). Also, the synthesized CQDs had luminescence stability at different pH. The synthesized CQDs with molecular tracking capability can be interestingly considered as a suitable option for drug, gene or protein transfer in living cells and systems.

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### Variation of Micro-Morphological Characteristics of Cherry Laurel (*Prunus laurocerasus* L.) Based on Habitat

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#### ARTICLE INFO

Keywords:

Diversity

Hyrceanian Forests

Stomatal density

Environmental condition

#### ABSTRACT

The intricate interplay between habitat conditions and morphological characteristics, is fundamental to understanding species adaptation and ecological dynamics [1]. This study investigated the micro-morphological variation of stomatal characteristics in Cherry Laurel (*Prunus laurocerasus* L.) across diverse habitats within the Hyrcanian forests. Through meticulous examination of leaf samples collected from Vaz, Haraz, and Gazoo (Mazandaran Province), differences in stomatal characteristics, including stoma width ( $\mu\text{m}$ ), length ( $\mu\text{m}$ ), area ( $\mu\text{m}^2$ ), perimeter ( $\mu\text{m}$ ), length-to-width ratio ( $\mu\text{m}$ ), and density (in an area of  $1\text{ mm}^2$ ), were inspected with the use of SEM and ImageJ software. Results of the Duncan test and variance analysis performed via R programming software revealed that there was a significant difference between the populations ( $p < 0.05$ ). The Haraz habitat had the highest values of length ( $0.035 \pm 0.001\ \mu\text{m}$ ), width ( $0.036 \pm 0.002\ \mu\text{m}$ ), perimeter ( $1.13 \pm 0.05\ \mu\text{m}$ ), and stoma length-to-width ratio ( $1.01 \pm 0.04\ \mu\text{m}$ ), whereas the Vaz and Gazoo habitats had the highest stomatal density ( $270.7 \pm 16.6\ \mu\text{m}$ ) and area ( $1004.1 \pm 375.4\ \mu\text{m}^2$ ), respectively. The low average temperature and increased UV radiation in high altitudes cause an increase in leaf stomatal density [2]. The stomatal density of cherry laurel trees in the Vaz habitat rises to withstand extreme conditions since these trees are situated in higher altitudes than those in Haraz. Accordingly, we determined that the stomatal characteristics varied depending on the habitat; It states noticeable effect of environmental conditions on the morphological characteristics [3]. Understanding these micro-morphological adaptations is crucial for elucidating species-environment interactions and informing targeted conservation strategies for biodiversity preservation in Hyrcanian forests.

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### Application of essential oils to increase the quality and storage life of Red Delicious apple

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#### ARTICLE INFO

**Keywords:**  
Peroxidase  
Catalase  
Total protein  
Essential oils

#### ABSTRACT

Recently, the use of chemical compounds to increase the quality and storage period of horticultural products endangers human health and the environment. For this reason, the use of healthy and environmentally friendly compounds is a new idea in modern agriculture. In this regard, in order to influence the application of cardamom and peppermint essential oils and storage at 2 ° C and relative humidity of 85-95% for three months in order to increase the quality and storage length of apple fruit of Red Delicious cultivar was conducted in a completely randomized design with three replications. The results of this study showed that cardamom and mint essential oils showed significant effects on the quantitative and qualitative parameters of apple fruit during storage. So that the treatments maintained fruit weight, increased tissue firmness, solids, total protein, vitamin C and also at concentrations of 5000 ppm of essential oils increased the activity of fruit antioxidant enzymes and titratable acid in fruit in this study. Under the influence of concentrations of essential oils showed an increasing and decreasing trend. In general, different levels of essential oils as healthy and safe compounds were able to preserve apple fruit and maintain its quality.

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Poster Presentation ID: 382

### Quince Seed Mucilage Sponge with ZnO Nanoparticles: Swelling and Structural Integrity

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#### ARTICLE INFO

*Keywords:*

Quince seed mucilage

Chitosan

ZnO nanoparticles

#### ABSTRACT

In this study, the preparation and characterization of a novel sponge composed of quince seed mucilage (QSM), chitosan (CS), and zinc oxide nanoparticles (ZnO NPs) are presented. CS, a biopolymer derived from chitin and known for its biocompatibility and properties [1], was incorporated into the sponge matrix to enhance its mechanical strength and stability. The structural integrity of mucilage diminishes upon water absorption, but the inclusion of chitosan and zinc oxide nanoparticles improves the durability of the sponge matrix [2]. Due to its hydrophilic nature, chitosan can retain water and preserve its structural integrity, even in moist conditions. ZnO NPs can form crosslinks with chitosan and other components of the sponge, reinforcing the sponge structure and improving its durability. Additionally, ZnO NPs help control the swelling behavior of the sponge. Although excessive swelling can weaken the material, ZnO NPs mitigate this effect. Overall, the incorporation of CS and ZnO NPs into the sponge matrix results in enhanced mechanical properties and increased structural strength.

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Poster Presentation ID: 385

### Phytochemical characteristics and antioxidant property of *Salvia hydrangea* DC. ex Benth. (Lamiaceae) growing wild in Iran: a rich source of rosmarinic acid for biotechnological exploitation

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#### ARTICLE INFO

##### Keywords:

Sage  
Medicinal plant  
Phenolic acid  
Rutin  
FRAP

#### ABSTRACT

Phytochemical characterization is essential for successful conservation, breeding, and sustainable exploitation of a medicinal plant [1]. *Salvia hydrangea* dc. ex Benth. is a perennial medicinal plant belonging to the Lamiaceae native to Iran which has many uses in traditional medicine [2]. The plant has been recently attracted as a rich source of phenolic compounds especially rosmarinic acid (RA), so in the present study phytochemical analysis of the plant aerial parts collected from its natural habitat (Abadeh, Fars Province) was performed. For instance, total phenol, total flavonoid, and RA content as well as Ferric reducing antioxidant power (FRAP) of the plant methanolic extract were assessed. Based on the obtained results, total phenol, total flavonoid, and RA content of the plant were measured as 15.56 mg gallic acid equivalent g<sup>-1</sup> DW, 118.35 mg rutin equivalent g<sup>-1</sup> DW, and 11.46 mg g<sup>-1</sup> DW, respectively. According to the antioxidant assays, the plant methanolic extract exhibited a significant antioxidant property ( $0.1964 \pm 1.10 \mu\text{mol Fe}^{+2} \text{ g}^{-1} \text{ DW}$ ). Due to the importance of RA, this information can be interestingly considered for further exploitation of the plant as a rich source of RA through biotechnological techniques such as in vitro cell suspension and hairy root cultures for the commercial production of this medicinally important phenolic acid.

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Poster Presentation ID: 386

### Effect of liposome and solid lipid nanoparticle of Carvacrol on the life of *Trichomonas vaginalis*

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#### ARTICLE INFO

##### Keywords:

Trichomonas vaginalis  
Trichomoniasis  
Carvacrol  
Liposome  
Nanoparticle

#### ABSTRACT

Trichomoniasis is one of the most common non-viral sexually transmitted disease (STD) worldwide. Trichomoniasis is one of the three common causes of vaginal infection in women and one of the causes of urethritis in men. Metronidazole and tinidazole are two effective drugs against *Trichomonas*. Resistance to metronidazole has been widely reported. The growing resistance to antibiotics has led to the use of herbal medicines as more accessible and cheaper substances than synthetic medicines. The use of particle delivery systems as carriers of small and large molecules is used in order to preserve the nature of the drug at a controlled and stable rate to the desired location of body. Liposomes and solid lipid nanoparticles (SLN) are of this category. First, solid lipid nanoparticles and different liposomes were prepared by homogenization method and the amount of carvacrol loading was evaluated by all formulations. Then, a serial dilution was prepared from the carvacrol formulation and its inhibitory effects on the growth of *Trichomonas vaginalis* were evaluated. After collecting the desired information, the statistical data was tested and analyzed. The use of liposome carrier containing carvacrol and its SLN resulted in the superiority of the formulation in the controlled release of the drug and increased stability compared to carvacrol alone. As a result, considering the greater effects of these two prepared formulations compared to carvacrol itself, it seems valuable to make and use them in subsequent studies for their clinical use.

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Poster Presentation ID: 387

### The Effects of *Adiantum capillus-veneris* Hydroalcoholic Extract on Proliferation of Liver (HepG2) and Colon (HT-29) Cancer Cell Lines

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#### ARTICLE INFO

**Keywords:**  
proliferation  
HepG2  
HT-29  
Extract  
MTT

#### ABSTRACT

*Adiantum capillus-veneris* (ACV) possesses a documented history of application in traditional medicine. Chemical analysis has revealed the presence of various bioactive secondary metabolites in the leaves of ACV including oleananes, alicyclic, carbohydrates, carotenoids, phenylpropanoids, flavonoids, and triterpenoids. Extracts derived from ACV leaves using a range of solvents have reportedly exhibited a multitude of biological activities, including antibacterial, antiviral, and antioxidant properties [1]. This study investigated the effects of an ACV hydroalcoholic extract on liver (HepG2) and colon (HT-29) cancer cell lines. The ACV was obtained from Kermanshah city and its dried leaves were pulverized and extracted via Soxhlet extraction method with a 30:70 water-ethanol solvent mixture [2]. The extract was concentrated and lyophilized to yield a powder form. HepG2 and HT-29 cells were cultured in Dulbecco's Modified Eagle Medium (DMEM) supplemented with 10% fetal bovine serum (FBS) and incubated at 37 °C and 5% CO<sub>2</sub> in a cell culture incubator. The cells were treated with varying extract concentrations (50-400 µg/mL) after reaching 70-80% confluence. Cell viability was assessed via formazan production, a marker of metabolic activity in living cells. Cell migration was evaluated using a scratch wound assay. ACV extract demonstrated a dose-dependent increase in HepG2 and HT-29 cell viability, with the highest proliferation observed at 400 µg/mL. Similarly, the scratch wound assay indicated a concentration-dependent enhancement of cell migration.

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### Nutrient dependent responses of licorice (*Glycyrrhiza glabra* L.) bioactive compounds and nutrient partitioning in its tissues as affected by soil fertility

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#### ARTICLE INFO

##### Keywords:

Glycyrrhizic acid

Licorice

Root Nutrients

Soil fertility

#### ABSTRACT

A factorial experiment based on CRBD with three replications was carried out to study the performance of two licorice ecotypes (Lalehzar and Kermanshah) under various nutrient sources (control, vermicompost, cow manure, urea, mycorrhizal inoculant, plant growth promoting bacteria (PGPB), cow manure+urea and cow manure+PGPB). Root and rhizome yield, leaf and root nutrient content, bioactive compounds were assessed. Urea resulted in the highest root dry weight in two years old Kermanshah ecotype. Mycorrhiza inoculation led to the highest rhizome dry weight in Lalehzar (first year) and Kermanshah (second year) ecotypes. The harvest index performed better in Lalehzar ecotype using vermicompost (first year) and cow manure+PGPB (second year). Using cow manure+PGPB increased nitrogen content in leaves and roots in Kermanshah ecotype. Leaf phosphorus content improved by mycorrhiza (Lalehzar) and cow manure+urea (Kermanshah). Cow manure and urea increased root P content in Lalehzar and Kermanshah ecotypes, respectively. Leaf potassium content in Kermanshah and Lalehzar ecotypes performed better by urea and mycorrhiza, respectively. The highest root K content achieved by urea in Kermanshah ecotype. Root glycyrrhizic acid (GA) content increased in Kermanshah ecotype with cow manure+PGPB (138 and 372.8 mg g<sup>-1</sup> DW in the first and second years, respectively). Rhizome GA content exhibited better in Lalehzar ecotype by cow manure+PGPB (191.34 mg g<sup>-1</sup> DW, first year) and in Kermanshah ecotype with cow manure+urea (239.62 mg g<sup>-1</sup> DW, second year). There was no significant effect of fertilizers on glabridin (GL) content. The content of GA and GL showed a negative correlation with potassium and nitrogen.



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### The Effect of $\gamma$ -Aminobutyric Acid Foliar Spray on Morphological Traits of *Calendula officinalis* L. under Hydroponic Culture Conditions

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#### ARTICLE INFO

Keywords:

GABA

Marigold

Asteraceae

#### ABSTRACT

*Calendula officinalis* L. (Marigold), native to Mediterranean regions, is a member of the Asteraceae (Compositae) family. Due to its rich content of secondary metabolites, this significant medicinal plant finds utility in both the food and pharmaceutical sectors [1, 2]. In this study, the effects of different levels of  $\gamma$ -aminobutyric acid (GABA) (0, 5, 10, 20 and 40 mM) were investigated as a experiment based on completely randomized design with three replications under hydroponic culture conditions on morphological parameters of *Calendula officinalis* L. The foliar sprayed on the aerial parts of marigold plants with GABA amino acid was performed in three stages (pre-flowering). The results showed that 20 mM GABA treatment had a significant difference on traits such as fresh and dry weight of shoot and root (shoot: 456.66 g and 22.27 g, root: 95 g and 1.4 g) respectively compared to the control. In addition, the highest flower diameter (7.48 cm) was observed in the 20 mM GABA treatment and the lowest in the control treatment. Considering that the improve of morphological traits can be effective in increasing the metabolites in marigold, it is recommended to use 20 mM GABA spraying to increase the morphological traits of marigold in hydroponic culture conditions.

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### Histopathological Study on the Effect of Royal Jelly-Derived Exosomes on Experimentally-Induced Crohn's Disease in Wistar Rat

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#### ARTICLE INFO

##### Keywords:

Royal Jelly  
Histopathology  
Crohn's disease  
Small intestine  
Exosome

#### ABSTRACT

Exosomes are messengers carrying molecules within cells, with potential for clinical applications in tissue repair and regeneration (1). Crohn's disease (CD) is a chronic, recurring form of IBD that affect all parts of the digestive system and can result in complications significantly reduce the quality of life of patients (2). This study investigated the effects of royal jelly-derived exosomes in Crohn's disease. The study utilized healthy adult female Wistar rats weighing approximately 200 grams. CD was induced by subcutaneous injections of Indomethacin (7.5 mg/kg in 5% sodium bicarbonate) 24 h apart for two consecutive days (3). After that the animals were divided into four experimental groups (n=6): a) Normal group: healthy rats without induced CD. b) Control group: the CD was induced without any treatment. c) Sulfasalazine treatment: rats received sulfasalazine (100 mg/kg/day) orally for 10 days. d) RJ exosomes treatment: Rats received intraperitoneal injections of RJ exosomes (100 µg/kg) on days 2,5, and 8 of study. At the end of the study day 10, histopathological parameters were evaluated using colon specimens. In control group colons typically show features of active chronic colitis include crypt architectural distortion and shortening of the crypts. Administration of exosomes was modification lesions of colon. In exosomes group structure of colon similar to normal group and crypts are uniformly. Also, exosomes decreased infiltration of inflammatory cells in colons. The lesions of colon greatly eliminated after exosomes administration. It seems that exosomes prevent the colon damage cause by Crohn's disease by antioxidant activity and has therapeutic effects.

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Poster Presentation ID: 391

### Comparison of Total Alkaloid Contents in Two Cultivars of *Catharanthus roseus* (L.) in Response to GABA Foliar Application

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> <math>\gamma</math>-aminobutyric acid Indole alkaloids Madagascar periwinkle</p>	<p>Madagascar periwinkle (<i>Catharanthus roseus</i> (L.)) belongs to the family Apocynaceae is a important medicinal plant with highly medicinal value because of its potential to biosynthesis active compounds including more than 130 known terpenoid indole alkaloids (TIAs) [1, 2]. In this study, A pot experiment was used in order to evaluate the effects of foliar application <math>\gamma</math>-aminobutyric acid (GABA) on total alkaloids content in two cultivars of <i>C. roseus</i>, (Polka Dot and Littl Mix) based on factorial completely randomized design (FCRD) in 4 different concentrations (0, 10, 20 and 40 mM) GABA, with three replications. The foliar sprayed application of GABA was performed in three stages; in the pre-flowering stage, the aerial parts of plants. The results obtained showed that total alkaloids contents were significantly increased (<math>p &lt; 0.01</math>) by application of 40 mM GABA concentration in both cultivars of <i>C. roseus</i>. The highest content of total alkaloids (404.09 <math>\mu\text{g/g DW}</math>) were recorded in Polka Dot and concentration of 40 mM GABA. While, content of total alkaloid in 40 Mm GABA concentration, 212.27 <math>\mu\text{g/g DW}</math> were obtained in Littl Mix. Also, the lowest content of total alkaloid in two cultivars of <i>C. roseus</i>, (225.45 <math>\mu\text{g/g DW}</math> and 189.54 <math>\mu\text{g/g DW}</math> in Polka Dot and Littl Mix, respectively) were recorded in the control samples. According the results of this study, application of concentration 40 mM of GABA can improve the total alkaloid contents of <i>C. roseus</i>.</p>

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Poster Presentation ID: 392

### Protective Effect of Royal Jelly on Histopathological Manifestations of Small Intestine in Wistar Rats with Experimental Crohn's Disease

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#### ARTICLE INFO

##### Keywords:

Royal Jelly  
Histopathology  
Crohn's disease  
small intestine  
IBD

#### ABSTRACT

Royal jelly is a rich source of nutrients and bioactive compounds, including proteins, peptides, lipids, phenolics, and flavonoids, which have the potential to play a vital role in biological activities and pharmaceutical applications (1). IBD is a common disease involving inflammation of the intestines for various reasons. The disorder may fluctuate in severity over time, with periods of exacerbation and remission (2). Crohn's disease (CD) is one of main types of inflammatory bowel diseases. This study used healthy, adult female Wistar rats that weighed around 200 grams. The CD was induced by subcutaneous injections of indomethacin (7.5 mg/kg in a 5% sodium bicarbonate solution). The injections were given 24 hours apart over two consecutive days (3). Four groups of six animals each were created for the experiment: a) Normal group: healthy rats without induced CD. b) Control group: the CD was induced without any treatment. c) Sulfasalazine treatment: rats received sulfasalazine (100 mg/kg/day) orally for 10 days. d) RJ treatment: rats received royal jelly (250 mg/kg/day) orally for 10 days. Light microscopic examination of Crohn's disease group revealed desquamated epithelial cells, destruction of intestinal villi, erosions, prominent inflammatory infiltrate made of lymphocytes, plasma cells, macrophages and congested vessels. Sulfasalazine and Royal Jelly groups revealed preserved mucosal architecture and reduced histopathological alterations such as inflammation and mucosal destruction. In conclusion, this study demonstrates the potential therapeutic effect of RJ in mitigating CD symptoms. This study suggests that RJ may be as effective as sulfasalazine in reducing intestinal inflammation and tissue damage.

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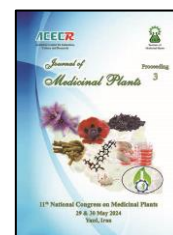
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Poster Presentation ID: 393

### Isolation and Characterization of a Glucosylceramide and a Glycosylated Steroid from *Hyoscyamus senecionis*

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#### ARTICLE INFO

Keywords:

*Hyoscyamus senecionis*

Chromatography

Isolation

Natural products

#### ABSTRACT

Nowadays, medicinal plants play a significant role in our life. Their natural compounds are used for treatment and prevention of various diseases. Among the medicinal plants, species of *Hyoscyamus* genus have great importance. In traditional Chinese and Indian medicines, they have been used to treat stomach pain and severe coughs [1]. Major compounds within this genus are tropane alkaloids such as scopolamine and hyoscyamine, which are widely used in pharmaceutical industry worldwide [2]. In this study, we focused on the isolation and purification of the phytochemical constituents of *H. senecionis*, a native Iranian species which possesses antispasmodic and analgesic properties [3]. Herein, an ethyl acetate extract of the leaves of this species was subjected to various chromatography methods. Additionally, modern NMR methods were used for compound identification, leading to the identification of a ceramide derivative (**1**) as well as a glycosylated steroid. Similar structures of these compounds have been previously reported from *Hyoscyamus* genus and are consistent with our results.

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Poster Presentation ID: 395

### Study the effect of hydroalcoholic extract of *Ferulago Boiss angulate* plant on polycystic ovary syndrome in rats

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#### ARTICLE INFO

##### Keywords:

Polycysticovarysyndrome  
Progesterone  
Estradiolvalerate  
Clomiphen  
Chovill

#### ABSTRACT

Polycystic ovarian syndrome (PCOS) is the most common endocrine disorder in women. Infertility occurs due to impaired follicle maturation and ovulation and ovaries full of cysts and hyperandrogenism along with metabolic abnormalities including obesity, hyperinsulinemia, increased risk of type 2 diabetes and cardiovascular diseases. Currently, the most well-known treatment method is the use of drugs such as clomiphene citrate and tamoxifen. Chovill plant with the scientific name *Ferulago Boiss angulate* is one of the native plants of Iran and is used as a medicinal plant. Antimicrobial and antioxidant properties of different species of Chovill have been proven. In this experimental study, 24 rats (adult females) were used, which were divided into 4 experimental groups, including negative control, positive control (polycystic) and two treatment groups of polycystic rats that received doses of 50 and 75 mg/kg body weight of hydroalcoholic extract (as intraperitoneal injection). The results show FSH at dose of 75 mg/kg and LH at dose of 50 and 75 mg/kg and testosterone at dose of 50 and 75 mg/kg had significant difference with the positive control groups. ( $P < 0.05$ ) According to the reducing effect of Chovill extract on serum concentration of LH and testosterone and increase in concentration of FSH in PCOS rats, it seems that this plant has therapeutic effects on PCOS.

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Poster Presentation ID: 396

### Investigation of Aloe ferox methanolic extract on group B beta hemolytic streptococcus bacteria (one of the causes of premature birth)

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#### ARTICLE INFO

##### Keywords:

Group B beta hemolytic  
streptococcus  
Premature birth  
Aloe vera plant  
MIC  
MBC

#### ABSTRACT

Prematurity is considered the most common cause of infant mortality. Group B streptococci (GBS) live in the genital area and digestive tract of 30% of women, including pregnant women. In mothers where this bacterium is colonized, up to 70% of babies are infected, which may lead to premature birth. This study was conducted to investigate the antibacterial effect of methanol extract of Aloe ferox against clinical strains of group B beta-hemolytic streptococcus. In order to study the extraction of aloe vera plant using the percolation method, and bacteria Group B beta hemolytic streptococcus was purchased from Iran Scientific and Industrial Research Organization. finally (Minimum Bactericidal Concentration) MBC and (Minimum Inhibitory Concentration) MIC of aloe vera plant by microtiter plate method on beta hemolytic streptococcus Checked out. The results of the present study showed that aloe vera leaf extract had a significant growth inhibitory and lethal effect on Streptococcus agalactiae bacteria ( $p < 0/05$ ). In this study, the growth inhibitory concentration (MIC) of aloe vera extract for group B beta-hemolytic streptococcus bacteria was calculated as 1 mg/ml, and the minimum lethal concentration (MBC) of aloe vera extract for agalactia streptococcus bacteria was calculated as 8 mg/ml. According to the results, it seems that the extract of aloe vera plant can be used as an antibacterial agent against Streptococcus agalactia bacteria.

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Poster Presentation ID: 397

### Hypolipidemic effect of aqueous leaf extract of *Rhamnus persica* in diabetic rats

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#### ARTICLE INFO

Keywords:

*Rhamnus persica*

Diabetes

Triglycerides

Total cholesterol

Rat

#### ABSTRACT

Diabetes mellitus is a chronic metabolic syndrome that affects many people in the world. Diabetes is the fourth known cause of death in developing countries. Currently, the main and effective treatment for diabetes mellitus is the use of insulin and hypoglycemic agents. Considering the side effects of chemical drugs, the hypoglycemic effects of many plants in the treatment of diabetes and their complications have been proved. Natural products that have antidiabetic potential, act through insulin-mimicking properties, insulin secretion, inhibition of intestinal absorption of glucose, or through insulin-dependent metabolic processes. The *Rhamnus* plant with the scientific name *Amygdalus Rhamnus* is one of the largest genera of *Rhamnaceae*, which has many flavonoid compounds. This study was based on 54 rats in 6 groups. The first group, control group (without any treatment), the second group, diabetic group (injection of streptozocin), the third group, hydroalcoholic extract of the plant (dose of 80 mg/kg of body weight), the fourth group, hydroalcoholic extract of the plant (120 mg/kg of body weight), the fifth group, diabetics treated with leaf extract of *Rhamnus persica* (80 mg/kg of body weight) and the sixth group of diabetics treated with a dose of 120 mg/kg of body weight. At the end, the results showed that total cholesterol and triglyceride levels in the fifth and sixth groups were significantly reduced compared to the diabetic group ( $p < 0.05$ ) and high doses of the extract have been more effective in reducing blood glucose, total cholesterol, triglycerides and LDL.

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Poster Presentation ID: 398

### Attenuation of LPS-induced acute lung injury biomarkers by gallic acid compared to dexamethasone in rats

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#### ARTICLE INFO

##### Keywords:

Gallic acid

Dexamethasone

Acute lung injury

#### ABSTRACT

Acute lung injury (ALI) due to sepsis is a leading cause of death in intensive care unit (ICU) patients (1). Gallic acid is a flavonoid and phenolic compound that is naturally present in various medicinal plants and has antioxidant and anti-inflammatory properties (2). In this study, rats were pretreated with gallic acid at a dose of 200 mg/kg and dexamethasone at a dose of 1 mg/kg. Then, the ALI model was established by intraperitoneal injection of LPS at a dose of 10 mg/kg. After 20 hours, rats were sacrificed and blood, lung tissue, and BALF samples were collected. The results showed that gallic acid and dexamethasone alone can reduce TNF- $\alpha$  and increase SOD, CAT, and GPX enzymes in lung tissue, and gallic acid had a better effect than dexamethasone on improving acute lung damage biomarkers including antioxidant enzymes and malonaldehyde. It was concluded that gallic acid, as a herbal polyphenol, has preventive effects on LPS-induced acute lung injury.

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Poster Presentation ID: 399

### Investigating the effect of day length on the harvest index of a number of quinoa lines

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#### ARTICLE INFO

##### Keywords:

Quinoa lines  
Photoperiod  
Harvest index

#### ABSTRACT

**Introduction** Quinoa, scientifically known as *Chenopodium quinoa* Willd. is a member of the Amaranthaceae family. Promoting the cultivation and nutrition of quinoa will diversify food products in the country, sustainable production, increase farmers' incomes and provide part of the community's food needs. **Photoperiod** is one of the factors affecting the growth and performance of quinoa, and determining the appropriate planting date has the greatest impact on the growth and yields of quinoa. **Materials and Methods** This research was conducted in two regions of Yazd province with 10 separate experiments in the form of a randomized complete block design with three replications. Experimental factors included 5 promising modified lines in Yazd Salinity Research Center with Titicaca cultivar. The lines consisted of four intermediate maturity lines, numbered 1 (NSRCQE), 2 (NSRCQC), 3 (NSRCQD), and 6 (NSRCQA), one late maturity line numbered 4 (NSRCQB), and the early maturity cultivar Titicaca numbered 5. To calculate the harvest index, the grain yield was divided by the dry weight of the plant. **Results and Discussion** The harvest index is a suitable feature to evaluate the distribution of dry matter and the efficiency of plants for the accumulation of economic yield. Some researchers stated that quinoa genotypes have high yields due to high harvest indices. The harvest index of quinoa lines in short day lengths was higher than in long days and they had the minimum harvest index in long days. The difference between the harvest index in all the lines, except medium clay line 6, was insignificant in different day lengths.

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Poster Presentation ID: 400

### Effect of selected phenolic compounds on the production of pseudomonas aeruginosa pyocyanin in silico

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#### ARTICLE INFO

##### Keywords:

Molecular docking  
Pyocyanin  
Phenolic plant  
metabolic

#### ABSTRACT

*Pseudomonas aeruginosa* is an opportunistic gram-negative bacterium commonly found in nosocomial infections, particularly among patients with cystic fibrosis and immunosuppressed individuals. *Pseudomonas aeruginosa* can produce various virulence factors, including proteases, rhamnolipids, and pyocyanin. Pyocyanin is a green-blue pigment belonging to the large family of three-ring nitrogen-containing phenazines, playing a significant role in bacterial survival and biofilm formation. It contributes to cell destruction by producing superoxide and reactive oxygen species.[1]Among the enzymes involved in pyocyanin biosynthesis, PhzM is crucial, catalyzing the conversion of PCA to pyocyanin in the final biosynthesis stage. Inhibiting this enzyme is a key strategy for treating *Pseudomonas* infections [2]. This study aimed to investigate the inhibitory effect of phenolic compounds on the activity of the PhzM enzyme in silico. First, the structure of the PhzM enzyme was obtained from the protein database (PDB ID: 2IP2). Selected plant compounds were acquired from the PUB CHEM database in SDF format. Molecular docking studies were performed using MOLGRO VIRTUAL DOCKER 6 and MOLEGRO MOLECULAR VIEWER 2.5 to analyze interactions between phenolic compounds and the PhzM enzyme. Results indicated that COMFORMER, with a binding energy of -85.34, had the lowest interaction, while the phenolic compound LIQUIRTIGENIN EPIOSIDE, with a binding energy of -164.65, exhibited the highest interaction with the PhzM enzyme. Consequently, LIQUIRTIGENIN EPIOSIDE shows potential as an effective inhibitor of PhzM, thereby reducing pyocyanin production. Further research is needed to elucidate the precise mechanisms by which plant compounds affect the PhzM enzyme and to assess their therapeutic potential in vivo. Combining plant inhibitors with existing antibiotics or biofilm disruptors may offer a synergistic approach to combat *Pseudomonas* infections and address the challenges posed by antibiotic resistance.

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Poster Presentation ID: 401

### Investigating the effect of *Calotropis procera* plant on skin pathogenic bacteria species

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#### ARTICLE INFO

##### Keywords:

Calotropis procera plant  
Sap  
Bacterial species  
Skin diseases

#### ABSTRACT

Indiscriminate use of antibiotics in various fields for the treatment of diseases improves the environment for the occurrence of resistance in pathogenic bacteria. Due to the problem of microbial resistance to antibiotics, there is an urgent need to discover new drugs and alternative treatments to control skin diseases. The medicinal plant of *Calotropis procera* Kermani has various secondary metabolites that are used to eliminate pathogens. The present study includes the stages of gum extraction and diagnostic microbiology tests. The antibacterial effect of the *Calotropis procera* plant on four important skin infection bacteria (*Escherichia coli*, *Staphylococcus aureus*, *Staphylococcus epidermidis*, and *Pseudomonas aeruginosa*) was evaluated by well diffusion method. The observations of our study showed that in concentrations of 5 to 100 µg/ml, it had a slight inhibitory effect on *Escherichia coli* and *Pseudomonas aeruginosa* bacteria, and at any concentration, they had an effect on *Staphylococcus aureus* and *Staphylococcus epidermidis* bacteria. Therefore, the claim that the gum of the *Calotropis procera* plant can have an inhibitory or killing effect on key bacteria such as (*Escherichia coli*, *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Pseudomonas aeruginosa*) was confirmed in our study. Although the studies about the effective ingredients of the mentioned plant can get better results.

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Poster Presentation ID: 402

### Forward Osmosis Process for the Concentration of Mint Extract

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#### ARTICLE INFO

*Keywords:*

Forward osmosis  
Mint extract  
Concentration  
Membrane

#### ABSTRACT

The concentration process is an integral part of food processing and extract concentration. A concentration process must be selected based on a variety of factors, including the stream's properties, applications and desired final products. There are two primary categories of processes which are classified as membrane and thermal concentration processes. Thermal evaporation is a widely used method for concentrating different types of plant extract. This process degrades most of the water-soluble or volatile compounds in the extract, affecting its color, aroma, and flavor [1]. Osmotic membrane systems, including forward osmosis, have undeniably gained widespread popularity as highly efficient and "soft" concentration processes in recent years [2]. In this study, the concentration of mint extract was explored by the forward osmosis process. Firstly, a thin-film composite membrane was prepared using a polyethersulfone substrate and polyamide rejection layer. The prepared membrane using DI water as feed and 1 M NaCl draw solution had a water flux of 12.5 LMH. Using dilute mint extract as the feed solution, we examined the effects of membrane orientation and draw agent concentration at room temperature on water flux. A water flux of 10.5 LMH was obtained after optimization, and the mint extract was concentrated up to 90%. Based on these results, it was demonstrated that the feed flow rates during concentration can be controlled to prevent membrane fouling. Furthermore, the forward osmosis concentration of mint extract has advantages over thermal concentration in terms of stability, browning index, and degradation of active components.

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### The quality and shelf life of purslane (*Portulaca oleracea* L.) as affected by storage temperatures, duration and packaging type

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#### ARTICLE INFO

##### Keywords:

Marketability

Purslane

Visual quality

Weight loss

#### ABSTRACT

Purslane (*Portulaca oleracea* L.) is a widely used plant due to its valuable medicinal and nutritional values. The effect of storage temperature (2, 5 and 10 °C), packaging type (polyethylene and cellulose) and storage duration (0, 4, 8, 12 and 16 day), on the quality criteria and shelf life of purslane were investigated. A factorial experiment based on completely randomized design with 3 replications was carried out in Department of Horticultural Science, University of Tehran during the 1400-1402. Criteria such as visual quality (degree of yellowness and decay), shelf life, marketability, weight loss, total soluble solid (TSS), titratable acid (TA) and plant extract pH were evaluated. The interaction effects of applied treatments significantly affected the evaluated traits. The leaves stored at 10°C after 8 days were not marketable with yellowish color, while the leaves stored at 2 and 5°C were still marketable after 12 and 10 days, respectively. Plants stored at 10°C compared to other samples showed higher values of leaf yellowish and chlorophyll loss. Storage at 10°C in cellulose packaging caused higher weight loss percentage. By increasing of storage temperature, the TSS value decreased. The pH of purslane extract during the last days of storage at 10 °C and both type of packages went towards acidification. Polyethylene package performed better in most storage temperatures and duration in terms of plant shelf life and quality criteria. Results revealed that the proper conditions for the shelf life of purslane were storage at 2°C in polyethylene package for up to 12 days.





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### Effect of Different Solvents Extraction on Photosynthetic Pigments In *Stevia rebaudiana* Medicinal Plant

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#### ARTICLE INFO

##### Keywords:

Acetone 100%

Diethyl Ether

Ethanol 95%

Methanol 100%

#### ABSTRACT

The chlorophylls and carotenoids are the most important natural pigments used extensively in the food industry. Two major factors for the production of chlorophylls and carotenoids are the natural sources rich in pigments and efficacy of extraction method. Present research was performed to obtain a more effective solvent type in extraction of photosynthetic pigments in *Stevia rebaudiana* medicinal plant. *Stevia rebaudiana* is a medicinal plant and natural sweetener belonging to Asteraceae (Compositae) family that cultivation of which is increasing worldwide due to its high benefits for human health [1]. In the present study the extraction of chlorophyll a (chl a), chlorophyll b (chl b), total chlorophyll (chl a+b) and carotenoid (C x+c) pigments were studied in shoot samples of *Stevia rebaudiana* by spectrophotometric method. The pigments were solvent extracted using acetone 100% (pure solvent), diethyl ether (pure solvent), ethanol 95% (v/v) and methanol 100% (pure solvent). This research was conducted using a completely randomized design (CRD) with four replications involving one factor namely solvent type (in 4 levels). The concentrations of photosynthetic pigments were determined by different equations suggested by Lichtenthaler (1987) [2]. It was observed that methanol 100% showed higher chlorophyll an extraction ( $9.486 \pm 0.233 \mu\text{g ml}^{-1}$ ), ethanol 95% showed higher chlorophyll b and total chlorophyll extraction (respectively  $4.559 \pm 0.316$  and  $13.563 \pm 0.317 \mu\text{g ml}^{-1}$ ) and finally diethyl ether showed higher carotenoids extraction ( $14.114 \pm 4.617 \mu\text{g ml}^{-1}$ ) when compared with other solvents.

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Poster Presentation ID: 405

### Impact of Ultrasound-Assisted Extraction and Different Solvents on Total Phenolic Content (TPC) of Candyleaf Medicinal Plant

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#### ARTICLE INFO

##### Keywords:

Ethanol 70%

Methanol 80%

Sweetleaf

#### ABSTRACT

Ultrasound-assisted extraction (UAE) is a fast and effective method that uses ultrasound waves and solvents to extract favorite compounds from plant materials [1]. In present study, extraction of total phenolic content (TPC) using different solvents (Ethanol 70% and methanol 80% v/v) with ultrasound and conventional method from shoot samples of *Stevia rebaudiana* medicinal plant was conducted. *Stevia rebaudiana* Bertoni is a medicinal plant belonging to Asteraceae (Compositae) family that create attention mainly due to the existence of bioactive compounds in their leaves such as phenolics [2]. This research was conducted using a completely randomized design (CRD) with three replications involving two factors namely solvent type (with two levels) and ultrasound-assisted extraction (with two levels). The two-way analysis of variance (ANOVA) calculations indicated that the solvent types and ultrasound using influenced significantly the TPC of samples. The total phenolic content was determined quantitatively using the Folin-Ciocalteu reagent (F-C reagent) with Gallic acid as the standard [3]. Overall, ethanol 70% (v/v) with ultrasonic-assisted extraction showed highest yield ( $159.288 \pm 1.079$  mg GAE g<sup>-1</sup> DW) while methanol 80% without ultrasound treatment showed the lowest extraction yield ( $53.979 \pm 5.466$  mg GAE g<sup>-1</sup> DW).

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Poster Presentation ID: 406

### Investigating the impact of *Zingiber officinale* (Ginger) on hematological parameters during surgical procedures

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> <i>Zingiber officinale</i> Ginger Hematological parameters Surgical procedures Perioperative care</p>	<p>Ginger, known for its culinary and medicinal properties, has been a subject of interest for its potential health benefits. In the realm of surgical procedures, exploring the impact of <i>Zingiber officinale</i> on hematological parameters could offer valuable insights into its role in enhancing patient outcomes. This study aims to explore the effects of <i>Zingiber officinale</i> (ginger) on hematological parameters in patients undergoing surgical procedures, assessing its potential as a supplementary therapy to mitigate hematological alterations during surgery. The study involved a randomized controlled trial with 100 adult patients undergoing elective surgical procedures, divided into two groups: one receiving ginger supplementation and the other receiving a placebo. Participants in the intervention group were administered 1 gram of ginger powder orally, three times daily, for seven days before the scheduled surgery. Blood samples were collected preoperatively, intraoperatively, and postoperatively to assess hematological parameters, including hemoglobin, hematocrit, platelet count, and coagulation profile. Analysis of hematological parameters revealed significant differences between the ginger supplementation group and the placebo group. Patients receiving ginger demonstrated higher levels of hemoglobin and hematocrit, along with improved platelet count and coagulation profile during the perioperative period. The findings of this study could potentially inform clinical practice by suggesting the incorporation of ginger as a complementary therapy to improve hematological outcomes in surgical patients. <i>Zingiber officinale</i> supplementation showed promising effects in maintaining hematological stability during surgical procedures. Integrating ginger as an adjunct therapy could potentially mitigate hematological alterations associated with surgery, enhancing patient outcomes and recovery.</p>

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Poster Presentation ID: 407

### The impact of *Arnica montana* on hematological parameters in veterinary surgery: A comprehensive analysis

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b>  <i>Arnica montana</i>            Hematological parameters            Postoperative bleeding            Veterinary surgery            Inflammation</p>	<p><i>Arnica montana</i>, commonly known as mountain arnica, is a perennial herb that has been used for centuries in traditional medicine for its anti-inflammatory and analgesic properties. In recent years, there has been growing interest in the potential therapeutic effects of <i>Arnica montana</i> in veterinary surgery, particularly in relation to its impact on hematological parameters. Hematological parameters, including red blood cell count, white blood cell count, and platelet count, play a crucial role in the body's ability to heal and recover from surgical procedures. Any disruption in these parameters can lead to complications and delays in the healing process. This study aims to investigate the effects of <i>Arnica montana</i> on hematological parameters during veterinary surgery. Canines undergoing elective surgeries, aged between 1-7 years, were included in the study. The animals were divided into two groups: one receiving <i>Arnica montana</i> preoperatively and the other serving as the control group. Hematological parameters including red blood cell count, white blood cell count, and platelet count were assessed preoperatively, intraoperatively, and postoperatively. The group administered with <i>Arnica montana</i> exhibited significantly lower levels of postoperative inflammatory markers compared to the control group. Additionally, a notable reduction in postoperative bleeding tendencies was observed in the <i>Arnica montana</i> group. <i>Arnica montana</i> demonstrates potential benefits in mitigating postoperative inflammation and reducing bleeding tendencies in canines undergoing veterinary surgery. Further research is warranted to elucidate the precise mechanisms underlying these effects.</p>

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Poster Presentation ID: 408

### Preparation of topical gel containing henna and aloe vera extract and its effectiveness in the treatment of dermatitis caused by radiotherapy in patients with breast cancer, a double-blind randomized clinical trial

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#### ARTICLE INFO

##### Keywords:

Gel  
Aloe vera  
Dermatitis  
Radiotherapy  
Henna

#### ABSTRACT

Burn is damage to the skin or underlying tissues caused by heat, electricity, chemicals, friction, or radiation. Separate studies had shown the effect of Henna extract and *Aloe vera* on dermatitis, wound healing, burns, and inflammation. Skin burns and dermatitis, as well as more minor side effects than chemical drugs, prepare a topical gel containing Henna extract and *Aloe vera* and evaluation of its effect on the dermatitis caused by radiotherapy in breast cancer. This study was a double-blind clinical trial in which 56 patients with dermatitis were selected by the available sampling method from among the patients referred to Shahid Ramezanzadeh Radiation Therapy Center and entered to this study. Twenty-eight participants were randomly divided into two groups' control (zinc oxide) and intervention (hydrogel containing hydroalcoholic extract of Henna and *Aloe vera*). The intervention lasted for 15 days, and during these 15 days, the dermatitis improvement process was evaluated and recorded by a checklist on the first, fifth, tenth, and fifteenth days. Data were analyzed by using of SPSS software version 26 and independent Student T-test and Mann-Whitney U tests. The results of the present study showed that the rate of burns in the group that used the gel containing hydroalcoholic extract of Henna and *Aloe vera* was significantly lower than the control group ( $P < 0.03$ ), and in fact, the healing process in this group happened faster. Henna and *Aloe vera* gel can effectively improve and reduce the treatment costs of patients with radiotherapy-induced dermatitis.

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Poster Presentation ID: 409

### Evaluation of phenological characteristics of Ajwain (*Trachyspermum ammi* L.) accessions

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#### ARTICLE INFO

##### Keywords:

Medicinal plant  
Apiaceae  
*Trachyspermum ammi*  
Phenology

#### ABSTRACT

Studying the characteristics of phenology and morphology of the medicinal plant leads to a better understanding of the rate of growth and development, and it is possible to plan accurately for the optimal use of the plant based on this feature. One of the advantages of examining the phenology of a plant is the optimal use of environmental resources, as well as the identification of sensitive stages of plant life to environmental stresses and optimal and timely management for them to achieve high performance. *Trachyspermum ammi* (L.) Plant is an annual plant from the Apiaceae family with many medicinal properties and is considered one of the most valuable native medicinal plants in Iran. Evaluation of the phenological characteristics is very important to identify different ecotypes of This plant and the results can be used in breeding programs. In this research, 18 ecotypes of *Trachyspermum ammi* (L.) Medicinal plants were cultivated in the form of a randomized complete block design in three replications. The statistical results showed that there are significant differences in the phenological traits of plant height, oflateralbranch, canopy cover, physiological stage, and yield components such as the number of umbels per plant, number of umbellate umbel, number of seeds umbellate, seed weight and dry weight plant.

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Poster Presentation ID: 412

### Evaluation of the effectiveness of turmeric in the prevention of contrast-induced nephropathy in coronary angiography: a double-blind clinical trial study

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#### ARTICLE INFO

*Keywords:*

Curcumin

Angiography

Nephrotoxicity

Clinical Trial

#### ABSTRACT

Contrast-induced nephropathy is a complication that can occur after the administration of iodinated contrast agents during coronary angiography. can lead to acute kidney injury and other serious complications. Curcumin, due to its anti-inflammatory and antioxidant properties, has been used as a traditional herbal medicine for the treatment of diseases including kidney diseases. This study was conducted on 68 patients with cardiovascular disease who underwent contrast-enhanced angiography. The aim of this study was to investigate the effect of curcumin in preventing kidney damage caused by these agents. Patients were randomly divided into two intervention and placebo groups. The intervention group received curcumin 12 hours before angiography. The placebo group also received a placebo 12 hours before angiography. Serum creatinine and blood urea nitrogen levels were measured before angiography and 24 hours after the procedure. In this study, serum BUN and Serum creatinine level decreased in patients treated with curcumin after the intervention. ( $P < 0.04$ ) ( $P < 0.001$ ). was also observed in the curcumin group compared to the placebo group. In addition, creatinine and BUN levels were significantly reduced in the treatment group after the end of the intervention ( $P < 0.001$ ,  $P < 0.04$ , respectively). Therefore, it seems that curcumin can be prescribed as an adjunctive therapy for patients with cardiovascular diseases undergoing angiography to reduce the complications of kidney toxicity.

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### Evaluating the effectiveness of garlic tablets in the treatment of contrast-induced nephropathy in patients undergoing elective percutaneous coronary intervention: a double-blind clinical trial study

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#### ARTICLE INFO

##### Keywords:

Garlic  
Contrast  
Nephropathy

#### ABSTRACT

It is estimated that the pathophysiology of contrast-induced nephropathy is not fully understood; however, oxidative stress appears to be the main mechanism of contrast-induced nephropathy. The garlic plant has strong antioxidant properties due to its nutritive and phenolic compounds. Consequently, the use of garlic and its derivatives has been studied for their potential kidney-protective effects, particularly in the context of diabetic nephropathy. Patients who met the study criteria were enrolled after providing written informed consent and receiving necessary training. They were then randomly assigned to either the control or experimental groups. The patients in the experimental group received 500 mg of garlic tablets, while the control group received a placebo 12 hours before the operation. After 72 hours, the creatinine level of the patients in both groups was measured. There were no significant differences in the demographic characteristics between the treatment and control groups. According to the Wilcoxon rank test, no significant differences were observed in mean creatinine levels between the treatment and control groups before and after the intervention. Similarly, the Mann-Whitney test showed no significant differences in mean creatinine levels before and after the intervention in the treatment group compared to the control group. Garlic may help prevent nephropathy caused by contrast agents. However, there are very few studies on this topic in Iran, despite its long history of traditional and herbal medicine. This highlights the need for more extensive research in this area."

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Poster Presentation ID: 414

### Phytochemical responses of *Linum album* as a potential source of anticancer Lignans subjected to osmotic stress

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#### ARTICLE INFO

##### Keywords:

Specialized metabolites  
Podophyllotoxin  
6-methoxy  
podophyllotoxin  
Biotechnology  
Cell suspension culture

#### ABSTRACT

*Linum album* Kotschy ex Boiss, is an endemic herbaceous plant distributed in Iran. The plant is comprised of precious lignans *i.e.* podophyllotoxin (PTOX) and 6-methoxy PTOX which possess anticancer activity. Limited natural sources of these compounds in addition to their complicated chemical synthesis have convinced experts to exploit cell suspension culture as an alternative procedure. In the present study, the effect of sorbitol (2,3, and 4%), sucrose (4.5,6, and 8%) and polyethylene glycol (PEG) 6000 (3,4, and 6%) as osmotic agents has been evaluated on specialized metabolites in *L. album* cells. Osmotic agents in mentioned concentrations and in 5 replications were added to cell suspensions (liquid MS) from the first day of culture and were collected after 28 days shaking in 24 °C with 92 rpm in complete darkness. Subsequently HPLC analysis results showed that the highest amount of PTOX (278.07 µmg.g<sup>-1</sup> DW) was obtained from samples containing PEG 4% , as well as the highest amount of 6M-PTOX (73.52 µmg.g<sup>-1</sup> DW) was recorded in the treatment with sucrose 6%. The minimum content of mentioned compounds were observed in sorbitol 4% (146.5 µmg.g<sup>-1</sup> DW) and PEG 6% (31.72 µmg.g<sup>-1</sup> DW), respectively. Our outcomes can be considered for more efficient lignans production by means of biotechnological methods such as cell suspension culture supplemented with osmotic agents particularly PEG.

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Poster Presentation ID: 415

### Investigating the impact of *Aloe vera* on pathology parameters in veterinary surgery

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#### ARTICLE INFO

##### Keywords:

*Aloe vera*  
Veterinary surgery  
Inflammation  
Wound healing

#### ABSTRACT

This study aims to evaluate the effects of *Aloe vera* on pathology parameters during veterinary surgery to assess its potential as a therapeutic agent in enhancing surgical outcomes and postoperative recovery. Twenty-four adult dogs of various breeds, ages, and genders undergoing elective surgical procedures were randomly assigned to either the control group receiving standard surgical care or the treatment group receiving *Aloe vera* supplementation in addition to standard care. Prior to surgery, baseline pathology parameters including hematological and biochemical parameters were measured in all subjects. The treatment group received oral *Aloe vera* supplementation for seven days leading up to surgery and continued for seven days postoperatively. Surgical procedures were performed under standard anesthesia and aseptic conditions. Pathology parameters were assessed preoperatively, intraoperatively, and postoperatively at specified intervals. Analysis of pathology parameters revealed significant improvements in markers of inflammation, wound healing, and oxidative stress in the *Aloe vera* treatment group compared to the control group. Specifically, reductions in inflammatory cytokines, enhanced wound healing markers, and decreased oxidative stress markers were observed in the treatment group. The findings of this study suggest that *Aloe vera* supplementation during veterinary surgery may have beneficial effects on pathology parameters, potentially improving surgical outcomes and facilitating postoperative recovery in dogs. Further research is warranted to elucidate the underlying mechanisms and optimize dosage regimens for clinical application.

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### Evaluation of the effectiveness of turmeric in the prevention of contrast-induced nephropathy in coronary angiography: a double-blind clinical trial study

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#### ARTICLE INFO

Keywords:

Curcumin

Angiography

Nephrotoxicity

Clinical Trial

#### ABSTRACT

Contrast-induced nephropathy is a complication that can occur after the administration of iodinated contrast agents during coronary angiography. can lead to acute kidney injury and other serious complications. Curcumin, due to its anti-inflammatory and antioxidant properties, has been used as a traditional herbal medicine for the treatment of diseases including kidney diseases. This study was conducted on 68 patients with cardiovascular disease who underwent contrast-enhanced angiography. The aim of this study was to investigate the effect of curcumin in preventing kidney damage caused by these agents. Patients were randomly divided into two intervention and placebo groups. The intervention group received curcumin 12 hours before angiography. The placebo group also received a placebo 12 hours before angiography. Serum creatinine and blood urea nitrogen levels were measured before angiography and 24 hours after the procedure. In this study, serum BUN and Serum creatinine level decreased in patients treated with curcumin after the intervention. ( $P < 0.04$ ) ( $P < 0.001$ ). was also observed in the curcumin group compared to the placebo group. In addition, creatinine and BUN levels were significantly reduced in the treatment group after the end of the intervention ( $P < 0.001$ ,  $P < 0.04$ , respectively). Therefore, it seems that curcumin can be prescribed as an adjunctive therapy for patients with cardiovascular diseases undergoing angiography to reduce the complications of kidney toxicity

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Poster Presentation ID: 417

### Phytochemical analysis of the *Calotropis persica* based on a bio-assay guided fractionation strategy

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#### ARTICLE INFO

##### Keywords:

Anticancer compounds

MTT assay

*Calotropis persica*

Triterpene compounds

Molecular networking

#### ABSTRACT

Based on the World Cancer Report in 2014, cancer was the second cause of death in developing countries and the main cause of death in developed countries. Plants are of interest due to their high structural diversity and wide range of biological activities such as antimicrobial, antiviral, antioxidant, anti-inflammatory, hepatoprotective and anticancer effects. There are various biological reports on different species of *Calotropis* genus including *C. procerae* and *C. gigantea*, indicating their high potential as anticancer, cytotoxic and antitumor agents against different cancer types. {1,2} So, this study focused on an Iranian native plant from this genus, *C. persica*, to investigate its cytotoxic activity against different cell lines including A549, MCF-7. For this, root bark and leaves of the plant were collected from Dezful and successively extracted using n-hexane, ethyl acetate and methanol solvents to obtain six different extracts based on the polarity of solvents. The biological effect of these extracts was then investigated using the BAEF method on A549, MCF-7, PC3, and healthy L929 cancer cells. Results showed that the cells were most affected by the crude ethyl acetate extract, with the toxicity level on PC3 cells being equal to  $IC_{50}=120 \mu\text{g/ml}$ . In continue, the ethyl acetate extract was selected to fractionate using column chromatography which will be used for isolation and purification of the cytotoxic components of the plant according to a bio-assay guided fractionation analysis.

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Poster Presentation ID: 418

### The impact of *Echinacea* plant on pathological parameters during rabbit surgery :exploring the healing power of *Echinacea*

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#### ARTICLE INFO

##### Keywords:

*Echinacea*  
Tissue healing  
Rabbit surgery  
Inflammation  
Immune response

#### ABSTRACT

This study aimed to investigate the effects of *Echinacea* plant supplementation on pathological parameters during the rabbit surgery process. Twenty adult New Zealand White rabbits were randomly divided into two groups: control (n=10) and experimental (n=10). The experimental group received *Echinacea* supplementation orally for two weeks prior to surgery, while the control group received a placebo. All rabbits underwent a standardized surgical procedure. Pathological parameters including inflammation levels, tissue healing, and immune response were assessed post-surgery. The experimental group exhibited significantly reduced inflammation levels compared to the control group (p<0.05). Additionally, improved tissue healing and enhanced immune response were observed in rabbits supplemented with *Echinacea*. 1. *Echinacea* plant extract demonstrated a significant reduction in inflammatory markers, such as C-reactive protein, during rabbit surgery, indicating its potential anti-inflammatory effects. 2. The use of *Echinacea* plant extract resulted in a decrease in post-operative pain scores in rabbits, suggesting its analgesic properties and potential benefits in managing pain during surgical procedures. 3. Administration of *Echinacea* plant extract was associated with improved wound healing and reduced incidence of post-operative infections in rabbits, highlighting its potential role in enhancing surgical outcomes and overall recovery. *Echinacea* supplementation demonstrated beneficial effects on pathological parameters during the rabbit surgery process, including reduced inflammation, enhanced tissue healing, and improved immune response. Incorporating *Echinacea* into pre-operative protocols may offer potential therapeutic benefits in surgical settings..

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Poster Presentation ID: 420

### Investigating the effect of tarragon seed extract *Artemisia dracunculus* L on liver cirrhosis in patients with chronic hepatitis C.

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#### ARTICLE INFO

Keywords:

*Artemisia dracunculus*

Liver tissue

Chronic hepatitis C

#### ABSTRACT

Cirrhosis is the final stage of liver lesions with various causes, including viruses, which are sometimes active for several years without any symptoms in the patient. Currently, the treatment methods used in chronic liver diseases are not certain and reasons such as the expensiveness of common treatments, not being effective in all patients, the possibility of disease recurrence after stopping the drug, sometimes severe side effects that lead to stopping the drug have caused the use of Medicinal plants should be considered by doctors and patients. In this clinical trial, the effect of the herbal medicine Millimarin A at a dose of 800 mg compared to a placebo (with the same molecular structure as synthesized and given at a dose of 800 mg) on 70 patients with liver cirrhosis caused by chronic hepatitis C who were treated with common treatment methods in It was reviewed over a period of 12 months. The patients of two groups before and after 12 months of drug and placebo administration were examined and compared in terms of the improvement of clinical symptoms and serological indicators such as ascites, Pugh-Child criteria, bilirubin level, prothrombin time, number of platelets and white blood cells. It should be noted that in all stages of this research, ethical considerations have been observed and implemented according to the latest resolution of the clinical trial ethics working group of the Ministry of Health. The results of the project indicated that the patients who took Millimarin A herbal medicine for 12 months had a significantly better Pugh-Child standard condition and a greater reduction in ascites compared to the starting time and also compared to the placebo group, as well as a significant decrease in the amount of They had two liver enzymes, alanine aminotransferase and aspartate aminotransferase. In the group of placebo patients, none of the serological and clinical indicators and markers of the patients were significantly different after 12 months compared to before the start of the study. The general result is that in this research, the administration of the herbal medicine Millimarin A to patients with chronic hepatitis C for 12 months improved the symptoms of liver cirrhosis. Long-term administration of this herbal medicine is suggested to a larger number of patients with liver cirrhosis to investigate its effect on the mortality of these types of patients.

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Poster Presentation ID: 421

### Preparation, evaluation and comparison of different vaginal products from blueberries

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#### ARTICLE INFO

##### Keywords:

Vaginitis  
Cornelian Cherry  
Anthocyanin  
Candida  
Trichomonas

#### ABSTRACT

Cornelian cherry was first extracted by percolation with 70% methanol. The total anthocyanin extract was prepared using a UV-Vis spectrophotometer and a pH differential method. The antibacterial and antifungal properties of the total extract were investigated. Desired vaginal products were prepared from the total anthocyanin extract. Hydroxypropylmethylcellulose, triethanolamine, polyethylene glycol (PEG), and alcohol were used in the preparation of vaginal gel formulations. Cetyl alcohol, stearic acid, paraffin, vaseline, and glycerin were used in the preparation of vaginal cream formulations. Additionally, hydroxypropylmethylcellulose, lactose, cornstarch, magnesium stearate, croscarmellose, Avicel, and crospovidone were used in the preparation of vaginal tablets. The antibacterial and antifungal properties of the total extract showed that *Trichomonas vaginalis* was resistant to different doses of Cornelian cherry. The diameter inhibiting growth for *Candida albicans* was 20 mm, which is approximately equal to the nystatin inhibition zone. *Escherichia coli* was resistant to Cornelian cherry, while *Staphylococcus aureus* exhibited a growth inhibition zone of 10 mm. The calculated minimum inhibitory concentration (MIC) was 400 mg/ml. Evaluation of vaginal formulations showed that the best gel formulations included 0.5 g of extract, 0.7 g of hydroxypropylmethylcellulose, 0.5 ml of triethanolamine, 20 ml of alcohol, 10 ml of PEG, and 10 ml of water. The best vaginal cream formulations contained 0.5 g of total extract, 0.5 g of cetyl alcohol, 0.5 g of stearic acid, 3 g of vaseline, 2 g of paraffin, 1 g of glycerin, and 2 ml of water. Vaginal gel demonstrated nearly 60% efficacy in the first 6 hours of release, while vaginal cream had nearly 40% efficacy. Vaginal tablets had nearly 80% drug release. Therefore, based on the results of our study, the formulation of vaginal tablets and gels can be used in non-*Trichomonas* vaginitis.

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Poster Presentation ID: 425

### Antioxidant and antibacterial potential of green fabricated silver nanoparticles made from *Fragaria vesca* L. leaves extract

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#### ARTICLE INFO

##### Keywords:

*Fragaria vesca* L.

Ag-NPs

Medical technologies

DPPH<sup>0</sup>

Pathogenic bacteria

#### ABSTRACT

Cognizant of the harsh chemical method of nanoparticles synthesis, researchers are shifting towards the green phyto-mediated synthetic approaches [1-2]. We herein report the green synthesis of Ag-NPs using silver nitrate solution as precursors added to aqueous extract of *Fragaria vesca* L. leaves extract to evaluate their antioxidant and antibacterial activity. The synthesized nanoparticles were characterized using UV-Vis, FT-IR, X-ray TEM and EDX. The total phenolic contents (TPC) and total flavonoid contents (TFC) of the extract were then measured using Folin Ciocalteu Reagent (FCR) and AlCl<sub>3</sub> methods, respectively. And total antioxidant activity was assayed by DPPH<sup>0</sup> free radical scavenging assay method. The antibacterial potential was evaluated using the agar well technique. UV-Vis spectrophotometry studies at 440 nm confirmed the synthesis of Ag-NPs. FT-IR spectroscopy revealed that the presence of various functional groups was responsible for reduction and stabilization during the biosynthesis process. Also, the size of the nanoparticles was determined to be in the range of 20-50 nm. Aqueous extract of leaves of *Fragaria vesca* L. showed total phenolic contents and total flavonoid contents of (81.46±0.13) mg GAE/g and (78.26±0.08) mg QE/g dry plant material respectively. The antioxidant activity assays showed a strong reducing potential towards the radicals tested. Lastly, strong antibacterial activities were observed when the nanoparticles were tested on some pathogenic bacteria through the agar well method. According to the results of this project, the Ag-NPs produced by this green synthesis are able to use medical technologies

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Poster Presentation ID: 426

### Biosynthesis of silver nanoparticles hydroalcoholic extract of *Amygdalus scoparia* Spach. and its potential anticancer and antibacterial activities

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> <i>Amygdalus scoparia</i> Spach. Silver nanoparticles XRD Disk diffusion MCF-7</p>	<p>In recent years, much attention is focused on silver nanoparticles (Ag-NPs) for biomedical applications and then synthesis using plant procedure has drawn a great focus [1-2]. In the current project (Ag-NPs) were synthesized using the hydroalcoholic extract of <i>Amygdalus scoparia</i> Spach. this has been used traditionally for several therapeutic purposes The synthesized Ag-NPs by hydroalcoholic extract of <i>Amygdalus scoparia</i> Spach. were subjected to several studies using UV-Vis, FT-IR, XRD, and TEM. The synthesized Ag-NPs were tested for antibacterial activity using the disk diffusion method. The antitumor activity of the synthesized Ag-NPs was also tested using breast cancer cell lines (MCF-7). The UV-Vis spectra gave surface plasmon resonance for synthesized silver nanoparticles at 425 nm. FT-IR spectroscopy revealed that silver nanoparticles were functionalized with biomolecules that have NH<sub>2</sub>, C=O, -OH groups. The XRD pattern showed the silver nanoparticles are crystalline in nature. Also, the silver nanoparticles showed spherical structure and their sizes ranged from 40-60 nm under TEM. The biosynthesized nanoparticles showed promising antibacterial activities. Later, Cytotoxicity study was done on two different samples hydroalcoholic extract and Ag-NPs (2.5 and 5 µg/mL) on human breast cancer cell line (MCF-7 cells). Initially, 2.5 µg/mL dose treatment showed a viable cells region of 68.01%, apoptosis 10.80%; late apoptosis 14.29% and necrosis 1.19%. Interestingly, 5 µg/mL exhibited substantial cytotoxic effects, viable cells region 51.92%, apoptosis 5.25%, late apoptosis 29.87% and necrosis 5.74%. Overall, this project suggests that Ag-NPs generated by <i>Amygdalus scoparia</i> Spach. possess significant antibacterial, and anticancer activities, making them potentially valuable in pharmaceutical applications</p>

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### Potential antifungal effects of silver nanoparticles of aqueous extract of leaves of against *Candida glabrata* and *Candida glabrata*

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#### ARTICLE INFO

##### Keywords:

*Atriplex hortensis* L.  
Green synthesis  
Microwave irradiation  
*Candida albicans*  
Medicine applications

#### ABSTRACT

In recent years, nanoparticle synthesis has witnessed a remarkable shift toward sustainable and environmentally friendly approaches. Conventional nanoparticle synthesis methods frequently involve using hazardous chemicals and high-energy processes, raising environmental concerns, and producing toxic by-products. On the other hand, green synthesis methods provide a viable solution by utilizing bio-based materials such as microorganisms, plants, and agricultural waste as environmentally friendly sources for nanoparticle synthesis [1-2]. *Atriplex hortensis* var. *rubra* L. is a spinach-type vegetable belonging to the same subfamily (Chenopodioideae) as spinach (*S. oleracea*) and quinoa. This plant is well-adapted to harsh environmental conditions, tolerating downpours, droughts, and deficiency of nutrients in soil. In this project, silver nanoparticles were synthesized using *Atriplex hortensis* L. leaves extract as a reducing agent by a microwave irradiation method. The advantage of using microwave irradiation is it takes less time to reduce the silver ions. Surface Plasmon Resonance (SPR) peaks in UV-Vis spectra, observed at 410 nm, indicated the formation of poly dispersive Ag-NPs using *Atriplex hortensis* L.. The synthesized Ag-NPs were mostly spherical in shape with an average size of 35 nm. It shows the significant antifungal efficacy against *Candida albicans* and *Candida glabrata* by disk diffusion method. The diameter of Zone of Inhibition (ZOI) in *Candida albicans* and *Candida glabrata* was observed as 25, 15 mm, respectively. The biosynthesized nanoparticles showed promising antifungal activities. From the results, it is suggested that green synthesized Ag-NPs could be used effectively in medicine applications.

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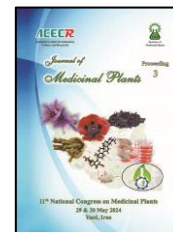
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Poster Presentation ID: 428

### Qualitative and quantitative of phytochemical evaluation of the ethanolic extract of leaves of *Convolvulus arvensis* L.

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> <i>Convolvulus arvensis</i> L. Phytochemical Pharmacological activity IC<sub>50</sub> Keller-Killani test</p>	<p><i>Convolvulus arvensis</i> is a medicinal plant in the family Convolvulaceae, which is used in traditional phytotherapy [1-2]. In this project, the leaves were collected and extract prepared from ethanol by microwave assisted extraction (MAE) method. The present project revealed that the phytochemicals analysis of eight different chemical compounds flavonoids (Alkaline Reagent Test), phenols (Ferric Chloride Test), coumarins (sodium hydroxide Test), tannins (Ferric Chloride Test), phlobatannins (HCl Test), cardiac glycosides (Keller-Killani test), saponins (Foam Test) and alkaloids (Mayer's reagent) were tested in ethanolic extract. The total phenolic contents and total flavonoid contents of the extract were then measured by standard method. And, total antioxidant activity was assayed by DPPH<sup>0</sup> free radical scavenging assay method. Total phenolic contents and total flavonoid contents of ethanolic extract of leaves of <i>Convolvulus arvensis</i> L. showed 75.21±0.1 mg GAE/g dry plant material and 49.97±0.03 mg QE/g dry plant material, respectively. The antioxidant activity of the investigated ethanolic extract of leaves <i>Convolvulus arvensis</i> L. was scavenging ability of DPPH<sup>0</sup> radical scavenging activity 88.73%. The IC<sub>50</sub> of ethanolic extract of leaves of <i>Convolvulus arvensis</i> L. for DPPH<sup>0</sup> assay was 5.46±0.02 mg/ml respectively. The results of the phytochemical screening of ethanolic extract of leaves of <i>Convolvulus arvensis</i> L. were flavonoids, coumarins, saponins, cardiac glycosides, tannins, phlobatannins and phenols presented. Furthermore, in the present project the phytochemical screening of <i>Convolvulus arvensis</i> were found to be a powerful antioxidant and antibacterial, anticancer agent and this project can be continued for their structural elucidation and pharmacological activity.</p>

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Poster Presentation ID: 429

### Antibacterial activity of ethanolic extract of *Quercus castaneifolia* C. A. Mey Fruits using disk diffusion method for the treatment of urinary tract infections

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#### ARTICLE INFO

##### Keywords:

*Quercus castaneifolia*

C. A. Mey

Urinary tract infections

*Staphylococcus*

*saprophyticus*

Gentamicin

Disk diffusion method

#### ABSTRACT

Nowadays, incidence of antibiotic-resistance among pathogenic bacteria has increased due to indiscriminate use of antimicrobial drugs for treatment of diseases, especially urinary tract infections. Medicinal plants are also of great importance as antibacterial agents. *Quercus* is the largest genus in the family Fagaceae and this genus includes evergreen and deciduous shrubs and trees extending from cold latitudes to tropical Asia and Americas. *Quercus castaneifolia* C. A. Mey is one of the most important species of Iran's native oaks distributed in the Hyrcanian Forests [1-2]. Therefore, the aim of this project was to determine the antibacterial effect of ethanolic extract of *Quercus castaneifolia* C. A. Mey fruits from Guilan province using disk diffusion method. Ethanolic extract of *Quercus castaneifolia* C. A. Mey fruits was prepared by the Microwave-Assisted Extraction (MAE) method. Effect of different concentrations of the extract on *Escherichia coli* and *Staphylococcus saprophyticus* was evaluated using the disk diffusion method by measuring diameter of growth inhibition zone. Gentamicin and propylene glycol were used as positive and negative control, respectively. The ethanolic extract of *Quercus castaneifolia* C. A. Mey fruits had favorable inhibitory effect on the growth of *Escherichia coli* and *Staphylococcus saprophyticus*. The ethanolic extract of *Quercus castaneifolia* C. A. Mey fruits has good inhibitory effect on the growth of *Escherichia coli* and *Staphylococcus saprophyticus* which confirms the traditional use of this plant for the treatment of urinary tract infections.

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### Preparation of mucoadhesive patch of *Salvadora persica* for oral ulcers treatment

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#### ARTICLE INFO

##### Keywords:

Persica  
Mucoadhesive  
Oral ulcers

#### ABSTRACT

**Background:** The use of patches as an adhesive mucosal film can afford a positive and rapid effect on the treatment of oral ulcers. **Methods:** A thin oral mucoadhesive film of persica (*Salvadora persica* Linn.) was prepared by the percolation method. The prepared formulations were studied for appearance, thickness, release time and disintegration time. Polymers including HPMC, sodium alginate and chitosan, plasticizer, and a cross-linking agent were applied to form the mucoadhesive films of persica. **Results:** The results revealed that the thickness of mucoadhesive films was approximately  $45.5 \pm 11 \mu\text{m}$  with a uniform matrix and smooth surface. Films containing HPMC and chitosan, along with PG as the plasticizer, improved regarding features such as fragility. Addition of sodium alginate to HPMC-containing films increased the rate of swelling while the rate of film disintegration was not affected. Addition of  $\text{CaCl}_2$  to formulations containing alginate as a cross-linking agent increased the disintegration time by up to 35 minutes. On the other hand, cross-linking of chitosan films with tripolyphosphate (TPP), reduced hydration, swelling and practically decreased the films' transparency. Application of alginate in the HPMC formulation reduced the extract release time from 60 min to 25 min and the release profile was not affected by alginate crosslink. cross-linking of chitosan with TPP caused a significant delay in the release profile of persica where 19.5% of its extract was released after 3 hours. **Conclusion:** By comparing different formulations, it can be seen that chitosan with high adhesion and high body compatibility can be considered as a candidate to improve the release properties of HPMC matrix containing persica extract.

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### Qualitative characteristics of ginger (*Zingiber officinale*) affected by packaging and storage duration

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#### ARTICLE INFO

##### Keywords:

Ginger  
Essential oil  
Packaging  
Storage duration

#### ABSTRACT

Ginger (*Zingiber officinale*) is an herbaceous and perennial plant from the Zingiberaceae family, which has a high value in medicinal and spice uses, and its dried rhizome, essential oil and extract (oleoresin) are of interest. One of the major problems in the post-harvest stages of this product is the lack of scientific information about the packaging and its effect on the quality of dried ginger during storage period. Therefore, in this research, the effect of the type of packaging film (four gas barrier nano-composite films based on polyethylene, produced in the polymer engineering department, Tarbiat Modares University, Tehran, Iran) and also the duration of storage (zero, 3, 6 and 9 months) on the qualitative characteristics of the ginger rhizome. The measured characteristics were color, total content of phenolic compounds, essential oil content and composition. The results showed that with increasing storage duration, the amount of essential oil decreased in all samples, but samples packaged with F9 (5% Nanoclay, 5% Compatibilizer and 90% High density polyethylene) caused more essential oil to be preserved than other treatments. Also, most of the main essential oil components ( $\alpha$ -zingiberene,  $\beta$ -bisabolene and  $\beta$ -sesquiphellandrene) and the best color characteristics were observed in samples packaged with F10 (5% Nanoclay, 0% Compatibilizer and 95% High density polyethylene).

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Poster Presentation ID: 437

### Investigation of *Mentha longifolia* essential oil against *Erwinia amylovora*

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#### ARTICLE INFO

##### Keywords:

Antibacterial activity

*Erwinia amylovora*

Lorestan province

*Mentha longifolia*

Essential oil

#### ABSTRACT

*Mentha longifolia*, known as pooneh in Iran, is used as a home remedy due to its antiparasitic, anti-inflammatory, antimicrobial and / or antiseptic properties and its positive effect on digestion since it is a known treatment for gastrointestinal disorders as peptic ulcer, antiemetic, diarrhea, ulcerative colitis and liver diseases [1, 2, 3, 4]. Fire blight is a major threat to apple and pear production worldwide. The ability of its causative agent, *Erwinia amylovora*, to rapidly spread through host plants makes this devastating disease difficult to manage [5]. In this study, for the first time, the effects of essential oils of three ecotypes collected from Lorestan province from Iran (Khorramabad, Delfan, Aleshtar) against plant pathogenic bacterial *Erwinia amylovora* was evaluated. The minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) of *Mentha longifolia* from three region of lorestan province was  $10^{-3}$  and  $10^{-2}$  respectively. These results showed that *Mentha longifolia* essential oil in three regions of Lorestan province has a strong and same antibacterial activity against the *E. amylovora* in laboratory conditions. It is suggested to study effect of *Mentha longifolia* against another plant pathogenic bacteria.

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Poster Presentation ID: 438

### Green synthesis of silver nanoparticles by *Malva sylvestris* and its antifungal activity against *Candida albicans*

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#### ARTICLE INFO

##### Keywords:

Silver nanoparticles

*Malva sylvestris*

*Candida albicans*

#### ABSTRACT

Silver nanoparticles are recognized as one of the most effective antibacterial, antiviral, and antifungal agents [1]. Various methods such as chemical, physical, and biological methods exist for the production of nanoparticles. The use of biological methods, especially medicinal plants, for nanoparticle production has advantages compared to other methods. Economical, simple, fast, stable, safe, and environmentally friendly production are among them [2]. In this study, silver nanoparticles were synthesized using the aqueous extract of *Malva sylvestris* at room temperature. Silver nanoparticles were synthesized by mixing plant cell extract with a 20 mM solution of silver nitrate. Various analyses such as UV-Vis spectrophotometry, FT-IR, XRD, DLS, and FE-SEM were performed for characterization and optimization of nanoparticle production. The results showed that the synthesized nanoparticles were spherical in shape and ranged in size from 30 to 80 nanometers, with the highest frequency being 45 nanometers. The antifungal effect of these silver nanoparticles was demonstrated by examining the growth inhibition percentage compared to the negative and positive control samples on *Candida albicans*. The analysis indicates that silver nanoparticles may exhibit significant antifungal activity by disrupting the cellular membrane structure and integrity, which is relevant for clinical applications.

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Poster Presentation ID: 439

### Effects of Phycocyanins Extracted from Spirulina on Colorectal Cancer Cells

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#### ARTICLE INFO

##### Keywords:

Phycocyanins  
Spirulina  
Colorectal Cancer

#### ABSTRACT

Today, the use of medicinal plants and certain microalgae-derived compounds is highly appealing due to their potent therapeutic properties and fewer side effects compared to chemical drugs and chemotherapy [1]. Some of these active compounds have demonstrated anti-cancer properties or can act as therapeutic complements to conventional cancer treatments. Spirulina microalgae, due to its rich content of biological compounds, especially phycocyanins with revitalizing and antioxidant properties, holds many therapeutic benefits [2]. Phycocyanins exhibit anticancer effects through inducing apoptosis, inhibiting cell proliferation, and reducing inflammation. Additionally, colorectal cancer is the third most common and deadly cancer worldwide, which was the focus of this study as a representative cancer cell model. In this study, the effects of phycocyanins extracted from Spirulina on colorectal cancer cells were investigated using the MTT method as a model to examine anticancer effects. The obtained results clearly showed dose-dependent effects, and for reasonable and reproducible conclusions, optimization and purity of phycocyanin and additional tests are required.

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Poster Presentation ID: 440

### Formulation of Moisturizing and Healing Lotions and Creams with *Aloe vera* Gel, Phycocyanin, and Coconut Oil: An Experimental Study

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#### ARTICLE INFO

*Keywords:*

Phycocyanin

Formulation

Lotions and Creams

#### ABSTRACT

Skin health and beauty have always been of paramount importance. With increasing awareness of the potential harmful effects of artificial chemicals in skincare products, there has been a shift towards natural alternatives [1]. Skin care products derived from natural sources have gained attention due to their safety and potential therapeutic benefits. Phycocyanin, *Aloe vera*, and coconut oil are well-known for their nourishing and therapeutic properties [2]. Combining these ingredients in skincare formulations can lead to the development of effective products for moisturizing and skin repair. In this experimental study, lotions and creams were formulated using a combination of Phycocyanin, *Aloe vera* gel, and coconut oil. The mixture underwent rigorous testing to ensure stability, consistency, and safety, and the products were ultimately tested practically to evaluate their efficacy. The formulated lotions and creams demonstrated promising results in moisturizing and healing the skin. Consumers reported relative satisfaction with increased softness and radiance of the skin after regular use of these products over one to three-month intervals. Furthermore, no adverse reactions were observed during the testing period. The results indicate that the combination of Phycocyanin, *Aloe vera* gel, and coconut oil in skincare product formulations is effective in moisturizing and healing the skin. However, further research and development in this area are necessary.

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Poster Presentation ID: 441

### Sperm quality assessment in honey bee drones fed with lemon balm (*Melissa officinalis*) medicinal plant extract

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#### ARTICLE INFO

##### Keywords:

Sperm quality  
Honey bee drones  
Medicinal plant extract  
Lemon balm

#### ABSTRACT

Today, in order to preserve and survive honey bee colonies, special attention has been paid to feeding the colonies with extracts of medicinal plants [1]. To better understand whether feeding honey bee colonies (*Apis mellifera*) with lemon balm hydroalcoholic extract has an effect on the characteristics of drone sperm, the present research was conducted. The experimental treatments included the control group and extracts of 1, 2 and 3% of lemon balm extract separately. Field operations were carried out in spring and for 60 days (30 days of feeding with extracts and 30 days after feeding). At the beginning of the experiment, the colonies were homogenized according to the population, food storage and queens with same age. To investigate the reproductive characteristics of drone, was measured parameters such as motility and motility, concentration, viability, sperm plasma membrane integrity and Sperm apoptosis. In this experiment, a significant increase in sperm motility and viability was observed for drone fed with a concentration of 2% lemon balm extract. The level of integrity of the plasma membrane in the treatment of 2% lemon balm extract was higher than other treatments ( $P < 0.05$ ). The sperm concentration in the treatment of 1% lemon balm was had significantly increased compared to the control treatment. The percentage of sperms with early apoptosis in the treatment of 1% of lemon balm, the percentage of sperms with complete apoptosis in the treatments of 1 and 2% of lemon balm had a significant decrease compared to the control treatment.

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### Evaluation of Salt Tolerance in Fennel (*Foeniculum vulgare* Mill.) on Germination Stage

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#### ARTICLE INFO

*Keywords:*

Fennel

Germination

Salinity stress

Stress tolerance indices

#### ABSTRACT

Existence of salinity stress in most agricultural lands of Iran reveals the importance to pay attention to salinity stress. Consequently, it is important to recognize different ecotypes in terms of their tolerance to salinity stress and select the appropriate ecotype based on the soil and environmental conditions of each region. The current study focused on investigation of resistance to salinity stress at germination and whole plant stages and determination of threshold levels of salinity tolerance in fennel (*Foeniculum vulgare* Mill.) and selection of salinity resistant ecotypes. The present study was carried out as a factorial experiment based on completely randomized design with three replications in Moghan agricultural faculty, University of Mohaghegh Ardabili, Ardabil. The seeds of fennel exposed to salinity stress in petri dishes. Eleven fennel ecotypes were investigated at 5 salinity levels (control, 1, 2, 4 and 8 dS/m NaCl). After 14 days, radicle and plumule length, radicle and plumule dry weight, germination rate and percent traits were measured in random 5 plants. Based on the ANOVA analysis there was significant differences among ecotypes and salinity levels in almost all measured traits. According to the results of the current study, there was a suitable diversity among ecotypes in terms of their response to salt stress, which could provide the basis for subsequent breeding programmes. Moreover, this study clearly revealed that salinity, even at its low levels, leads to a significant reduction in the morphological traits of fennel.

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### Evaluation of Essential oil Compounds Diversity in Dill (*Anethum graveolens* L.) Accessions under Field Conditions

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#### ARTICLE INFO

##### Keywords:

Essential oil  
Dill  
Phenylpropanoid  
Monoterpenoid  
 $\alpha$ -Phellandrene

#### ABSTRACT

Dill (*Anethum graveolens* L.), an aromatic and medicinal annual plant from Apiaceae family with strong medicinal properties, is cultivated in different parts of the world and Iran. In this study, the yield, quantity and quality of various collected dill accessions' essential oil were investigated. First, the plant organs were harvested at the full flower stage and dried in the shade. Essential oils extracted from dry sample of the accessions by distillation method with Clevenger type apparatus. The highest and lowest extracted essential oils were obtained with 0.34 and 0.06% in Kashmar and Arak accessions, respectively. In total, 71 compounds were identified for five different accessions, of which 26, 34, 26, 42 and 37 compounds were produced in Arak, Malayer, Jahrom, Jolfa and Kashmar accessions, respectively. Among all the compounds produced, the highest amount (0.591%) was related to Santolina triene in Jahrom accession and the lowest amount (0.016%) was related to Cineole in Malayer accession. In all studied accessions,  $\alpha$ -Phellandrene, D-Limonene, Limonene, *p*-Cymenene, Carvone, Dihydrocarvone, *trans*-Dihydrocarvone and Dihydrocarveol as bicyclic monoterpenoids, Piperitenone oxide as monoterpenoid ketone, Myristicin, Elemicin and Apiol as phenylpropanoids, and Oleic acid, as a monounsaturated fatty acid, were identified with constant and varied amounts. The results of this study can be useful and effective in the management and planning for the protection of Iranian dill germplasm as well as the introduction of accessions for the food, pharmaceutical and cosmetic industries.

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### Study the Effects of Organic and Chemical Fertilizers on Quality and Quantity of Medicinal Plant Physalis

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#### ARTICLE INFO

*Keywords:*

Medicinal Plant  
Physalis  
Quantity  
Quality  
Fertilizer

#### ABSTRACT

In order to study the effects of organic and chemical fertilizers on quantity and quality of physalis, an experiment was conducted in factorial as randomized block design in three replicants at research farm of agriculture college of Islamic azad university of amol in 2018. The treatments of experiment were amino acid, fe, npk, urea, zn, folic acid and control. The seedswere planted in a tray and then were transfered to vases and eventually were planted in main field and then treatments were conducted before flowering. The results showed the usage of different treatments had significant and positive effects on traits of leaf number, plant height, shading area, fruit number, fruit diameter, fruit yield, dry and fresh weight of stem and leaf weight in probability of 1%. The treatment of folic acid had the most yield (2760.8% k/h) and the treatment of urea had the lowest yield (1074.8% k/ h, equal to control treatment) statistically. So the total results showed the usage of amino acid promoted quality and quantity of physalis.

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Poster Presentation ID: 446

### Study the Effects of Amino Acid and Seaweed on Phytochemical Traits of *Physalis Alkekengi L.* under Drought Stress

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#### ARTICLE INFO

##### Keywords:

Amino Acid  
Physalis  
Phytochemical  
Drought Stress

#### ABSTRACT

In order to study the effects of amino acid and seaweed on quantity and quality of physalis, an experiment was conducted in factorial as randomized block design at research greenhouse of agriculture college of Islamic azad university of amol. The first factor contains three levels of amino acid (0.2%), seaweed (0.2%) and control (spraying with distilled water). The second factor contains dry stress three levels of 80% needed irrigation, 400% needed irrigation and ordinary irrigation (control). The samples of amino acid and seaweed was prepared from the farm company of faraz-e-aseman and the seeds was prepared from pakan bazr company of Isfahan. The prepared transplantings transferred to main field and the fertilizers treatments conducted in the beginning of plant growth and stress treatments in flower initiation phase. The results of data showed that different treatments had significant and positive effects on phytochemical traits of physalis alkekengi. The treatment of amino acid and irrigation 80% need had the most antioxidant action (71.46%) and the most essential oils (1.47% plant dry weight). So the total results showed the usage of amino acid and sea weed extraction can promote the phytochemical traits in low watering (drought stress).

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Poster Presentation ID: 447

### The study investigated the impact of different irrigation regimes and sowing dates on the dragon's head (*Lallemantia iberica*) plant

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#### ARTICLE INFO

##### Keywords:

Autumn sowing date

Medicinal plant

Water stress

#### ABSTRACT

Dragon's head, with the scientific name *Lallemantia iberica*, is a medicinal, an annual and herbaceous plant of the Mentha family that is cultivated in different parts of Europe, the Middle East, and especially Iran [1]. Comprehensive research on the dragon's head plant is crucial due to Iran limited water resources and the plant's remarkable adaptability to the country's climate [2]. The study investigated the impact of different irrigation regimes (I20, I40, and IS) and sowing dates (autumn and spring) on the dragon's head plant. The experiment was conducted as a split-plot, using a randomized complete block design with three replications, at the research farm of Shahed University during the crop year 2021-2022. Seed yield, total chl T, chl a, chl b, relative leaf water content, leaf area index, and seed mucilage percentage were analyzed. The results showed significant differences in these characteristics under the interaction of sowing date and irrigation regimes. The study found that the highest average chl b levels ( $0.45 \text{ mg g}^{-1} \text{ FW}$ ) were observed in the I20 irrigation regime under autumn sowing date. The I20 irrigation regime in autumn resulted in the maximum seed yield ( $680.1 \text{ kg ha}^{-1}$ ). The highest leaf area index was recorded in the I40 irrigation regime during autumn (an average of 1.1). The IS irrigation regime in autumn exhibited the highest percentage of mucilage (12.4%). Overall, combining the I20 irrigation regime with the autumn sowing date enhanced the physiological and ecological traits of the plants.

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Poster Presentation ID: 11

### ***Ducrosia anethifolia* (DC.) Boiss. from spreading the flood of Garebaigan Fasa: its essential oil analysis and polyphenolic constituents**

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#### ARTICLE INFO

Keywords:

*Ducrosia anethifolia*

Essential oil

Chemical composition

Phenolic compounds

Flood Spreading

#### ABSTRACT

*Ducrosia anethifolia* belongs to the Apiaceae family. This plant is one of the most important medicinal species of the genus *Ducrosia*, which has 3 native species in Iran [1]. 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 *D. anethifolia* 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 2023. 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). A total of 47 compounds that made up 98.67% of the total EO were identified. The results of this study showed that the main constituents of *D. anethifolia* EO at the flowering stage were n-decanal (46.6%), dodecanal (11.8%),  $\alpha$ -pinene (8.9%), (*E*)-2-dodecanal (4.6%), terpinolene (3.6%), limonene (3.2%), myrcene (2.6%), citronellal (2.2%), n-decanol (1.5%), n-tetradecanol (1.4%), n-decanoic acid (1.1%) and (*E*)- $\beta$ -ocimene (1.1%), respectively. Quercetin (0.94 mg/g), caffeic acid (0.83 mg/g), rosmarinic acid (0.54 mg/g), coumarin (0.26 mg/g) and *p*-coumaric acid (0.06 mg/g) were the main PC in *D. anethifolia* methanolic extract [2].

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Poster Presentation ID: 15

### Evaluation of the some phenolic compounds in *Cichorium intybus* L. collected from different localities of Iran

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#### ARTICLE INFO

##### Keywords:

*Cichorium intybus*  
Chicoric acid  
Chlorogenic acid  
Rutin

#### ABSTRACT

Common chicory (*Cichorium intybus*) is a perennial herbaceous plant of the family Asteraceae, usually with bright blue flowers. *Cichorium intybus* is a medicinally important plant in Eurasia and in parts of Africa [1]. Phytochemical analysis showed that different parts of *Cichorium intybus* contained sesquiterpene lactones, caffeic acid derivatives (chiroric acid, chlorogenic acid, isochlorogenic acid, dicaffeoyl tartaric acid), coumarins, hydroxycoumarins, flavonoids, alkaloids, steroids, terpenoids, inulin, sugars, oils, volatile compounds, vitamins and polyynes [2]. In this article, a phytochemical investigation including identification and measurement of some major phe compounds in the hydroalcoholic extracts of the *Cichorium intybus* L. collected from 6 localities (Chaloos, Karaj, Qazvin, Loshan, Firoozkooh and Tehran) was carried out by high performance liquid chromatography (HPLC). Eight phenolic compounds such as chicoric acid, chlorogenic acid, caffeic acid, rosmarinic acid, salicylic acid, quercetin, catechin and rutin were evaluated in all samples. Among the studied compounds chicoric acid, chlorogenic acid and rutin in extracts of aerial parts and chicoric and chlorogenic acid were found in the roots of all samples. Among the studied populations, the highest amount of major compounds (chicoric acid and chlorogenic acid) were observed in the aerial parts of the sample collected from Tehran (National Botanical Garden of Iran).

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Poster Presentation ID: 76

### Investigating the effect of *Boswellia carterii* on wounds caused by *Leishmania major* in sensitive laboratory animals

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#### ARTICLE INFO

Keywords:

*Boswellia carterii*

Leishmaniasis

#### ABSTRACT

The *Boswellia* genus has medicinal properties, including anti-cancer, anti-wound, anti-microbial and anti-diabetic. Leishmaniasis is a parasitic disease that is transmitted by the bites of *Phlebotomus* and *Lutzomyia* flies and divided into 3 clinical forms, which are: 1. Cutaneous, 2. Muco-cutaneous and (3) visceral. In order to prepare ethanolic extract, 30 grams of dried powder of *Boswellia carterii* was used. The study was conducted on 50 female mice. To infect the mice, the standard strain of *Leishmania major* (MRHO/IR/15/ER) was used. Mice were divided into 5 groups of 10, including A1 (positive control, treatment with Glucantime), B1 (treatment with 1 concentration of extract in distilled water), C1 (treatment with 0.1 concentration of extract in distilled water), D1 (treatment with 0.01 concentration of extract in distilled water) and E1 (negative control, treatment with distilled water). 2 ml of Standard strain was inoculated subcutaneously to all mice. To perform the test in vitro condition, 1 ml of the strain prepared under sterile conditions was transferred to tubes containing 5 ml of RPMI 1640 medium and 5 ml of fetal serum, and after successive passages, 106 parasites grew in the culture. The best result among the 5 studied groups belonged to B1. The best concentration of *Boswellia carterii* extract with anti-leishmania effect in the culture medium (in vitro) is 0.1% and 0.01% in the first 15 and 60 minutes of the experiment. This study show the growth inhibitory and lethal effects of *Boswellia carterii* extract in laboratory on the promastigote form of *Leishmania major*.

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Poster Presentation ID: 340

### Phytochemical Response of *Zataria multiflora* to Mycorrhizal Fungus (*Glomus versiforme*) and Salicylic Acid under Salinity Stress

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#### ARTICLE INFO

Keywords:

Essential oil

Mycorrhizafungus

Salicylic acid

#### ABSTRACT

A factorial experiment in a completely randomized design was performed to study the mitigation effects of mycorrhizal fungi and salicylic acid on Shirazy Thyme (*Zataria multiflora* Boiss.) under salinity stress. The treatments were inoculation and non-inoculation of mycorrhizal fungi, application of salicylic acid with 0 and 200 ppm and 5 salinity levels of 0, 50, 100, 150 and 200 mM, with 3 replications. The results showed In general, 45 compounds were identified in Shirazy Thym essential oil, of which three compounds, linalool (43.38%), carvacrol (14.8%) and thymol (9.87%) were the major oil components. The highest concentration of linalool (68.73%) was related to the salicylic acid at 200 ppm without salinity or mycorrhizal fungi treatments. Using salicylic acid and mycorrhizal fungus to improve salinity stress conditions is a practical and useful solution because their use improved many destructive effects and improved many traits.

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Poster Presentation ID: 384

### Investigating the effect of *Fumaria officinalis* on wounds caused by *Leishmania major* in sensitive laboratory animals

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#### ARTICLE INFO

Keywords:

*Fumaria officinalis*

Leishmaniasis.

#### ABSTRACT

*Fumaria officinalis* contained alkaloids, carbohydrates, phenolic compounds, flavonoids, glycosides, terpenoids, tannins and other chemicals. This plant has antioxidant, anticancer, antibacterial and antidiabetic effects. Leishmaniasis is endemic in 88 countries and divided into cutaneous leishmaniasis (CL), mucocutaneous leishmaniasis (MCL), and visceral leishmaniasis (VL). In order to prepare ethanolic extract, 30 grams of dried powder of *Fumaria officinalis* was used. The study was conducted on 50 female mice. To infect the mice, the standard strain of *Leishmania major* (MRHO/IR/15/ER) was used. Mice were divided into 5 groups of 10, including A1 (positive control, treatment with Glucantime), B1 (treatment with 1 concentration of extract in distilled water), C1 (treatment with 0.1 concentration of extract in distilled water), D1 (treatment with 0.01 concentration of extract in distilled water) and E1 (negative control, treatment with distilled water). 2 ml of Standard strain was inoculated subcutaneously to all mice. To perform the test in vitro condition, 1 ml of the strain prepared under sterile conditions was transferred to tubes containing 5 ml of RPMI 1640 medium and 5 ml of fetal serum, and after successive passages, 106 parasites grew in the culture. The best result among the 5 studied groups belonged to B1. The best concentration of *Fumaria officinalis* extract with anti-leishmania effect in the culture medium (in vitro) is 0.1% and 0.01% in the first 15 and 60 minutes of the experiment. This study shows the growth inhibitory and lethal effects of *Fumaria officinalis* extract in laboratory on the promastigote form of *Leishmania major*.

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Poster Presentation ID: 365

### Effect of health awareness on consumers' intention to purchase medicinal plants

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#### ARTICLE INFO

Keywords:

Health

Consumers

Medicinal plants

#### ABSTRACT

Throughout history, mankind has always used medicinal plants to treat, prevent and maintain health. Many of the world's plant species are used for medical purposes, and according to the statistics of the World Health Organization, many people around the world are used plant species to treat their diseases. Viruses are a cause and spread of disease for animals and humans, and medicinal plants are considered as a therapeutic agent due to their antiviral agents. The present study investigated the effect of health awareness on the intention to buy medicinal plants in the conditions of the corona virus. SPSS and Smart PLS software were used to analyze the data. The statistical population in the present study is the users of medicinal plants. According to the results, the coefficient of health awareness is equal to 0.133, which is significant at the level of 0.05, which means that health awareness has a significant effect on the intention of consumers to purchase medicinal plants.

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Poster Presentation ID: 366

### Investigating the effect of nutritional and therapeutic properties of medicinal Plants on Covid-19

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#### ARTICLE INFO

##### Keywords:

Nutritional Therapeutic  
Medicinal plants

#### ABSTRACT

In the past half century, along with the prevalence of chemical and synthetic drugs, their harmful effects on human life have caused a renewed trend towards medicinal plants and the use of medicinal plants as one of the effective treatment methods is undeniable. So that in many developing countries, herbal medicine is known as an important part of their treatment system, and according to the statistics of the World Health Organization, more than 80% of the world's people use 200 types of medicinal plants to treat their diseases. Covid-19 is a disease of viral origin for which no definitive treatment has been registered, and an effective way to treat corona patients is to use medicinal plants. In this regard, the present study has investigated the effect of medicinal plants' therapeutic properties on the purchase intention of consumers in Corona conditions by using data analysis using Smart PLS software. The results showed that the path coefficient for nutritional properties and therapeutic properties of medicinal plants is equal to 0.157, and the results of T-statistics showed that the therapeutic properties of medicinal plants at the level of 0.05 have a significant effect on the purchase intention of consumers of medicinal plants.

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Poster Presentation ID: 448

### The effect of hydroalcoholic extract of *Prangos ferulacea* (L.) Lindl on protoscoleces of liver hydatid cyst in laboratory conditions

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#### ARTICLE INFO

##### Keywords:

Common basilisk

Hydatid

*Prangos ferulacea*

Protoscoleces

#### ABSTRACT

Surgery is one of the best ways to treat hydatid cysts. Although various chemicals are used to destroy protoscoleces during the surgery, most of them have adverse side effects for patients [1, 2]. Therefore, using plants with an acceptable protoscoleces killing effect has been considered as alternative sources with no adverse side effects. This study aimed to investigate the effect of the hydroalcoholic extract of *P. ferulacea* on hydatid cyst Protoscoleces. To this end, the extract was prepared through the hydroalcoholic method. The results showed that *P. ferulacea* plant extract had good protoscolicidal activity. In analyzing the scolocidal effects of different concentrations of hydroalcoholic extract (25, 50, 100, 200 and 400 mg/ml) at different times (5, 10, 15, 30 and 60 min), a significant difference ( $P \leq 0.01$ ) was observed between the simple and reciprocal effects of time and concentration. Based on the findings, the highest scolocidal activity (100%) of hydroalcoholic extract was observed in concentrations of 200 and 400 mg/ml in 60 min. Although more than 80% of the lethality of the studied protoscoleces was observed in concentrations of 400 mg/ml in 30 min (less time) and about 87.66% and 84.33% of lethality were seen in 100 mg/ml (less concentration) in 60 min, respectively, no significant difference ( $P > 0.05$ ) was found considering the treatments conducted at 100% lethality. The lowest scolocidal activity was also observed at a concentration of 25 mg/ml and at a time of 10 min (11%).

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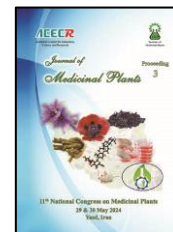
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Poster Presentation ID: 449

### Investigating the effect of hydroalcoholic extract of *Prangos ferulacea* (L.) Lindl on *Giardia lamblia* cysts in laboratory conditions

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#### ARTICLE INFO

##### Keywords:

Common basilisk  
Giardia  
Metronidazole  
Parasitic infection

#### ABSTRACT

*Giardia lamblia* is one of the most common intestinal flagellated protozoa causing a parasitic infection of the small intestine in humans [1, 2]. This study aimed to investigate the effect of the hydroalcoholic extract of the plant (*P. ferulacea*) on *Giardia lamblia* cysts. In this regard, the extract was prepared by the hydroalcoholic method. Analysis of variance of the anti-giardia effect of different concentrations of the hydroalcoholic extract (75, 150, 300 and 600 mg/ml) and constant concentrations of positive and negative controls at different incubation times (240, 120, 60, 30, and 480 minutes) on the parasite *Giardia lamblia* showed a statistically significant difference (P value  $\leq 0.001$ ) between different levels of concentration, time, and the interaction time-concentration. Based on this, the hydroalcoholic extract at a concentration of 600 mg/ml could destroy 100% of *Giardia lamblia* cysts. This rate was even more than 94% in the same concentration (600 mg/ml) but in a shorter period (240 minutes). The results indicated that the lethal effect of the hydroalcoholic extract at a concentration of 600 mg/ml and the time of 480 minutes were consistent with the effect of metronidazole as the drug of choice in treating *Giardia lamblia* at times of 60 to 480 minutes (P value  $> 0.05$ )

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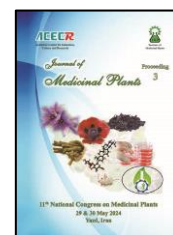
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Oral Presentation ID: 450

### Semi-synthesis of new derivatives of noscapine and investigation of their biological properties

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#### ARTICLE INFO

Keywords:

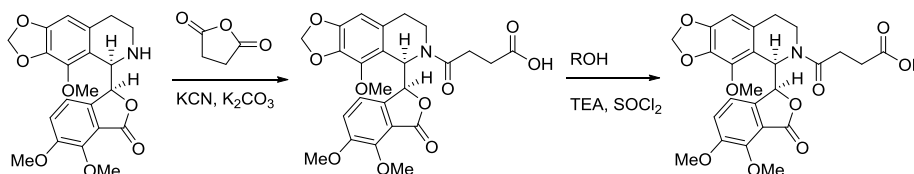
*Papaver somniferum*

Noscapine

Anti-cancer activity

#### ABSTRACT

Noscapine and its derivatives are recognized for their importance as potential anticancer agents due to their ability to inhibit cancer cell growth by blocking tubulin depolymerization [1, 2]. In this project, the focus was on modifying the 6-position of noscapine to create new compounds with enhanced anticancer properties. Nor-noscapine was synthesized through demethylation of noscapine and subsequently reacted with succinic anhydride to produce the precursor. This compound was then used to synthesize nine ester derivatives by reacting with various alcohols, aiming to diversify the structures.



The synthesized compounds were tested for their anti-cancer effects on the MCF7 breast cancer cell line. Results showed that most of the compounds exhibited superior anticancer properties compared to noscapine, with the derivative synthesized using methylcyclohexanol demonstrating the highest efficacy (IC<sub>50</sub> = 23.75 μM).

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Poster Presentation ID: 451

### Neuroprotective effect of *Capparis spinosa* extract in a rat model of neuropathic pain

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#### ARTICLE INFO

##### Keywords:

*Capparis spinosa*  
Chronic pain  
Medicinal plants  
Neuroinflammation  
Neuropathic pain  
Oxidative stress

#### ABSTRACT

Neuropathic pain is a type of chronic pain that can greatly impact the lives of those who suffer from it. Unfortunately, the current medications used to treat neuropathic pain are often not effective in controlling the pain. In the present study, we examined the effects of *Capparis spinosa* hydro-alcoholic extract in rats subjected to chronic constriction injury (CCI). To induce a model for neuropathic pain, Wistar rats underwent chronic constriction injury (CCI) surgery on their left sciatic nerve. The male Wistar rats were then separated into four groups: CCI, Sham, CCI with *C. spinosa* (100 mg/kg), and CCI with *C. spinosa* (200 mg/kg). The rats were administered a hydro-alcoholic extract of *C. Spinosa* (orally, daily) beginning from the CCI induction and lasting for 14 days after. Behavioral tests (measuring mechanical allodynia, cold allodynia, and thermal hyperalgesia) and biochemical tests (measuring IL-1 $\beta$ , TNF- $\alpha$ , MDA, and total thiol) were performed on the rats. The induction of CCI resulted in a considerable increase of allodynia (mechanical and cold) and thermal hyperalgesia when compared with the sham group. However, oral administration of *C. Spinosa* significantly alleviated the nociceptive pain caused by CCI. The inflammation markers, including IL-1 $\beta$  and TNF- $\alpha$ , were significantly higher in the spinal cord specimens of CCI rats than those in the sham group. Additionally, the antioxidative status was significantly decreased, as indicated by increased MDA level and decreased total thiol level in CCI rats. Fortunately, these changes were reversed after *C. spinosa* treatment. *C. spinosa* alleviates neuropathic pain by exhibiting antioxidative and anti-inflammatory effects.

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Poster Presentation ID: 381

### Investigation of the Effect of Formulations Containing *Stachys pilifera* Benth Extract on Acute Skin Wounds in Rats

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#### ARTICLE INFO

##### Keywords:

Stachys pilifera  
Plant extract  
Wound  
Rat

#### ABSTRACT

Skin lesions have a remarkably negative impact on healthcare and wellness systems. Medicinal plants are affordable, cost-effective, and safe for wound healing. Species of the *Stachys* genus, have been attributed with numerous medicinal properties, including anti-inflammatory, antioxidant, analgesic, and more, which are related to their phytochemical content. This research aims to develop safe therapeutic substances for the improvement of acute wounds based on the *S. pilifera* plant. A 70% hydroalcoholic extract in a 1:10 ratio was dried using a desiccator. Subsequently, an ointment was prepared with 1% and 3% of the extract and applied to 24 rats in a completely randomized design with two positive and negative controls (totaling four treatments). Macroscopic results showed that the treatment with the ointment containing the extract had a significant difference compared to other treatments, with the 3% ointment treatment showing the best improvement in terms of wound healing percentage and reduction in wound area. Microscopic results in this study indicated that the formulations used at different sampling stages had varying effects on the tissue regeneration process. Overall, the results demonstrated that ointment formulations containing *S. pilifera* extract act as an effective solution for improving tissue regeneration processes after wounds and surgeries. Therefore, with further research, better and more effective formulations can be achieved, which could be used in medical and paramedical fields as a side-effect-free and cost-effective medication.

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Poster Presentation ID: 383

### Assessment of quality control parameters and standardization of fran syrup: a polyherbal formulation

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#### ARTICLE INFO

##### Keywords:

Standardization  
Physicochemical  
parameters  
Faran Syrup

#### ABSTRACT

World Health Organization highlighting the necessity of quality and safety of herbal formulations also proposes guidelines for its standardization [1]. Standardization is an important step for the establishment of a consistent biological activity, a consistent chemical profile, or simply a quality assurance program for production and manufacturing of herbal drugs [2]. Feran syrup is a multi-herb formula that is used to treat fatty liver disease grades one to four. The scientific standardization of Fran syrup has not been studied yet. In the present study, we have standardized the syrup using standard physico-chemical protocols such as: density, total phenol, total flavonoid, antioxidant, total ash. The amount of total phenol is equal to 97.67 and total flavonoid is equal to 405.53. In addition, residual analysis such as: heavy metal content, microbial load analysis and accelerated stability study were also investigated to strengthen the standard process. Our results give an idea about the beneficial effect of Fran syrup.

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Poster Presentation ID: 351

### Antibacterial activity of gold nanoparticles (AuNPs) synthesized using aqueous extract of *Cistanche tubulosa*

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#### ARTICLE INFO

##### Keywords:

Cistanche  
Antibiotics  
Zone of inhibition  
*E. coli*

#### ABSTRACT

The emergence of drug-resistant bacterial infections, as one of the challenges of global growth, is attributed to the ineffectiveness of the existing antibiotics and their improper and excessive use [1, 2]. To investigate the antibacterial activities of biosynthesized nanoparticles using the aqueous extract of the *Cistanche tubulosa* plant against *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa*, and *Bacillus cereus* bacteria, the disc diffusion and microdilution methods were employed. Based on the results, AuNPs biosynthesized at lower concentration exhibited higher minimum inhibitory concentration (MIC) on the Gram-positive bacteria including *B. cereus* (37.50±16.23 µg/mL) and *S. aureus* (75.00±32.47 µg/mL). Given that a higher concentration of biosynthesized AuNPs was required for the studies Gram-negative bacteria to investigate the inhibitory effects, they showed higher resistance to the nanoparticles. Regarding the minimum bactericidal concentration (MBC) factor, *B. cereus* (225.00±0.00 µg/mL) and *S. aureus* (300.00±129.90 µg/mL) were eliminated at lower concentrations compared with the designated values. However, for *E. coli* and *P. aeruginosa*, the MBC values were reported as 375.00±129.90 µg/mL and 450.00±0.00 µg/mL, respectively. Considering the biosynthesized gold nanoparticles, the highest zone of inhibition (ZOI) was attributed to *B. cereus* (19.20 mm) and *S. aureus* (16.76 mm), while the lowest ZOI values were observed for *E. coli* (13.10 mm) and *P. aeruginosa* (12.23 mm). In general, a significant difference ( $P\text{-value} \leq 0.001$ ) was observed between Gram-negative and Gram-positive bacteria considering the antibacterial properties of biosynthesized gold nanoparticles, but no significant differences were found within each bacterial population.

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Poster Presentation ID: 36

### Composition of the Essential Oils of Wild and Cultivated *Thymus lancifolus* from Fars Province, Iran

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#### ARTICLE INFO

*Keywords:*

*Thymus lancifolius*

Essential oil

Wild

Cultivated

#### ABSTRACT

This investigation compared the chemical compositions of wild and cultivated *Thymus lancifolus* (Lamiaceae) essential oils (EOs). Wild populations of *Th. lancifolus* were collected from three natural habitats in Fars province, and the EOs from both wild and cultivated plants were evaluated. The study found that wild plants had a higher EO yield (1.3-3.3% of dried material) compared to cultivated plants (1.2%). Gas chromatography (GC) and gas chromatography-mass spectrometry (GC-MS) were used to examine the chemical composition of the EOs. The wild plants' EO had 20-22 identified components, which accounted for over 90% of the total oil constituents, while the cultivated plants' EO had 18 identified components, representing 86.1% of them. The main components of the wild populations' EO were Thymol, Carvacrol, Borneol, P-Cymene,  $\gamma$ -Terpinene, Cineole, E-Caryophyllene, and Linalool. The main components of the cultivated *Th. lancifolus* EO were Thymol, Carvacrol, P-Cymene, Linalool, Cineole, and  $\gamma$ -Terpinene. The study concluded that the main compounds were the same in the wild and cultivated plants' EOs, and cultivation mainly influenced EO yields while the EO composition remained mostly constant [1,2].

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

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Poster Presentation ID: 32

### Investigation of Natural and Bioactive Compounds, Thymol and Carvacrol, of Wild and Cultivated *Thymus daenensis* in Farse, Iran

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#### ARTICLE INFO

Keywords:

*Thymus daenensis*

Essential oil

Thymol

Carvacrol

#### ABSTRACT

Thymol and carvacrol are active ingredients of family *Lamiaceae*; these components have antibacterial, antifungal, insecticidal, and anti-oxidative properties. The aim of this study was to investigate and compare the main components of wild and cultivated *Thymus* essential oil. The aerial parts of wild populations of *Th. daenensis* were collected from three natural habitats of Fars province. EO composition and yield of cultivated and wild growing plants have been also evaluated. Higher oil yield was observed in plants growing wild (1.3–1.9% of dried material) than in cultivated plants (1.1%). The chemical composition of the EOs were examined by GC and GC–MS. 21–22 components were identified from the wild plants EOs, that represent more than 92.0–93.7% of the total oil constituents, and 19 components were identified from the cultivated plants EO, that represent 89.1% of them. The major components of wild populations were Carvacrol (40.5–74.3%), Thymol (7.6–30.9%), P-Cymene (3.7–5.4%), Borneol (2.3–3.4%),  $\gamma$ -Terpinene (1.5–2.3%), Cineole (1.6–2.9%), E-Caryophyllene (1.1–1.5%) and Linalool (1.0–1.3%). The major components of the cultivated *Th. lancifolius* EO were Carvacrol (57.6%), Thymol (16.3), P-Cymene (5.4%), Cineole (4.4%), Linalool (2.6%),  $\gamma$ -Terpinene (2.5%), and Borneol (1.1%). The study results implied that wild and cultivated *Th. daenensis* EO are valuable sources of thymol and carvacrol. It is suggested to use in cosmetic, food, and pharmaceutical industries [1,2].

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