ACECR
Academic Center for Education, Culture and Research

IMP
Institute of Medicinal Plants

Journal of Medicinal Plants

Proceeding
2

10th National Congress on Medicinal Plants

12 & 13 July 2023

Urmia, Iran

JOURNAL OF MEDICINAL PLANTS

Proceeding 2

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran

Indexing Databases:
- Scopus
- Chemical Abstracts
- DOAJ
- Google Scholar
- Index Copernicus
- IMEMR
- SID
- ISC
- Magiran

Director-in-Charge:
R. Ghafarzadegan (PhD)
Institute of Medicinal Plants, ACECR, Iran

Editor-in-Chief:
F. Khalighi-Sigaroodi (PhD)
Institute of Medicinal Plants, ACECR, Iran

Section Editors:
F. Khalighi-Sigaroodi (PhD)
S. Kianbakht (PhD)
MR. Labbafi (PhD)
N. Zarrinpanjeh (PhD)

Executive Manager:
MR. Labbafi (PhD)

Executive Board:
L. Ghavipanjeh
H. Ghavipanjeh

EDITORIAL BOARD

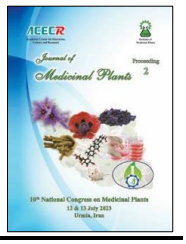
Bernáth J.	Hungarian University of Agriculture and Life Sciences, Hungary	Başer K.H.C.	Near East University, Turkey
Demirci F.	Anadolu University, TURKEY	El Sayed A.M.	Cairo University, Egypt
Fallah-Huseini H.	Institute of Medicinal Plants, ACECR, Iran	Ghasemi Pirbalouti A.	Islamic Azad University, Iran
Hajiaghaee R.	Institute of Medicinal Plants, ACECR, Iran	Hajimehdipoor H.	Shahid Beheshti University of Medical Sciences, Iran
Hosseinzadeh H.	Mashhad University of Medical Sciences, Iran	Iranshahi M.	Mashhad University of Medical Sciences, Iran
Jamshidi A.H.	Iran University of Medical Sciences, Iran	Jazaeri F.	Tehran University of Medical Sciences, Iran
Khalighi-Sigaroodi F.	Institute of Medicinal Plants, ACECR, Iran	Khanavi M.	Tehran University of Medical Sciences, Iran
Kianbakht S.	Institute of Medicinal Plants, ACECR, Iran	Kozuharova E.	Medical University of Sofia, Bulgaria
Mirjalili M.H.	Shahid Beheshti University, Iran	Mojab F.	Shahid Beheshti University of Medical Sciences, Iran
Naghdi Badi H.	Institute of Medicinal Plants, ACECR, Iran	Qaderi A.	Institute of Medicinal Plants, ACECR, Iran
Rafieian-Kopaei M.	Basic Health Sciences Institute, Iran	Rezazadeh S.	Institute of Medicinal Plants, ACECR, Iran
Sarker S.D.	Liverpool John Moores University, UK	Shekhawat G.S.	Jai Narain Vyas Universitydisabled, Jodhpur, India
Skaltsounis A.L.	University of Athens, Greece	Ziai S.A.	Shahid Beheshti University of Medical Sciences, Iran

Copyright © 2023 by Institute of Medicinal Plants, ACECR. All rights reserved.

Owner & Publisher: Institute of Medicinal Plants, ACECR

Address: No. 43, Forsat St., North Jamalzadeh St., Enghelab Ave., Tehran, Iran
P.O.Box: 13145-1446
Tel: +98 21 66561050; Fax: +98 21 66561491
E-mail: info@jmp.ir
Journal homepage: www.jmp.ir

10th National Congress on Medicinal Plants



Welcome Message

Dear Colleagues and Friends

It is my great pleasure and honor, on behalf of the National Network of Research and Technology in Medicinal Plants, to welcome you to the 10th National Congress of Medicinal Plants (NCMP2023) in the beautiful city of Urmia, West-Azarbaijan, Iran. We are honored to host researchers in the field of medicinal plants and related subjects and hope to follow in the successful footsteps of the previous meetings.

The meeting will provide a platform for researchers to present the recent advances in the field of medicinal plants and their application in level-up the lifestyle of people and curing diseases. The topics will include pharmacy, medicine, agriculture and natural resources, biotechnology, basic sciences, herbal trades, and industrial applications. The program will also include a professional exhibition, allowing participants to exchange experiences and discuss with the producers and business sectors of medicinal plants and herbal medicines.

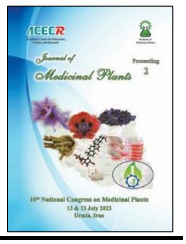
I would like to express my gratitude to the members of organizing committee for their invaluable efforts in setting up the program, our colleagues in the scientific committee for their thorough and timely reviewing of more than 450 papers, and our sponsors for their financial support that has helped us keep down the costs.

Sincerely,

Peyman Salehi, Ph.D.
Congress Scientific Chair

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Scientific Committee

Dr. Peyman Salehi, Scientific Chairman, Shahid Beheshti University
Dr. Valiollah Mozaffarian, Research Institute of Forests and Rangelands
Dr. Faraz Mojab, Shahid Beheshti University of Medical Sciences
Dr. Abbas Hasani, Urmia University
Dr. Abolfazl Alirezalu, Urmia University
Dr. Ali Rasouli, Iranian Veterinary Council
Dr. Ali Sonboli, Shahid Beheshti University
Dr. Alireza Ghassempour, Shahid Beheshti University
Dr. Amir Reza Jassbi, Shiraz University of Medical Sciences
Dr. Bahman Hosseini, Urmia University
Dr. Darab Yazdani, Institute of Medicinal Plants, ACECR
Dr. Faezeh Ganati, Tarbiat Modares University
Dr. Farahnaz Khalighi Sigaroodi, Institute of Medicinal Plants, ACECR
Dr. Farzad Najafi, Shahid Beheshti University
Dr. Fatemeh Sefidkon, Research Institute of Forests and Rangelands
Dr. Hasan Malekinejad, Uremia University of Medical Sciences
Dr. Hassan Rafati, Shahid Beheshti University
Dr. Hessameddin Akbarein, University of Tehran
Dr. Hossein Nazemiyeh, Tabriz University of Medical Sciences
Dr. Khosro Khajeh, Tarbiat Modares University
Dr. Leila Tabrizi, Tehran University
Dr. Mahdi Ayari, Tarbiat Modares University
Dr. Mahdi Moridi Farimani, Shahid Beheshti University
Dr. Majid Gorbani, Institute of Medicinal Plants, ACECR
Dr. Majid Shekarpour, Tehran University
Dr. Mehdi Mohammadzadeh, Shahid Beheshti University of Medical Sciences
Dr. Mehrdad Feizi, Shahid Beheshti University of Medical Sciences
Dr. Mohammad Ali Behdani, Birjand University
Dr. Mohammad Bagher Rezaie, Research Institute of Forests and Rangelands
Dr. Mohammad Fattahi, Urmia of the University
Dr. Mohammad Hossein Mirjalili, Shahid Beheshti University
Dr. Mohammad Javad Khoshnoud, Shiraz University of Medical Sciences
Dr. Mohammad Reza Naghavi, University of Tehran
Dr. Mohsen Farzaneh, Shahid Beheshti University
Dr. Nima Naderi, Shahid Beheshti University of Medical Sciences
Dr. Parnia Asghariyan, Tabriz University of Medical Sciences
Dr. Parvaneh Merrbod, Pasteur Institute of Iran
Dr. Samad Nejad Ebrahimi, Shahid Beheshti University
Dr. Shahrokh Kazempour, Tarbiat Modares University

Dr. Peyman Salehi, Scientific Chairman, Shahid Beheshti University
Dr. Valiollah Mozaffarian, Research Institute of Forests and Rangelands
Dr. Faraz Mojab, Shahid Beheshti University of Medical Sciences
Dr. Abbas Hasani, Urmia University
Dr. Abolfazl Alirezalu, Urmia University
Dr. Ali Rasouli, Iranian Veterinary Council
Dr. Ali Sonboli, Shahid Beheshti University
Dr. Alireza Ghassempour, Shahid Beheshti University
Dr. Amir Reza Jassbi, Shiraz University of Medical Sciences
Dr. Bahman Hosseini, Urmia University
Dr. Darab Yazdani, Institute of Medicinal Plants, ACECR
Dr. Faezeh Ganati, Tarbiat Modares University
Dr. Farahnaz Khalighi Sigaroodi, Institute of Medicinal Plants, ACECR
Dr. Farzad Najafi, Shahid Beheshti University
Dr. Fatemeh Sefidkon, Research Institute of Forests and Rangelands
Dr. Hasan Malekinejad, Uremia University of Medical Sciences
Dr. Hassan Rafati, Shahid Beheshti University
Dr. Hessameddin Akbarein, University of Tehran
Dr. Hossein Nazemiyeh, Tabriz University of Medical Sciences
Dr. Khosro Khajeh, Tarbiat Modares University
Dr. Leila Tabrizi, Tehran University
Dr. Mahdi Ayari, Tarbiat Modares University
Dr. Mahdi Moridi Farimani, Shahid Beheshti University
Dr. Majid Gorbani, Institute of Medicinal Plants, ACECR
Dr. Majid Shekarpour, Tehran University
Dr. Mehdi Mohammadzadeh, Shahid Beheshti University of Medical Sciences
Dr. Mehrdad Feizi, Shahid Beheshti University of Medical Sciences
Dr. Mohammad Ali Behdani, Birjand University
Dr. Mohammad Bagher Rezaie, Research Institute of Forests and Rangelands
Dr. Mohammad Fattahi, Urmia of the University
Dr. Mohammad Hossein Mirjalili, Shahid Beheshti University
Dr. Mohammad Javad Khoshnoud, Shiraz University of Medical Sciences
Dr. Mohammad Reza Naghavi, University of Tehran
Dr. Mohsen Farzaneh, ***Shahid Beheshti University***
Dr. Nima Naderi, Shahid Beheshti University of Medical Sciences
Dr. Parnia Asghariyan, Tabriz University of Medical Sciences
Dr. Parvaneh Merrbod, Pasteur Institute of Iran
Dr. Samad Nejad Ebrahimi, Shahid Beheshti University
Dr. Shahrokh Kazempour, Tarbiat Modares University

Organizing Committee

Dr. Samad Nejad Ebrahimi, Medicinal Plants and Drug Research Institute, Shahid Beheshti University
Mrs. Azadeh Yaghoubian, National Network of Research and Technology in Medicinal Plants
Mrs. Leila Ghavipanjeh, Expert in Executive Affairs, Institute of Medicinal Plants, ACECR

Dr. Abolfazl Alirezalu, Urmia University

Mrs. Maryam Talebi, National Network of Research and Technology in Medicinal Plants
Mrs. Hajar Ghavipanjeh, Expert in Executive Affairs, Institute of Medicinal Plants, ACECR

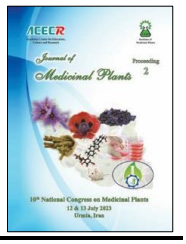
Oral Presentation

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Oral Presentation ID:

Metabolic disorders and herbal medicine

Hassan Malekinejad [1, 2]

[1]*Experimental & Applied Pharmaceutical Sciences Research Center, Urmia University of Medical Sciences, Urmia, Iran*
[2]*Department of Pharmacology and Toxicology, School of Pharmacy, Urmia University of Medical Sciences, Urmia, Iran*

ARTICLE INFO

Keywords:
Metabolic disorders
Insulin resistance
Liver
Ovary
Protective effects

ABSTRACT

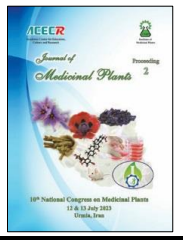
Nonalcoholic fatty liver disease (NAFLD) and polycystic ovarian syndrome (PCOS) are two known and closely related metabolic disorders. Therefore, it is scientifically and practically accepted that there are some overlapping points between these two metabolic disorders, which requires treatment approaches that be able to target those similar abnormalities. In this study the possible protective effects of Lupeol (LPL), as a pentacyclic triterpenoid, on both disorders in separate and simultaneous forms was studied. Both metabolic disorders were induced in the mice and the NAFLD or PCOS-positive mice were received LPL and or metformin for 28 days. Following the treatment period, various target organs were collected and subjected to biochemical and histopathological examinations. Results revealed that LPL was able to reduce the NAFLD -elevated hepatic functional enzymes level and lowered serum level of total cholesterol, total triglycerides. LPL also lowered the NAFLD-induced insulin resistance index and the PCOS-elevated testosterone level. Ultimately, the protective effects of LPL on hepatic injuries including lipid accumulation in the liver and reduction of atretic follicles in the ovary were highlighted. Results of the current study suggest that LPL could be a novel candidate for further studies as a protective agent in the protection from physio-pathologically-related metabolic disorders of NAFLD and PCOS.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Oral Presentation ID:

The application of metabolomics of plant secondary metabolites in *plant* stress management

Seyed Mehdi Razavi[1]

[1]*Department of Biology, Faculty of, Science, University of Mohaghegh Ardabili, Ardabil, Iran*
E-mail: razavi694@gmail.com

ARTICLE INFO

Keywords:
Metablomics
Environmental stress
Essential oil

ABSTRACT

In the recent years, new efforts to analyses of cell products such as genes, transcriptomes, proteins and then metabolites tend to appear a new scientific field as omics studies considering a division of system biology. Systems biology is a biology-based interdisciplinary field of study that focuses on complex interactions within biological systems, using a holistic approach to biological research. Metabolomics in accompanied with genomics, transcriptomics and protomics are regarded as different division of omics studied. In metabolomics, total metabolites of a lining cell were screening to achieve a global view of the state of the system. Different environmental stress such as drought or salinity influence plant secondary metabolites profile. Thus, metabolomics studies can be used as a suitable way to manage plant environmental stress process like identification of tolerance mechanisms in plants and determination of stress tolerant plant populations. Due to rapid analyzing using GC-MS technique, plant volatile secondary metabolites making essential oils are good candidate for this studied. This studies are perfumed in continuous stages as: 1-Biological knowledge acquisition 2-Sample preparation 3- Data acquisition using GC_MS 4- Data Processing by multivariate statistical analysis 5-Biological interpretation. The multivariate analysis involve Principle component analyze (PCA) and Partial Least Squares regression (PLSD) methods to find correlation between plant essential oil components and environmental stress factors. The results are illustrated by VIP score and heat map plots.

References

1. Kasture, V.S., Musmade, D.S., Vakte, M.B., Sonawane, S.B. and Patil, P.P. (2012). Metabolomics: current technologies and future trends. *Int. J. Res. Dev. Pharm. Life Sci*. 2(1): 206-217.

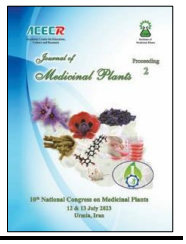
2. Riekeberg, E. and Powers, R. (2017). New frontiers in metabolomics: from measurement to insight" (2017). Robert Power Publications. 70.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Oral Presentation ID: 411

Chemodiversity of essential oil composition in Iranian *Tanacetum* (Compositae-Anthemideae) species

Ali Sonboli*[1], Naser Nasiri[1], Hamed Shamkhani[1], Mehran Mojarrad[2]

[1]*Department of Biology, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, 1983969411, Tehran, Iran*
[2] *Department of Biology, Payame Noor University, P.O. Box: 19395-3697, Tehran, Iran*
E-mail: a-sonboli@sbu.ac.ir

ARTICLE INFO

Keywords:
Asteraceae
Essential oil
Chemotaxonomy
Iran

ABSTRACT

Tanacetum L. is a species-rich genus of 160 species and ranks as the third largest genus of the tribe Anthemideae of Asteraceae after *Artemisia* L. and *Anthemis* L. It now appears that 36 species of the genus are distributed naturally in Iran, of which 16 are endemic. In this research, chemodiversity of essential oil composition of Iranian *Tanacetum* species has been reviewed. The essential oil composition of *T. budjnurdense* has been reported for the first time. Also, this investigation summarizes some of the main reports on the chemistry of *Tanacetum* essential oils from the data in the recent literature (1999-2022). *Tanacetum* species generally have essential oils with a high content of camphor, 1,8-cineole, chrysanthenyl alcohols and esters, thujone and borneol. In rare occasions some *Tanacetum* species *viz. T. balsamita* was also found to be rich in carvone. The literature survey revealed that α-cadinol (35.3%) in *T. sonbolii*, camphor (50.5 %) in *T. parthenium* and carvone (51.0%) in *T. balsamita* were found to be the main compounds [1-3]. The presence of different constituents as the major essential oil compounds in *Tanacetum* species could be considered as a diagnostic chemotaxonomic marker for species identification.

References

1. Firozy M, Talebpour Z, Sonboli A. Essential oil composition and antioxidant activities of the various extracts of *Tanacetum sonbolii* Mozaff. (Asteraceae) from Iran. *Natural Product Research* 2012; 26: 2204-2207.

2. Mirjalili MH, Salehi P, Sonboli A, Mohammadi Vala M. Essential oil composition of feverfew (*Tanacetum parthenium*) in wild and cultivated populations from Iran. *Chemistry of Natural Compounds* 2007; 43: 218-220.

3. Yousefzadi M, Nejad Ebrahimi S, Sonboli A, Miraghasi F, Ghiasi S, Arman M, Mosaffae N. Cytotoxicity, Antimicrobial Activity and Composition of Essential Oil from *Tanacetum balsamita* L. subsp. *balsamita*. *Natural Products Communications* 2009; 4: 119-122.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran

Oral Presentation ID:

Medicinal and Aromatic plants of Compositae Family in Iran

Valiollah Mozaffarian[1,*]

[1]*Member of Scientific Board of Research Institute of Forests and Rangelands, Department of Botany, Retired*

ARTICLE INFO

Keywords:
Alkaloids
Polyphenolic contents
GABA

ABSTRACT

The family Asteraceae or Compositae with approximately 1590 genera and 23600 species is one of the largest plant families in the world (Mabberley 2008). And with nearly 170 genera and 1000 species, it is the second largest plant family in terms of the number of species after the Leguminosae family and the first family in terms of the number of genera in Iran. One of the characteristics of this family is the diversity of its vegetative form and the uniformity of its reproductive system. Annual, biennial or perennial herbs, or sometimes shrubs, tissues lactiferous or not. Leaves alternate, sometimes opposite, exstipulate or rarely stipulate, entire, toothed, lobed or variously dissected. Individual flowers usually numerous, rarely one, sessile and aggregated into a capitulum surrounded by a protective involucre of 1-many series of phyllaries (involucral bracts), rarely fused. Capitula are sometimes aggregated into a secondary Capitulum like-head, called pseudocephalium. Receptacle naked or with straw-like scales (Palea), long hair or bristle. Flowers epigynous, either all hermaphrodite and protandrous, or female, male or neuter (sterile). Calyx represented on apex of ovary by a Pappus (enlarging in fruit) of hairs, bristles, scales or awns, or by a ± continuous corona (crown); Pappus sometimes completely absent. Corolla gamopetalous, tubular (infundibular, or narrowly cylindrical below and campanulate above), filiform, ligulate or rarely bilabiate, usually 3- or 5-toothed; rarely absent. Stamens (4-)5, epipetalous, filaments usually free; anthers laterally united into a cylinder round the style, rarely free; dehiscence introrse. Ovary inferior, 1-celled, with 1 basal anatropous ovule; style usually divided above into 2 branches, the styles of the disc flowers often bearing collecting (brush) hairs that sweep the pollen from the anther cylinder. Fruit an achene (cypsela), usually bearing a persistent or deciduous pappus that is sessile or borne on a beak (rostrum). Depend on the geographical distribution and the number of genera and species in this family, a few of its species are known as medicinal plants, but a significant number of plant species of the tribes Astereae, Anthemideae, Inuleae are included in the ranks of aromatic plants.

Some of the largest genus and their species of this family are:
Anthemis 39 species and 15 Endemic species
Artemisia 44 species and 8 Endemic species
Centaurea 83 species and 27 Endemic species
Cousinia 210-311 Species and 226 Endemic species
Echinops 72 species and 57 Endemic species
Scorzonera 57 species and 20 Endemic species
Tanacetum 39 species and 17 Endemic species
Taraxacum 57 species and 6 Endemic species

For the ease of identification, the plants of this family in Iran are classified into 12 tribes based on the characteristics of the reproductive system. The largest tribes of this family in Iran include Cynareae, Lactuceae, Anthemideae, and Artemisia, Achillea, Anthemis and Tanacetum are among the largest genera containing aromatic species. The genera and medicinal species of this family are scattered in different tribes, and it can be said that the Anthemideae tribe contains the most medicinal species of this family. Medicinal Genus which includes medicinal species are:
Achillea, Anthemis, Ambrosia, Artemisia, Aster, Bellis, Bidens, Calendula, Carlina, Carpesium, Carthamus, Centaurea, Chrysanthemum, Cichorium, Cirsium, Cnicus, Conyza, Doronicum, Echinops, Eclipta, Eupatorium, Francoeuria, Gnaphakium, Gundelia, Helianthus, Hertia, Hieracium, Inula, Lactuca, Lapsana, Leucanthemum, Matricaria, Onopordon, Petasites, Phagnalon, Platychaete, Pulicaria, Senecio, Sigeabeckia, Silybum, Sonchus, Solidago, Tanacetum, Tragopogon, Tripleurospermum, Tussilago, Xanthium

The genera including medicinal plant species planted in this family in Iran are:
Ageratum, Cichorium, Cynara, Echinacea, Grindelia, Helianthus, Lactuca, Solidago, Tagetes and Tanacetum

References

1. Davis P.H. Flora of Turkey, V. 5, Edinburgh at the University Press 1975
2. Mabberley D. J., A portable dictionary of plants, their classification and uses, Third Edition, Cambridge University press 2008
3. Mozaffarian V. Identification of Medicinal and Aromatic Plants of Iran, Farhang Moaser, Tehran, 2013
4. Rechinger K.H. Flora Iranica, Akademische Druck- U. Verlagsanstdt, Graz 1963-2015.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran

Oral Presentation ID:

The role of medicinal plants in rheumatoid arthritis

Parina Asgharian*

[1]*Department of pharmacognosy, School of pharmacy, Tabriz University of Medical Sciences, Tabriz, Iran. Iran*
E-mail: parina.asgharian@gmail.com, Asgharianp@tbzmed.ac.ir

ARTICLE INFO

Keywords:
Rheumatoid arthritis
Pharmaceutical compounds
Iridoides
Ethnopharmacology

ABSTRACT

Rheumatoid arthritis (RA) is a chronic, inflammatory, autoimmune disease, which affects synovial tissue in multiple joints. As various medicinal plants are traditionally and pharmaceutical compounds used for the management of symptomatology associated with RA in Persian medicine, we will present Herbal medicines to confirm their efficacy in the management of RA. Herbal medicines along with some herbal pharmaceutical compounds (which are available in drug store) achieved some results to some extent in the treatment of rheumatoid arthritis (RA). Especially in Iran formulas are used in the clinic because of their advantages. Some of these formulas have been used for thousands of years in ancient Iran and China, they pays much attention to strengthening healthy, cleaning heat, and wet, activating blood, etc. So Iranian Medicine in anti-RA drug is considered as a simple and effective method. In addition, Herbal medicines are also traditionally used as extracts and many Iranian herbs which are considered to be effective for RA. With the advancement of technologies and research methods, researchers have devoted themselves to exploring new therapeutic materials from troves of Iranian Medicine. In this presentation, we will mention the efficacy of herbal pharmaceutical compounds which available in the Irans market and in the world. Moreover, we will discuss about the pharmaceutical ingredients (such as Iridoieds, coumarins, flavonoids, saponins and so on) as well as pharmacological effects along with side effects.

References

1. Yin W et al. Analgesic and anti-inflammatory properties of brucine and brucine N-oxide extracted from seeds of Strychnos nux-vomica. *J. Ethnopharmacol*. 2003; 88: 205-214

2. Cameron M et al. Evidence of effectiveness of herbal medicinal products in the treatment of arthritis Part 1: osteoarthritis. *Phytother. Res.* 2009; 23: 1497-1515.

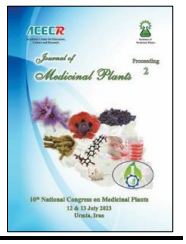
3. Soeken KL et al. Herbal medicines for the treatment of rheumatoid arthritis: a systematic review. *Rheumatology* 2003; 42: 652-659.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Oral Presentation ID: 38

Grain Yield and Quality of Blessed thistle Affected by Plant Density and Nutrition System

Majid AghaAlikhani[1,*], Negar Ebrahimi[1], Eshagh Keshtkar[1]

[1]*Department of Agronomy, Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran*
E-mail: maghaalikhani @modares.ac.ir

ARTICLE INFO

Keywords:
Fertilizer
Seed production
Oil yield
Fatty acids Profile
Cnicus benedictus L.

ABSTRACT

In order to evaluate grain yield and quality of the Blessed thistle (*Cnicus benedictus* L.) influenced by plant density(D)and nutrition system(N), an split plot experiment using RCBD was conducted at research field of Tarbiat Modares University on 2020- 2021. Nutrition system (control, chemical, biological and integrated) and plant density (67000, 100000 and 133000 plants/ha) were arranged in main and sub plots respectively. Morphological and vegetative traits (plant height, branches number, leaf area index, SPAD value and standing crop biomass were measured at 50% flowering stage. Also the grain yield and quality (oil yield and fatty acids profile) were measured at grain physiological maturity. Results showed the main effect of N on plant height and SPAD value was significant. The highest branches number was obtained under interaction of biological fertilizer and density of 67000 plant/ha. The maximum LAI (2.415) were measured at density of 100000 plants/ha under chemical and biological integrated system. The Higher plant densities, the higher amount of photosynthetic pigments. D×N interaction effect on all quantitative and qualitative characteristics of grain yield (except for 1000 seed weight, harvest index, oil content) was significant. Regarding to the oil content (22.13%) and the highest grain yield (5091.5 kg/ha), the maximum oil yield (1126.7 kg/ha) were obtained at density of 100,000 plants/ha with chemical and integrated nutrition system. The majority of the fatty acids of the oil were unsaturated, of which linoleic acid (72%) and oleic acid (23%) accounted for the highest amount. Linolenic acid was affected by the nutrition system, and its maximum amount was obtained under biological fertilizer.

References

1. Dong H, Kong X, Li W, Tang W. Zhang D. Effects of plant density and nitrogen and potassium fertilization on cotton yield and uptake of major nutrients in two fields with varying fertility. *Field Crops Research*, 2010; 119(1), 106-113.

2. Ghiasy-Oskoee M, Hatterman-Valenti H, Monono E, AghaAlikhani M. Blessed thistle a promising species on North Dakota, USA marginal lands: Agronomic productivity, oil properties and biodiesel potential. *Ecological Engineering*, 2020; 155 (1) 105908.

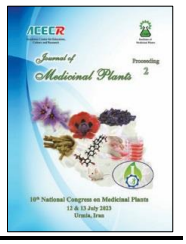
3. Ghiasy -Oskoee M, AghaAlikhani M, Mokhtassi-Bidgoli A, Sefidkon F, Ayyari M. Blessed thistle growth, essential oil content, yield and constitutes as influenced by plant density and nitrogen fertilizer. *Journal of Essential Oil Bearing Plants* 2020; 23 (2) 276 - 291.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Oral Presentation ID:

Side effects of herbal medicine focusing on Hepatotoxicity

Hadi Hamishehkar*

[1] *Department of clinical pharmacy, Tabriz University of medical sciences, Tabriz, Iran*

ARTICLE INFO

Keywords:
Herbal medicines
Complementary & alternative medicine
Hepatotoxicity
Herb-drug interaction

ABSTRACT

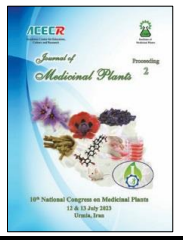
Herbal remedies may be associated with hepatotoxicity, making it important to discuss the use of herbal and dietary supplements (HDS) and complementary and alternative medical (CAM) therapies with patients to prevent potential complications, such as herb-drug interactions. The use of herbal remedies should be considered as a possible etiology in any setting of clinical manifestations of liver injury. Proving that an herbal or dietary supplement causes liver injury relies on both chronologic and clinical criteria. Features suggesting drug toxicity include lack of illness prior to ingesting the drug, clinical illness or biochemical abnormalities developing after beginning the drug, and improvement after the product is withdrawn. Obtaining a sample of the implicated HDS or CAM therapies for testing is possible, but expertise is not widely available. Costs are generally prohibitive, and most research laboratories are capable of testing only for certain compounds. The mainstay of therapy for herbal hepatotoxicity is withdrawal of the offending toxin and supportive care. A searchable database of drugs, herbal medications, and dietary supplements has been developed by the National Institutes of Health.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Oral Presentation ID:

Applications of medicinal plant extracts and essential oils on meat and meat products

Kazem Alirezalu[1,*]

[1] *Department of Food Science and Technology, Faculty of Agriculture, University of Tabriz*
E-mail: kazem.alirezalu@yahoo.com

ARTICLE INFO

Keywords:
Meat
Essential oils Plant extracts
Shelf life

ABSTRACT

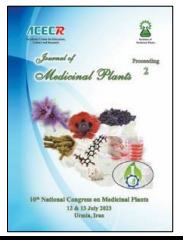
Meat and meat products are perishable due to their low oxidative stability, high content of unsaturated fatty acids and high moisture contents, and susceptibility to microbial spoilage which can lead to the creation of discoloration, off-flavors, and texture. To reduce quality losses and maintain the freshness, several types of chemical antimicrobial compounds including nitrite salts, sorbic acid, propionic acid, citric acid, benzoic acid, and different types of enzymes are utilized in the meat industry. The application of nitrite in meat industry allows the development of the typical characteristics of meat and meat products such as reddish-pink color, unique flavor and aroma, in addition to delay lipid and protein oxidations. It is also an effective additive for controlling Clostridium perfringens in meat and meat products, especially its spores. However, nitrite can lead to the formation of carcinogenic and mutagenic components, which can increase the risk of developing bladder, gastric, nasopharyngeal and esophageal cancers and anemia and jaundice disorders. The ability of bioactive compounds such as essential oils and plant extracts due to the presence of terpenoids and phenolic components in their composition to delay bacterial growth at meats makes them healthy alternatives to chemical antimicrobials and antioxidants in meat industry. Therefore, the essential oils and plant extracts could be effectively used for improving stability and shelf life of meat products.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Oral Presentation ID: 430

Effect of Elicitors on Secondary Metabolites Production in Hairy Root Cultures System

Bahman Hosseini[1,*], Ahad Hedayati[1,2*], Elnaz Norouzi[1,2], Shahla shameh[1]

[1] *Department of Horticulture, Faculty of Agriculture, Urmia University, Urmia, Iran*

[2] *Research Department of Secondary Metabolites Production in Bioreactor, Academic Center for Education, Culture and Research (ACECR), West Azarbayjan Branch, Urmia, Iran*

E-mail: b.hosseini@urmia.ac.ir

ARTICLE INFO

Keywords:
Elicitation
Hairy root
Hyoscyamine
Nanoparticles

ABSTRACT

Plants produce secondary metabolites with economically important as drugs, flavor and fragrances, dye and pigments, pesticides, and food additives. These compounds are influenced by a multitude of factors such as lower production level, non-uniformity of quality and supply of raw materials. The huge rise in demand for this natural and renewable product has caused the in vitro plant tissue cultures to be considered as an alternative for the production of important plant active compounds. Producing secondary metabolites by employing the plant tissue culture technology is still encountering biological and biotechnological constraints, such as a lower percentage of produced metabolites in this method. In order to increase secondary metabolite production in medicinal plants, different classic and modern approaches have been explored, such as growth media adaptation, elicitation, selection of high yielding cell lines, Immobilization, precursor feeding, large scale culture in bioreactor systems, and hairy root culture. Several approaches to increasing metabolite production in hairy root cultures have been described, such as elicitation, precursor feeding, biotransformation and metabolic engineering of the biosynthetic pathways [1]. Elicitation is a process that activates plant defense systems and can induce the production of specialized metabolites in plant cell cultures and increase the expression of genes involved in plant secondary metabolism pathways [2]. Nanoparticles (NPs) are a new group of elicitors that are used as stimulants for the production of valuable metabolites. Considering this, this research seeks to discern the effectiveness of using titanium dioxide, silicon dioxide and iron NP treatment on the produce active secondary metabolites as well as, over-expressing the key gene(s) involved in the biosynthetic pathway in *Hyoscyamus reticulatus* and *Dracocephalum kotschyi* hairy root culture (as important medicinal plants with valuable medicinal compounds).The application of nanotechnology and nanomaterials for elicitation is rapidly expanding and recent research indicates that nanoparticles can be used as an efficient elicitor to increase the production of tropane alkaloids and Methoxylated flavonoids in *Hyoscyamus* and *Dracocephalum* species, respectively. The results of this research indicate that different NPs play a decisive role on the expression of genes involved in the secondary metabolites biosynthetic pathways of these two plant species. Depending on the toxicity level and the activated of signaling pathways in the cell, these nano elicitors affected on the expression of the genes involved of secondary metabolites biosynthetic pathway.

References

1. Namdeo, A.G., 2007. Plant cell elicitation for production of secondary metabolites: a review. *Phcog. Rev*. 1 (1), 69–79.

2. Georgiev, M.I., Pavlov, A.I., Bley, T., 2007. Hairy root type plant in vitro systems as sources of bioactive substances. *Appl. Microbiol. Biotechnol*. 74, 1175–1185. https://doi.org/10.1007/s00253-007-0856-5.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran

Oral Presentation ID:

Challenges Associated with the Use of Plant-Derived Substances in Food Preservation

Mehran Moradi

Department of Food Hygiene and Quality Control, Faculty of Veterinary Medicine, Urmia University, Urmia, Iran

ARTICLE INFO

Keywords:
Essential oils
Food biopreservation
Food packaging
Plant extracts

ABSTRACT

Plant-derived substances, specifically essential oils and plant extracts, are widely used in food preservation because of their easy preparation, strong antimicrobial and antioxidant properties, international approval for food use, and consumer preference for natural ingredients. The primary goals of incorporating plant essential oils and extracts in food preservation are to inhibit the growth of pathogens, prevent spoilage, and enhance the taste and aroma of food. However, the utilization of these compounds in food preservation presents several challenges, including the need for quality standardization, potentially undesirable sensory effects (particularly with essential oils), undesired stability and solubility, interactions with food components (e.g., fat, protein, and carbohydrates), and potential interference with starter cultures. This paper aims to address these challenges and provide practical solutions for the effective utilization of essential oils and plant extracts for food preservation.

References

1. Bhavaniramya S., Vishnupriya S., Al-Aboody M. S., Vijayakumar R., and Baskaran, D. Role of essential oils in food safety: Antimicrobial and antioxidant applications. *Grain & Oil Science and Technology*, 2019; 2(2), 49–55. doi:10.1016/j.gaost.2019.03.001

2. Christaki S., Moschakis T., Kyriakoudi A., Biliaderis C. G., and Mourtzinos, I. Recent advances in plant essential oils and extracts: Delivery systems and potential uses as preservatives and antioxidants in cheese. *Trends in Food Science & Technology*, 2021; 116, 264–278. doi: 10.1016/j.tifs.2021.07.029

3. Sharafi H., Moradi, M., and Sharafi, K. A systematic review and meta-analysis of the use of plant essential oils and extracts in the development of antimicrobial edible films for dairy application. *Veterinary Research Forum*, 2023; 14(4), 179–194. doi:10.30466/vrf.2022.1986122.3730

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran

Oral Presentation ID: 429

A preliminary survey of the family Lamiaceae in W Azerbaijan, Iran

Shahram Bahadori[1,*], Ali Sonboli[2], Shahrokh Kazempour-Osaloo[3]

[1]*Central Herbarium of Tehran University, School of Biology, College of Science, University of Tehran, Tehran, Iran*

[2]*Department of Biology, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Evin, Tehran, Iran*

[3]*Department of Plant Biology, Faculty of Biological Sciences, Tarbiat Modares University, Tehran, Iran*

ARTICLE INFO

Keywords:
Endemic species
Lamiaceae
Medicinal species
Rare species
W Azerbaijan

ABSTRACT

Lamiaceae is of most prominent families in point of view of medicinal plants in the world. With over 400 species classified into 5 subfamilies and 43 genera, mints are known as the 4th largest plant family of the Flora of Iran. The present study based on both the related literature [1, 2] and extensive field considerations, surveys the status of Lamiaceae in W Azerbaijan province, Iran. Summarily, distribution of the family in this province is as followed: 4 subfamilies including Ajugoideae with 2 genera and 10 species, Scutellarioideae with 1 genus and 9 species, Lamioideae with 9 genera and 40 species and Nepetoideae with 16 genera and 80 species are present in the area. Approximately, one-third of all Lamiaceae species of Iran may be seen in W Azerbaijan. Noteworthily, near 11 species are endemic for the flora of Iran, of which 6 are roughly restricted to W Azerbaijan. Furthermore, 50-60 species could be considered rare, while more than 35 species are widespread. *Salvia* L. with 30 species followed by *Nepeta* L. with 19 species is the species-richest genus in the area. However *Scutellaria* L. and *Salvia* contain the highest number of local endemics. Occurrence of about 10 species in the area is documented for the first time as well. In addition, 3 non-native species of mints family in this area are vastly cultivated. Among the investigated plants some species such as *Mentha longifolia* (L.) L., *Origanum vulgare* L., *Satureja laxiflora* K.Koch, *S. macrantha* C.A.Mey., *Stachys inflata* Benth., *St. lavandulifolia* Vahl, *St. schtschegleevii* Sosn. ex Grossh., *Teucrium polium* L., *Thymus fallax* Fisch. & C.A.Mey., *Th. kotschyanus* Boiss. & Hohen., *Th. pubescens* Boiss. & Kotschy ex Čelak., *Ziziphora clinopodioides* Lam., *Z. persica* Bunge and *Z. tenuior* L. possessing medicinal properties and/or pleasant flavor and aroma are usually used by the native folk for medicinal or culinary purposes. *Dracocephalum moldavica* L. is a widely cultivated popular medicinal plant in W Azerbaijan, which generally its distillate is used for making a tasty healthful beverage. While no representative of *Lavandula* L. is present in the flora of area, a few species of cat mints such as *N. betonicifolia* C.A.Mey. and *N. menthoides* Boiss. & Buhse are consumed instead of lavender.

References:

1. Jamzad, Z. 2012. Lamaiceae. In: Assadi, M., Maassoumi, A. & Mozaffarian, V. (eds), Flora of Iran. Vol. 76. Research Institute of Forests & Rangelands, Tehran.

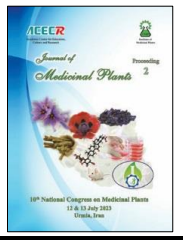
2. Rechinger, K.H., Hedge, I.C., Ietswaart, J.H., Jalas, J., Mennema, J., Seybold, S. 1982. Labiatae. In: Rechinger, K.H. (ed.), Flora Iranica. Vol. 150. Graz: Akademische Druck- und Verlagsanstalt.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Oral Presentation ID: 131

Fabrication of halochromic fibers utilizing the natural red pigment from pomegranate juice; mathematical modeling and molecular docking studies.

Mahshad Shahriari[1], Samad Nejad Ebrahimi[1,*], Masoud Rahimi[1]

[1]*Department of Phytochemistry, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Evin, Tehran, Iran*
E-mail: S_ebrahimi@sbu.ac.ir

ARTICLE INFO

Keywords:
Natural pigment
Adsorption resin
Pomegranate juice
Anthocyanins
Halochromic fibers

ABSTRACT

Pomegranate juice (PJ) is rich in polyphenolic compounds, particularly anthocyanins (ACNs), which are pH-sensitive and have high antioxidant activity (1). This study aimed to separate natural red pigment using LXA-10 adsorption resin in an efficient batch system and prepare pH-sensitive indicators for food freshness detection (2). In the optimum adsorption-desorption condition, the maximum of 94.0% adsorption and 93.3% desorption of ACNs were achieved. The enriched pigment was obtained in a polymeric matrix, and pH-sensitive indicators were prepared in two different formulations based on chitosan, PVA, and starch. Prepared fibers showed different colors in the presence of volatile ammonia compounds. The amount of The color changing (ΔE) reaches more than 12 in 6 and 26 min for F_1 and F_2 formulations which shows their good ability to identify food freshness and safety. FRAP assessment showed that the antioxidant activity of enriched pigment was 6.29 fold higher (8.8 ± 0.043 mmol Fe(II).L-1) than the original PJ (1.4 ± 0.051 mmol Fe(II).L-1) which evidences the high antioxidant activity of the prepared fibers (1.45 ± 0.06, and 1.02 ± 0.018 mmol Fe(II).g-1 for F1 and F2 formulations) in comparison with fiber without enriched pigment (0.02 ± 0.0025 mmol Fe(II).g-1). Moreover, the FTIR-ATR spectrum revealed the hydrogen interaction between ACNs and polymeric matrix which was also proved by molecular docking studies for the first time in this study. Docking study revealed that each ACNs interact with the polymeric matrix at least through four hydrogen bonds.

References

1. Ghosh S, Sarkar T, Das A, Chakraborty R. Natural colorants from plant pigments and their encapsulation: An emerging window for the food industry. Lwt. 2022; 153.

2. Akhila K, Sultana A, Ramakanth D, Gaikwad KK. Monitoring freshness of chicken using intelligent pH indicator packaging film composed of polyvinyl alcohol/guar gum integrated with Ipomoea coccinea extract. *Food Bioscience*. 2023; 52: 102397.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran

Oral Presentation ID:

Phytochemical screening and antioxidant activity of selected *Salvia* species

Atefeh Moshari-Nasirkandi[1], Abolfazl Alirezalu[1,*], Hadi Alipour[2], Jussara Amato[3]

[1]*Department of Horticultural Sciences, Faculty of Agriculture, Urmia University, Urmia, Iran*
[2]*Department of Plant Production and Genetics, Urmia University, Urmia, Iran*
[3]*Department of Pharmacy, University of Naples Federico II, Naples, Italy*
E-mail: a.alirezalu@urmia.ac.ir

ARTICLE INFO

Keywords:
Antioxidant activity
Phytochemicals
polyphenolic
Salvia

ABSTRACT

Salvia L. belongs to the Lamiaceae family and is utilized in a variety of industries, such as flavoring, cosmetics, perfumery, pharmaceuticals, and traditional medicine [1]. *Salvia* plants are recognized as a rich source of diverse secondary metabolites, particularly phenolic compounds, which exhibit potent antimicrobial and antioxidant properties [2]. To comprehensively evaluate 20 species of *Salvia* and identify potential sources of phytochemicals and antioxidants, a screening process was conducted. The analysis of the aerial parts of the 20 *Salvia* species included the determination of their total phenolic (TPC) and flavonoid (TFC) contents, tannin content (TTC), ascorbic acid (AAC), antioxidant activity (measured by DPPH and FRAP assays), and the identification of their polyphenolic compounds (such as gallic acid, chlorogenic acid, p-hydroxybenzoic acid, caffeic acid, p-coumaric acid, ferulic acid, rosmarinic acid, rutin, hyperosid, luteolin, and apigenin) using HPLC. The different *Salvia* species exhibited a wide variation in their phytochemical compounds and antioxidant properties. The *Salvia* species that showed the highest concentrations of phytochemical compounds (*S. verticillata* with 62.46 mg GAE/g DW for TPC and 16.85 mg Que/g DW for TFC, *S. limbata* with 245.02 mg TAE/100g for TTC, and *S. multicaulis* with 49.70 mg AA/g DW for AAC). Furthermore, the *Salvia* species exhibited the highest antioxidant activity, as determined by the DPPH and FRAP assays, were *S. ceratophylla* with 68.93 µg/mL and *S. limbata* with 1090.55 mmol Fe^{++}/g dw, respectively. The major compounds identified in the *Salvia* species extracts were rosmarinic acid and hyperosid compounds.

References

1. Kocak, M. S., Sarikurkcu, C., Cengiz, M., Kocak, S., Uren, M. C. and Tepe, B. (2016). *Salvia* cadmica: Phenolic composition and biological activity. *Industrial Crops and Products*, 85, 204-212.
2. Cvetkovikj, I., Stefkov, G., Acevska, J., Stanoeva, J. P., Karapandzova, M., Stefova, M., Dimitrovska, A. and Kulevanova, S. (2013). Polyphenolic characterization and chromatographic methods for fast assessment of culinary *Salvia* species from South East Europe. *Journal of Chromatography A*, 1282, 38-45.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran

Oral Presentation ID:

Amplification of Antibacterial Activity of Eudragite E-100 Coated Natural Nanoemulsions Against a Food Born Pathogen using Microfluidic Technology

Zinab Moradi Alvand[1,2], Liana Parseghian[1], Masoud Rahimi[1], Hasan Rafati[1,*]

[1]*Department of Pharmaceutical Engineering, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*
[2]*Department of Phytochemistry, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*
E-mail: z_moradialvand@sbu.ac.ir

ARTICLE INFO

Keywords:
Nanoemulsion
Microfluidic System
Antibacterial activity
Eudragit E-100

ABSTRACT

In this work, the antibacterial activity of *Satureja Khusitanica* essential oil nanoemulsions improved by employing Eudragit E-100 (EE-100/SKEO NE) against *E. coli* bacterium. The optimum ch/SKEO NE with mean droplet size of 98 nm was attained at 4.15, 2.18, and 0.07 % w/w of surfactant, essential oil and Eudragit E-100, using Response Surface Methodology (RSM). Applying microfluidic system, the EE-100/SKEO NE resulted in improved antibacterial activity owing to the modification of surface properties [1]. The samples showed a significant rupturing effect on the *E. coli* bacterial cell membrane which resulted in a rapid release of cellular contents. This action was remarkably intensified by executing microfluidic system in parallel to the conventional method. Having treated the bacteria in the microfluidic system for 6 min with a 8 µg/mL concentration of EE/SKEO NE, the bacterial integrity started to disrupt quickly, and the activity was totally lost in a 10-min period at 37 µg/mL, while it took 5 h for a complete inhibition in the conventional method using the same concentration of EE/SKEO NE. It can be concluded that nanoemulsification of EOs using Eudragit E-100 coating can intensify the interaction of nanodroplets with the bacterial membrane, especially within the microfluidic system which provides high contact surface area.

References

1. Pawłowski L, Bartmański M, Mielewczyk-Gryń A, Cieślik B.M, Gajowiec G, Zieliński A, *Materials*. 2021; 14(16): 4533. doi.org/10.3390/ma14164533.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran

Oral Presentation ID: 105

Common mistakes and challenges in the analysis of medicinal plants

Farahnaz Khalighi-Sigaroodi*

Medicinal Plants Research Center, Institute of Medicinal Plants, ACECR, Karaj, Iran
E-mail: khalighi@imp.ac.ir

ARTICLE INFO

Keywords:
Standardization
Complexity
Techniques
Animal models
Validation

ABSTRACT

Medicinal plants have been used for centuries to treat various ailments and diseases. However, the analysis of medicinal plants is a complex process that requires careful consideration of various factors. This study discuss common mistakes and challenges in medicinal plant analysis. One of the most common mistakes in medicinal plant analysis is the lack of standardization in sample preparation and extraction methods. The chemical composition of medicinal plants can vary depending on various factors such as soil type, climate, harvesting time, and processing methods [1]. Therefore, it is essential to establish standardized protocols for sample collection, preparation, and analysis to ensure consistency and accuracy in results. The biggest challenge in medicinal plant analysis is the complexity of the chemical composition of plants. Medicinal plants contain numerous compounds, including alkaloids, flavonoids, terpenoids, and phenolic acids, which can vary depending on factors such as plant species, geographic location, and environmental conditions. Analyzing these compounds requires sophisticated techniques such as chromatography and mass spectrometry [2]. Another mistake is the use of inappropriate animal models for testing the efficacy of medicinal plant extracts. Many studies use animal models that do not accurately reflect human physiology or disease states, leading to inaccurate conclusions about a plant's therapeutic potential. The lack of appropriate controls is another mistake that is often made in medicinal plant analysis. Many studies do not include appropriate controls, such as negative controls or positive controls, which are necessary for validating the results obtained from a study. Without appropriate controls, it is difficult to determine whether any observed effects are due to the plant extract being tested or other factors. Furthermore, the presence of contaminants is another challenge in medicinal plant analysis. Contaminants such as heavy metals, pesticides, and microbial pathogens can affect the safety and efficacy of herbal medicines. Therefore, it is essential to conduct rigorous quality control measures during sample preparation and analysis to ensure that herbal medicines are free from harmful contaminants. In conclusion, medicinal plant analysis is a complex process that requires careful consideration of various factors such as standardization, identification of active compounds, and contamination control. Addressing these challenges will improve the quality and safety of herbal medicines and promote their integration into modern healthcare systems.

References

1. Muyumba NW., et al. Quality control of herbal drugs and preparations: The methods of analysis, their relevance and applications. *Talanta Open* 2021; 4: 100070. doi: 10.1016/j.talo.2021.100070.

2. Xie J., et al. Recent advances and effective strategies in the discovery and applications of natural products. *RSC Adv* 2018; 8: 812. doi: 10.1039/c7ra09475b.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran

Oral Presentation ID:

Synergistic cytotoxicity of peptides isolated from *Lucilia sericata* larvae and *Apis mellifera* honey on *Leishmania major* cells

Jila Sherafati[1], Mohammad Saaid Dayer[1, *], Fatemeh Ghaffarifar[1]

[1]*Department of Parasitology and Medical Entomology, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran*
E-mail: dayer@modares.ac.ir

ARTICLE INFO

Keywords:
Leishmaniasis
Lucilia sericata
Honey
Natural medicine
Maggot Therapy

ABSTRACT

Leishmaniasis is an endemic vector-borne disease in Iran that manifests in three clinical forms, of which Zoonotic Cutaneous Leishmaniasis (ZCL) is caused by *Leishmania major*. Since 2019, ZCL has spread at an incidence rate of 15.8 cases per 100,000 into new areas despite control measures (1). Drug resistance and/or host factors were the main reasons behind many failure reports on ZCL chemotherapy using antimonials (2). Therefore, alternative medicines are being assessed particularly of natural origin. This study evaluated leishmanicidal effects of *Lucilia sericata* larval excretion/secretion (ES) combined with honey against *L. major*. Two ES products, both crude and fractionated, as well as honey were prepared at serial dilutions and tested, as standalone and/or combined, against promastigotes and amastigotes engulfed by J774A.1 macrophage. The cytotoxicity was determined by direct counting method and MTT assay. The toxicity against amastigotes was measured as macrophage infection rate and amastigote counts per infected macrophages. The IC_{50} values for crude ES plus honey, ES fraction >10 kDa plus honey, ES fraction <10 kDa plus honey, and honey alone were 21.66 µg/ml, 43.25 60 µg/ml, 52.58 µg/ml, and 70.38 µg/ml respectively. The IC_{50} for glucantime was 27.03 µg/ml. The viability rates were significantly lower for promastigotes exposed to tested doses of biocides compared to negative control ($P \leq 0.0001$). The biocides applied at 150 to 300 µg/ml significantly reduced the infection rate and amastigote counts in infected macrophages without harming them. The isolated larval peptides in combination with honey reacted synergistically against *L. major* cells (3).

References

1. Charrahy Z, Yaghoobi-Ershadi MR, Shirzadi MR, Akhavan AA, Rassi Y, Hosseini SZ, Webb NJ, Haque U, Bozorg Omid F, Hanafi-Bojd AA. Climate change and its effect on the vulnerability to zoonotic cutaneous leishmaniasis in Iran. *Transbound Emerg Dis.* 2022; 69(3):1506-1520. doi: 10.1111/tbed.14115.

2. Soleimanifard S, Arjmand R, Saberi S, Salehi M, Hejazi SH. Treatment Outcome of the Drug-resistant Zoonotic Cutaneous Leishmaniasis by Glucantime. *Adv Biomed Res*. 2017; 6:17. doi: 10.4103/2277-9175.201329.

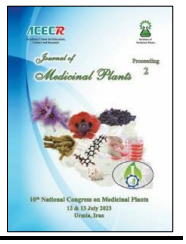
3. Sherafati J, Dayer MS, Ghaffarifar F. Therapeutic effects of *Lucilia sericata* larval excretion/secretion products on *Leishmania major* under in vitro and in vivo conditions. *Parasites & Vectors*. 2022; 15(1):1-12. doi: 10.1186/s13071-022-05322-7.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Oral Presentation ID: 51

Development and validation of a HPTLC-UV method for determination of polyamines in plant tissues: A comparative study with liquid chromatography-tandem mass spectrometry

Maryam Mohajeri[1*]

[1] *Phytochemistry Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran*
E-mail: Maryam.mohajeri66@gmail.com

ARTICLE INFO

Keywords:
Polyamine
HPTLC
LC-MS/MS
Benzoyl chloride
Correlation

ABSTRACT

Polyamines are important in several physiological processes, including cell proliferation, differentiation, and growth. Polyamine analysis has received a lot of attention in recent years because of its importance [1, 2]. In this study, a user-friendly and convenient quantification high performance thin layer chromatography (HPTLC) approach was developed and compared to liquid chromatography-tandem mass spectrometry (LC-MS/MS) employing benzoyl chloride as a derivatization agent of three abundant polyamines. The ideal conditions for the derivatization reaction were 60 µL of benzoyl chloride per milliliter of sample, 25 °C, and 10 minutes of vortex stirring of the mixture. As the mobile phase, chloroform/triethyl amine (4:1, v/v) was employed. For comparing the putrescine, spermidine, and spermine contents of various samples, HPTLC-UV and LC-MS/MS were used simultaneously. The two methods' Pearson correlation coefficients for putrescine, spermidine, and spermine, respectively, were 0.991, 0.993, and 0.983, confirming the applicability of both the HPTLC-UV method and the LC-MS/MS method. According to these results, the optimized HPTLC-UV method may be used as a practical analytical tool for routinely determining the levels of polyamines in various plant tissues and plant food.

References

1. Chattopadhayay, M. K., Tiwari, B. S., Chattopadhyay, G., Bose, A., Sengupta, D. N., & Ghosh, B. (2002). Protective role of exogenous polyamines on salinity-stressed rice (Oryza sativa) plants. *Physiologia Plantarum*, *116*(2), 192–199. https://doi.org/10.1034/j.1399-3054.2002.1160208.x

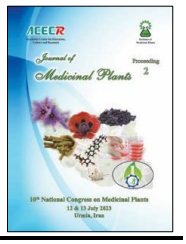
2. Todua, N. G., Camara, J. E., Murray, J. A., & Mikaia, A. I. (2018). Stepwise extraction, chemical modification, GC-MS separation, and determination of amino acids in human plasma # . *Separation Science Plus*, *1*(3), 177–189. https://doi.org/10.1002/sscp.201700043

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Oral Presentation ID: 73

Progeny test to identify superior clones of *Satureja rechingeri* Jamzad. to produce a synthetic variety

Ghasem Eghlima[1,*], Javad Hadian[2]

[1] *Department of Agriculture, Medicinal Plants and Drug Research Institute, Shahid Beheshti University, Tehran, Iran*
[2] *Department of Agriculture, University of the Fraser Valley, BC, Canada*
E-mail: gh_eghlima@sbu.ac.ir

ARTICLE INFO

Keywords:
Essential oil
Poly cross
Breeding
Satureja rechingeri

ABSTRACT

Satureja rechingeri, one of the endemic Savory in Iran, is an important plant in the pharmaceutical and food industries due to its high percentage of essential oils and high levels of carvacrol [1]. The first steps in the production of synthetic varieties is the selection of suitable parents among multiple candidates. This choice can be made through the evaluation of the parents themselves, the offspring of their self-fertilization, or the estimation of general compatibility resulting from their polycross progeny test [2]. Polycross test was performed in a randomized complete block design with 6 replications in 2018 and 2019, and half-sib progenies of the 58 parent clones were evaluated in a randomized complete block design with six replications. Different production biological traits as plant height, main branch numbers, lateral branch numbers, leaf width and length, fresh and dry weight, dry weight of leaves and flowers, and essential oil content and yield were evaluated at the full flowering stage. Results revealed a high level of general combining ability (GCA) for important traits such as plant height, plant fresh and dry weight, and leaf dry weight in clones of Z16, Z19, E41, G68, and G48 for essential oil percentage and in populations of K2 and F27 for yield. Overall, the results of this study indicated a high level of diversity for morphological and phytochemical traits in studied clones. Also, Z16, Z19, Z12, Z37, Z36, E41, G48, G68, and K48 half-sib families of *S. rechingeri* clones showed positive and high GCA which provide good opportunities for creating synthetic varieties.

References

1. Hadian J, Esmaeili H, Nadjafi F, KhadiviKhub A. Essential oil characterization of *Satureja rechingeri* in Iran. *Ind. Crops Prod*. 2014; 61: 403-409.

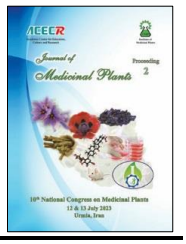
2. Hassiotisa CN, Tarantilis PA, Daferera D, Polissiou MG. Etherio, a new variety of Lavandula angustifolia with improved essential oil production and composition from natural selected genotypes. *Ind. Crops Prod*. 2010; 32: 77-82.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Oral Presentation ID:

Subcritical water and its applications in medicinal plants

Hoda Jafarizadeh-Malmiri [1,*]

[1]Faculty of Chemical engineering, Sahand University of Technology, East Azarbaijan, Tabriz, Iran[2] Academic
E-mail: h_jafarizadeh@sut.ac.ir

ARTICLE INFO

Keywords:
Subcritical water
Medicinal plants
Bioactive compounds

ABSTRACT

Medicinal plants are composed from numerous bioactive compounds which, those can be existed in the form of volatile and non-volatile in several parts of them such as steam, root, leaf, flower and buds. In fact, these bioactive compounds have gained more attentions by consumers and researchers due to their unique antimicrobial, anticancer, anti-inflammatory and antioxidant activities, which make those applicable in various areas including medicine, cosmetics and food. However, due to non-polar nature of the most of these valuable bioactive compounds, those have low solubility in aqueous media which, that limits its applications in pharmaceutical and food formulations. Extraction of these biomaterials have been widely done using organic solvents which these processes are time consuming with serious concerns related to the residuals of solvent in final products. Under pressurized water, with temperature ranging 100 to 374 °C and pressure of higher than 1 atmosphere, is boiling water in liquid stat, which, its polarity alters and tends into that of the organic solvents such as acetone, ethanol and methanol. This water is known as subcritical water. Using subcritical conditions, most of polar and non-polar bioactive compounds of the medicinal plants can be extracted by water and after getting out of these conditions, non-polar components are easily separated from water by participation of floatation. Several advantages of the subcritical water such as eco-friendly, cost-effective, does not need organic solvents and using water as a safe and available green solvent, make that more desirable and suitable in extraction of the valuable components of the medicinal plants, as compared to common extraction methods. Furthermore, using subcritical water, plant essential oil in water nanoemulsions can be easily prepared using minimum emulsifier content, which that is one the most attractive topics, these days.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran

Oral Presentation ID:

Response of *Satureja spicigera* to drying under gamma ray, storage conditions and duration

Mahdieh Jafari Ghoshchi[1], Bohloul Abbaszadeh[2,*], Mehdi Oraei[1], Razieh Azimi[2], Ali Faramarzi[1]

[1] *Department of Horticultural Sciences, Faculty of Agriculture, Miyaneh Branch, Islamic Azad University, Miyaneh, Iran*

[2] *Research Institute of Forests and Rangelands, Agricultural Research Education and Extension Organization (AREEO), Tehran, Iran*

E-mail: babaszadeh@rifr-ac.ir

ARTICLE INFO

Keywords:
Perennial Savory
Gamma rays
Thymol
Essential oil

ABSTRACT

Gamma irradiation is used as an efficient method to increase the durability of agricultural products after post-harvest by reducing the microbial load and disinfecting them without adverse effects. In this study, in order to investigate the effect of gamma ray as a selective method for drying plant material, storage conditions and storage duration on the percentage of essential oil, composition of essential oils and some physiological traits of *Satureja spicigera*, plant samples were collected at the flowering stage. Irradiation was performed at the Atomic Energy Organization. Gamma rays were irradiated at 5 levels of 0, 2.5, 5, 7.5 and 10 kGy (kilo gray). Storage was carried out in two conditions of refrigerator with 4 °C and room air. Maintenance time at three levels was 0, 120 and 240 hours. The experiment was performed as a factorial and in a completely randomized design with 3 replications. The results showed that the effect of gamma rays on the percentage of essential oil of the flowering shoot, the amount of compounds including p-cymene, thymol, carvacrol, phenol, and flavonoid, and antioxidant activity was significant at the level of 1%. Maintenance time had a significant effect on the percentage of essential oil, p-cymene, thymol and carvacrol. Storage conditions showed a significant effect on total phenol and flavonoid content, and antioxidant activity of ethanolic extract of *S. spicigera*. Comparison of the mean effect of gamma radiation showed that the highest percentage of essential oil with 1.12% and 1.03% were obtained from the control sample and 5 kgGy, respectively. The maximum amount of thymol (13.57%) was obtained from 10 kgGy and carvacrol in the control (34.73%) was higher than the others. With 2.5 kgGy, the amount of phenolic compounds increased by 1.4 equal and the antioxidant activity increased by 1.76 equal compared to the control sample. By keeping the plant in the refrigerator, the amount of thymol was reduced. The highest percentage of essential oil was related to storage for 120 hours, with plant storage, the amount of thymol increased and the amount of carvacrol decreased. In general, the use of high intensity gamma radiation is suitable for achieving high thymol essential oil. Using gamma rays to achieve high carvacrol essential oil is not suitable at all, and increases p-cymene and reduces the quality of essential oil. It is also not appropriate to use gamma rays for drying for essential oils.

References

1. Ebrahimi, S.N.; Farimani, M.M.; Mirzania, F.; Soltanipoor, M.A.; De Mieri, M.; Hamburger, M. *Journal of Natural Products*, **2014**, *77*, 848-854.

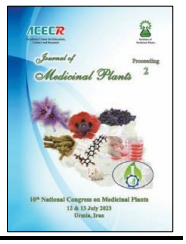
2. Mirzania, F., Moridi Farimani, M., Sarrafi, Y., Nejad Ebrahimi, S., Troppmair, J., Kwiatkowski, M., & Alilou, M. *Frontiers in Chemistry*, **2022**, *9*, 1166.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Oral Presentation ID:

Bioactive Natural Products Discovery Using Therapeutic Target Enzymes Inhibitory Approach

Mir Babak Bahadori

Medicinal Plants Research Center, Maragheh University of Medical Sciences, Maragheh, Iran
E-mail: mb.bahadori@gmail.com

ARTICLE INFO

ABSTRACT

Medicine in the twenty-first century has largely become a molecular science in which drug molecules are directed toward specific macromolecular targets whose bioactivity is pathogenic or at least associated with disease. Enzymes are excellent targets for pharmacological intervention, owing to their important roles in life processes and pathophysiology. The structures of enzyme active sites, and other ligand binding pockets on enzymes, are ideally suited for high-affinity interactions with drug-like inhibitors. Enzyme inhibitors are low molecular weight chemical molecules, which can decrease or totally inhibit the enzyme catalytic activity either irreversibly or reversibly. This is often used as a strategy for drug discovery and can provide insight into the mechanism of enzyme activity. Enzyme inhibitors target human enzymes and try to correct a pathological condition. They are often used as drugs, but can also be insecticides such as Malathion, herbicides such as glyphosate, or disinfectants such as Triclosan. As of 2017, an estimated 29% of approved drugs are enzyme inhibitors. Many drug molecules are enzyme inhibitors that inhibit an aberrant human enzyme or an enzyme critical for the survival of a pathogen such as a virus, bacterium, or parasite. Enzyme inhibitors may bind reversibly or irreversibly. Irreversible inhibitors form a chemical bond with the enzyme such that the enzyme is inhibited until the chemical bond is broken. Reversible inhibitors bind non-covalently and may spontaneously leave the enzyme, allowing the enzyme to resume its function. Enzyme inhibition is an important means of regulating activity in living cells. There are three basic types of enzyme inhibition: competitive, noncompetitive, and uncompetitive. In combination with molecular modeling and QSAR studies, enzyme inhibitory experiments are an applied and modern approach to drug discovery.

References

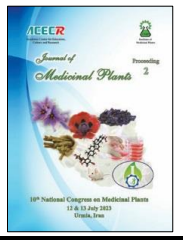
1. Yan, T.C., Cao, J. and Ye, L.H., **2022**. Recent advances on discovery of enzyme inhibitors from natural products using bioactivity screening. Journal of Separation Science, 45(14), pp.2766-2787.
2. Rollinger, J.M., Stuppner, H. and Langer, T., **2008**. Virtual screening for the discovery of bioactive natural products. Natural compounds as drugs Volume I, pp.211-249.
3. Harvey, A.L., 2008. Natural products in drug discovery. Drug discovery today, 13(19-20), pp.894-901.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Oral Presentation ID: 154

Introducing the Iranian ethnobotanical database

Mohammadreza Labbafi[1,*], Atefeh Babaei[2], Shahla Amini[1], Hamideh Khalaj[3], Narges sadat Latifi[4], Najmeh Havazadeh[5]

[1]*Medicinal Plants Research Center, Institute of Medicinal Plants, ACECR, Karaj, Iran*
[2]*Department of Plant Biology, Faculty of Biological Sciences, Tarbiat Modares University, Tehran, Iran*
[3]*Department of Agriculture, Payame Noor University, Tehran, Iran*
[4]*Department of Biology, Faculty of Science, University of Qom, Qom, Iran*
[5]*Department of Biotechnology, Falavarjan branch, Islamic Azad University, Esfahan, Iran*
E-mail: mlabbafy@gmail.com

ARTICLE INFO

Keywords:
Ethnobotany
Medicinal plants
Database
Herbal medicine

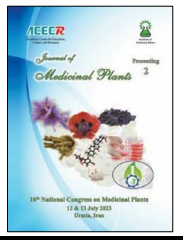
ABSTRACT

Due to the considerable phytogeographical position of Iran in SW Asia and its various climatic condition, Iran has a unique and diverse flora. It has been estimated that Iranian flora contains about 130 families and about 2,250 species of medicinal and aromatic plants [1]. Over the past few decades, the international trade of herbal products due to their usage in folk remedies has increased [2]. According to the presence of various ethnic groups in Iran, a mixture of different cultures can be seen that has a rich backbone of ethnobotanical knowledge. As there was no exhaustive and detailed database in this field, a comprehensive database was designed to collect and provide all the articles and theses related to ethnobotanical studies and medicinal plants in Iran. For this purpose, the information related to plants of each region and ethnic group of Iran was extracted. The information from about 200 articles and theses, 493 authors and researchers, more than 90 scientific journals, and over 2,000 medicinal and aromatic plant species were recorded in this database. The Iranian Ethnobotanical database consists of five main databases with search capabilities: Resources and Documents, Authors, Plants, Document Details, and Chemical Compounds. Medicinal plants of Iran as botanical wealth have unique capacities to serve as raw material for the synthesis of diverse products in the pharmaceutical industries; therefore, access to this valuable information can facilitate the production of herbal medicines as a suitable alternative to chemical and synthetic medicines. Iranian Ethnobotanical Database is limited accessible at: https://netplant.ir/ebotany.

References

1. Mozaffarian V. Identification of Medicinal and Aromatic Plants of Iran. Tehran: Farhang Moaser. 2013, 1444 pp.

2. Organización Mundial de la Salud, World Health Organization, WHO. WHO monographs on selected medicinal plants. World Health Organization; 1999.



Poster Presentation

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran

Poster Presentation ID:

Phytochemical Analyses and Biological Activities of three *Otostegia* Species in Iran

Amir Reza Jassbi, Mina Doorandishan, Najmeh Khalighian, Somayeh Pirhadi

[1] *Medicinal and Natural Products Chemistry Research Center, Shiraz University of Medical Sciences, Shiraz, Iran*
E-mail: jassbiar@sums.ac.ir

ARTICLE INFO

Keywords:
Otostegia
Rydingia persica
Rydingia michauxii
Moluccella aucheri
Labdane diterpenoids
Flavonoids

ABSTRACT

In Iran (Lamiaceae) three plants belong to the genus *Otostegia* Benth. are reported, namely *O. persica* (Burm.) Boiss., *O. aucheri* Boiss.; and *O. michauxii* Briq[1]. The first two species are reported in the South of Iran and Pakistan, while *O. michauxii* is restricted to the Fars province of Iran. Recently molecular and morphological studies classified *O. persica* and *O. michauxii* to the genus *Rydingia persica* (Burm.f.) A.-C. Scheen & V. A. Albert and *Rydingia michauxii* (Briq.) A.-C. Scheen & V. A. Albert while *O. aucheri* was changed to *Moluccella aucheri* (Boiss.) A.-C. Scheen [2]. We have isolated and identified several diterpenoids and flavonoids with antidiabetic and acetylcholine esterase activities. *ent*-Labda-8 (17),13-dien-18-oic acid-15,16-olide, its glycoside ester, and a trimethoxy flavone: 5, 4'-dihydroxy-6,7,3'-trimethoxy flavone (Eupatorin) were isolated from *R. michauxii*. 6ß-acetoxy- 9 α-hydroxy-7- oxa- labd-13-ene- 15, 16- olide ,5-hydroxy-7, 4-dimethoxyflavone and genkwanin were reported from *M. aucheri* [3]. Finally, four labdane diterpenoids: 15, 16-epoxy-3α, 7β, 9α-trihydroxylabdan-13-(16), 14-dien-6-one; 15, 16-epoxy-3α, 7α, 9α-trihydroxylabdan-13- (16), 14-dien-6-one; 9, 13, 15, 16-diepoxy- 3α, 7β, 15α (β)- trihydroxy-labdan-6-one were characterized in an ethyl acetate fraction of an ethanol extract of the aerial parts of *R. persica*. The structures of the compounds were elucidated by spectral data analyses of their ^{1}H and^{13}C NMR and ESIMS spectroscopy. The *in vitro* and in *silico* α-glucosidase and acetylcholine esterase activity of the isolated compounds are reported in this paper. **Acknowledgments:** The study was financially supported by the National Institutes for Medical Research Development (NIMAD), Tehran, Iran (grant number: 988197).

References

1. Mozaffarian V. A dictionary of Iranian plant names. Tehran: Farhang Moaser. 2003, 387.

2. Scheen AC, Albert VA. Molecular phylogenetics of the Leucas group (Lamioideae; Lamiaceae). *Syst Bot*. 2009;34(1):173-181.

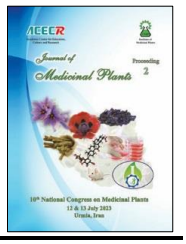
3. Doorandishan M, Pirhadi S, Swilam M. M, Gholami M, Ebrahimi P, El-Seedi H. R, Jassbi A. R. Molecular docking and simulation studies of a novel labdane type- diterpene from *Moluccella aucheri* Scheen (Syn. Otostegia aucheri) as human- AChE inhibitor. *J. Mol. Struct.* 2021. 1245, 131034.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 2

Phytochemical evaluation of the essential oils of *Prangos ferulacea* (L.) Lindl. seeds reported from the southern area of Isfahan province, Iran

Hamid Reza Farhang[1,*], Ali Reza Allafchian[2], Mohammad Reza Vahabi[1]

[1]*Department of Natural Resources, Isfahan University of Technology, Isfahan 84156–83111, Iran*
[2]*Research Institute for Nanotechnology and Advanced Materials, Isfahan University of Technology, Isfahan 84156–83111, Iran*
E-mail: hr.farhang@na.iut.ac.ir

ARTICLE INFO

Keywords:
Flowering period
Germplasm
Habitat
Reproductive group
Secondary metabolites

ABSTRACT

In general, in Iran's flora, medicinal plants have a very valuable placement in the production of various effective constituents so that the existence of diverse secondary metabolites associated with original germplasms and their unique therapeutic effects are widely known. Seed is a part of a plant that is used for reproduction which is the result of evolution and development of the reproductive growth stage and will begin to grow if the requirements are met [1]. *Prangos ferulacea* (L.) Lindl. belongs to the Apiaceae family and it is also a perennial and high medicinal plant with a height of 80 to 120 cm that grows wild in the mountainous regions of Iran [2]. The aim of this study was to isolate and identify the essential oils of *Prangos ferulacea* (L.) Lindl. seed through hydro-distillation method using Clevenger-type apparatus and analyzing by GC/MS. The study was performed in one of the major habitats of the mentioned plant situated in the south part of Isfahan province, Iran. The seeds of *Prangos ferulacea* (L.) Lindl. was collected from its major habitats at the end of the flowering periods. Then, they were air-dried, milled, and weighed in a certain quantity. The findings showed that 31 compounds belong to the two main chemical groups (i.e. the terpenoid compounds and siloxane compounds) and these compositions were identified coupled with some other chemical compounds. The major compounds were alpha-limonene (17.76 %), alpha-pinene (6.79 %), beta-pinene (5.93 %), alpha-bisabolol (5.09 %), and beta-phellandrene (4.87 %), respectively.

References

1. Bewley J. D, Black M. Seeds: Physiology of Development and Germination. New York: Plenum Press. 1994, 421.

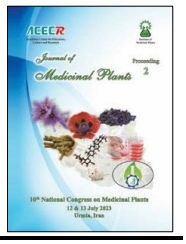
2. Ghahreman A. Chromophytes of Iran (plant systematics). Tehran: University Publishing Center. 1997, Vol. 2, 755.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 3

Identification of essential oil constituents of *Ferula gummosa* Boiss. seeds retrieved from the western area of Isfahan province, Iran

Hamid Reza Farhang[1,*], Ali Reza Allafchian[2], Mohammad Reza Vahabi[1]

[1]*Department of Natural Resources, Isfahan University of Technology, Isfahan 84156–83111, Iran*
[2]*Research Institute for Nanotechnology and Advanced Materials, Isfahan University of Technology, Isfahan 84156–83111, Iran*
E-mail: hr.farhang@na.iut.ac.ir

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.

References

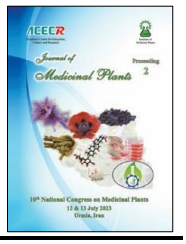
1. Baskin C. C, Baskin J. M. Seeds: ecology, biogeography and evolution of dormancy and germination. San Diego: Academic Press. 1998, 672.
2. Zargari A. Medicinal plants. Tehran: Tehran University Press. Vol. 2, 1989, 598-602.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 6

Evaluation of Ajwain seed priming with biofertilizers on plant establishment and germination percentage in response to salinity stress

Fatemeh Ansari[1*], Rostam Yazdani-Biouki[2], Hamid Sodaiezadeh[3], Mohammad-Ali Hakimzadeh-Ardakani[3]

[1] *Department of Arid Land Management and Desert Control, Faculty of Natural Resources, Yazd University, Yazd, Iran*
[2] *National Salinity Research Center, Agricultural Research, Education and Extension Organization (AREEO), Yazd, Iran*
[3] *Department of Arid Land Management and Desert Control, Faculty of Natural Resources, Yazd University, Yazd, Iran*
E-mail: fatemeeeansari74@gmail.com

ARTICLE INFO

Keywords:
Biological fertilizers
Medicinal plants
Nitroxin

ABSTRACT

Ajwain has high economic importance due to its essential oil and is considered as one of the valuable medicinal plants [1]. Today, due to various environmental stresses, including drought and salinity, the cultivation and production of these plants has decreased. Considering the development of salinity in agricultural lands and the existence of saline water sources, it is necessary to determine the tolerance level of different plants, especially medicinal plants, and the use of salinity-tolerant plants as a management factor in saline water or soil conditions is recommended [2]. This study with aimed at the response of investigating the effect of seed priming with biological fertilizers Supernitroplus and Nitroxin on the germination of the Ajwain under the influence of salinity stress was conducted as factorial experiment based on a completely randomized design with 3 replications, during 2022-2023 growing season in Salinity Research Center, Yazd. The experimental factors included 4 levels of water salinity stress (control, 3, 6, and 9 dS/m) and three levels of biological fertilizer inoculation included (without inoculation (control), seed inoculation with nitroxin fertilizer, and seed inoculation with supernitroplus fertilizer). The results showed that with the increase in salinity, the percentage of seed germination decreased significantly. So that the germination percentage of Ajwain seeds decreased by 9, 28.5 and 36%, respectively, from the control treatment (without stress) to 3, 6 and 9 dS/m with increasing salinity. The highest and lowest seed germination percentages were 64 and 40.4% in the control and 9 dS/m treatments. The results also showed that the priming of Ajwain seeds with nitroxin and supernitroplus biological fertilizer led to an increase of 26.6 and 20.7 percent germination compared to the control treatment. No significant difference was observed between the two investigated biological fertilizers.

References

1. Davazdahemami S, Majnoun Hosseini N. Cultivation and production of certain herbs and spices. 2008; University of Tehran press, 2nd Edition. 300p.

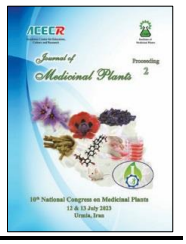
2. Davazdahemami S, Enteshari Sh, Allahdadi M, Yasamani Sh. Effect of Salinity Stress on Some Mineral Contents and Biochemical Parameters of Ajowan. 20220; *Journal of Crops Improvment*, 23(1): 128-139.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 7

Evaluation of seed yield, percentage and yield of essential oil of Ajwain under the effect of biological fertilizer and salinity stress

Fatemeh Ansari[1*], Hamid Sodaiezadeh[1], Rostam Yazdani-Biouki[2], Mohammad-Ali Hakimzadeh-Ardakani[1]

[1] *Department of Arid Land Management and Desert Control, Faculty of Natural Resources, Yazd University, Yazd, Iran*
[2] *National Salinity Research Center, Agricultural Research, Education and Extension Organization (AREEO), Yazd, Iran*
E-mail: fatemeeeansari74@gmail.com

ARTICLE INFO

Keywords:
Essential oil
Seed yield
Super Nitroplus

ABSTRACT

Ajwain is an erect yearly herb with striate stem, India and eastern Persia is the origin of this plant. The most useful element of Ajwain is the little fruit like caraway, which always especially admired in Indian delectable recipes, flavorful baked goods, and snacks [1]. Salinity is one of the abiotic stresses causing important economic losses and endangering food global security [2]. This study with aimed at the response of investigating the effect of seed priming with biological fertilizers Nitroxin and Super Nitroplus on the seed yield, essential oil and essential oil yield of the Ajwain under the influence of salinity stress was conducted as factorial experiment based on a completely randomized design with 3 replications, during 2022-2023 growing season in Salinity Research Center, Yazd. The experimental factors included 4 levels of water salinity stress (control, 3, 6, and 9 dSm^{-1}) and three levels of biological fertilizer inoculation included (control, seed inoculation with nitroxin and seed inoculation with Super Nitroplus). The results of this research showed that with the increase in salinity, the seed yield decreased significantly, so that increasing the salinity levels from the control treatment (without stress) to 3, 6, and 9 dSm-1 caused a decrease of 8.7%, 14.5%, and 25.6%, respectively. The results also showed that by priming the seeds with Super Nitroplus and Nitroxin, 21.6 and 29.6 percent increase in plant seed weight was observed compared to the control, and this increase was not significant between the two biological fertilizers. The results showed that with increasing salinity, the percentage of essential oil increased and the yield of essential oil decreased significantly. In general, seed inoculation with Nitroxin and Super Nitroplus fertilizers led to improved seed yield compared to non-inoculation treatment.

References

1. Hanif MA, Hassan SM, Mughal SS, Rehman A, Hassan SK, Ibrahim A, Hassan H. An overview on ajwain (*Trachyspermum Ammi*) pharmacological effects: current and conventional. Technology. *Pharmaceutical Science and Technology*. 2021; 30;5(1):1-6.

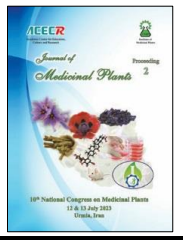
2. Lungoci C, Motrescu I, Filipov F, Rimbu CM, Jitareanu CD, Ghitau CS, Puiu I, Robu T. Salinity Stress Influences the Main Biochemical Parameters of *Nepeta racemosa* Lam. *Plants*. 2023; 29; 12(3): 583.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 10

Physicomechanical and Antibacterial Activity of Caraway (*Carum carvi*) Essential oil Emulsion-based Edible Film

Zahra Babaei[1], Roya Moghimi[1*], Farzaneh Zandi[2]

[1] *Department of Organic Chemistry, Faculty of Chemistry, University of Mazandaran, Babolsar, Iran*
[2] *Medical Plants and Drugs Research Institute, Shahid Beheshti University*
E-mail: r.moghimi@umz.ac.ir

ARTICLE INFO

Keywords:
Carvone
Antibacterial action
Edible film
Sodium caseinate
Gum tragacanth

ABSTRACT

Sodium caseinate is a water-soluble polymer that can form widespread molecular interactions (hydrogen, hydrophobic, and electrostatic).This feature of sodium caseinate makes it a suitable candidate for fabricating transparent edible films with good mechanical properties [1].Essential oils (EOs) extracted from plants exhibit natural antimicrobial activities [2]. In this study, different emulsion-based edible films were produced using sodium caseinate and gum tragacanth as natural and biodegradable polymers and caraway (*carum carvi*) EO nanoemulsions as natural antimicrobial compounds. The amounts of EO in the different nanoemulsions were 5 and 10 w/v (NE5 and NE10). Various features such as moisture content, swelling percentage, film transparency, and mechanical properties of the edible films were investigated in this study. In addition, the antimicrobial activity of the herbal edible films was assessed against *Escherichia coli* and *Shigella dysenteriae*. The results showed that edible films of NE10 had better antibacterial activity rather than NE5 and control (zone of inhibition =17.33±1.52 mm against *E. coli* and 19.66±0.57 mm against *S. dysenteriae* for NE10).Regarding film transparency, the control was the most transparent film, and the transparency decreased with increasing EO content. In this study, herbal emulsion-based edible films were produced using natural biopolymers with acceptable antibacterial activity and good physicomechanichal properties

References

1. M. Jahromi, M. Niakousari, M. T. Golmakani, and M. A. Mohammadifar, “Physicochemical and structural characterization of sodium caseinate based film-forming solutions and edible films as affected by high methoxyl pectin,” *Int. J. Biol. Macromol.*, vol. 165, pp. 1949–1959, 2020, doi: 10.1016/j.ijbiomac.2020.10.057.

2. K. Sharma, A. Babaei, K. Oberoi, K. Aayush, R. Sharma, and S. Sharma, “Essential Oil Nanoemulsion Edible Coating in Food Industry: a Review,” *Food and Bioprocess Technology*, vol. 15, no. 11. Springer, pp. 2375–2395, Nov. 01, 2022. doi: 10.1007/s11947-022-02811-6.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran

Poster Presentation ID: 11

Impact of ACCase Inhibitor Herbicides on Saffron (*Crocus sativus* L.) Yield

Hamid-Reza Fallahi[1*], Mohammad Ali Behdani[2], Hossein Hammami[2], Seyyed Amirhossein Hosseini[3], Mahdi Rezghi[2], Mahsa Aghhavani-Shajari[4]

[1]*Plant and Environmental Stresses Research Group, University of Birjand, Birjand,, Iran*
[2]*Departement of Plant Production and Genetics, University of Birjand, Birjand, Iran*
[3]*Department of Agronomy and Plant Breeding, University of Tehran, Tehran, Iran.*
[4]*Department of Agrotechnology, Ferdowsi University of Mashhad, Mashhad, Iran*
E-mail: Hamidreza.fallahi@birjand.ac.ir

ARTICLE INFO

Keywords:
Fatty acid
Gas chromatography
Vegetable oils
Non-polar column
Peak separation

ABSTRACT

Saffron (*Crocus sativus* L.) is a weak competitor against weeds due to its leaf structure and low leaf area index. Therefore, weed control in an important practice to improve it flowering capacity [1]. In this regard a field experiment was carried out at the research field of university of Birjand to investigate the effect of different weed control methods on saffron reproductive growth parameters. The experiment was performed based on a randomized complete block design, during 2019. Corm planting (using corms with ~ 6g weight, density of 50 corms per m^2 and planting depth of 20 cm) was done in September 2016, then when the field was two-year old (February 2018) experimental treatments (Table 1) were applied. At the start of the next flowering season (November 2019) saffron flowers were harvested and counted daily. Then mean flower weight and length were determined. In addition, stigmas and petals were dried at shade (~25 ºC) for a week and then their yields were measured. All weeds control treatments especially mechanical method (by hand) improved significantly stigma and petal yields. The best concentrations of Sethoxydim and Cletodim were 4.5 and 1 L ha^{-1}, respectively (Table 1). According to photodegradation and biodegradation of Sethoxydim and Cletodim in environment, it seems that this herbicide have potential to be used in saffron fields [2]. Overall, hand weeding was the best method of weed control in saffron field, but all concentrations of both used herbicides were also useful. However, it is recommended to evaluate these herbicides at the low levels prior to their widespread application in the fields.

Table 1. Effect of weed control treatments on saffron flowering parameters

Weed controlling treatments	Concentration (L ha^{-1})	Number of flower per m^2	Mean flower weight (g)	Mean flower length (cm)	Stigma dry yield (kg.ha^{-1})	Petal dry yield (kg.ha^{-1})
Control	-	23.0^{d}	0.37^{b}	4.86^{a}	1.11^{c}	05.91^{d}
Hand weeding	-	57.0^{a}	0.38^{b}	5.08^{a}	3.25^{a}	17.40^{a}
Sethoxydim (Nabo-S)	1.5	31.5^{bcd}	0.38^{b}	4.82^{a}	1.55^{bc}	10.51^{bc}
	3	31.0^{bcd}	0.38^{b}	4.54^{a}	1.56^{bc}	10.78^{bc}
	4.5	41.6^{b}	0.41^{ab}	4.89^{a}	2.18^{b}	14.51^{ab}
Cletodim (Select super)	0.5	40.1^{bc}	0.36^{b}	4.86^{a}	1.60^{bc}	13.01^{ab}
	1	40.0^{bc}	0.39^{ab}	4.94^{a}	1.78^{bc}	12.38^{b}
	1.5	26.0^{cd}	0.43^{a}	4.85^{a}	1.46^{bc}	6.80^{cd}

In each column, mean with similar letters are not significantly different based on FLSD test.

References

1. Behdani MA, Fallahi HR. Saffron: Technical knowledge based on research approaches. Birjand: Univeristy of Birjand Press. 2015, 113-118.

2. Senseman SA. Herbicide Handbook. Weed Science Society of America Press. 2007. 458 p.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran

Poster Presentation ID: 12

Effect of Weed Management Practices on Weed Population and Saffron Flowering

Hamid-Reza Fallahi[1*], Mohammad Ali Behdani[2], Hossein Hammami[2], Seyyed Amirhossein Hosseini[3], Seyyed Morteza Hosseini[2]

[1]*Plant and Environmental Stresses Research Group, University of Birjand, Birjand,, Iran*
[2]*Departement of Plant Production and Genetics, University of Birjand, Birjand, Iran*
[3]*Department of Agronomy and Plant Breeding, University of Tehran, Tehran, Iran.*
E-mail: Hamidreza.fallahi@birjand.ac.ir

ARTICLE INFO

Keywords:
Chemical weed control
Flowering
Hand-Weeding
Herbicides

ABSTRACT

Saffron is a short herbaceous plant with upright narrow leaves which make it a non-competitive plant. Therefore, weeds control is a vital practice for promoting its flower quantity and quality [1, 2]. Accordingly, a field experiment (based on a randomized complete block design with three replications) was performed at the research field of university of Birjand, during 2016-19. Corm planting was done in September 2016 using corms with a mean weight of 6 g and planting density of 50 corms per m^2. Two years later, when the field was almost 2-years old, different weed control methods were used in February 2018. Experimental treatments are presented in Table 1. At the end of saffron growing season (April 2019), weeds number and dry weight were determined. In addition, at the start of the next flowering season (November 2019), flowers were harvested daily and then flower yield was determined. The highest amounts of weeds number and biomass, but the lowest flower yield were obtained at control (no weed management) treatment. Although there was no significant difference between hand weeding and six chemical control treatments in terms of weeds population, but hand weeding was the best treatment in terms of saffron flower yield [Table 1]. It means that herbicides probably imposed a negative effect on saffron flowering. However, chemical control had a positive effect on flowering compared with no weed control treatment. Overall, it concluded that weed controlling, whether manual or chemical, is a crucial practice for improving saffron flowering, but more research is needed to select and recommend the best herbicide.

Table 1. Effect of weed control method on saffron flower yield and weeds population

Weed controlling treatments	Concentration (L ha^{-1})	Weed (number per m^2)	Weed dry weight (g. m^2)	Flower yield ($kg.ha^{-1}$)
No weed control	-	504.0^{a}	257.0^{a}	84.8^{d}
Hand weeding	-	277.3^{b}	115.6^{b}	217.0^{a}
Sethoxydim (Nabo-S)	1.5	266.6^{b}	177.3^{ab}	120.5^{bcd}
	3	178.7^{b}	97.11^{b}	120.1^{bcd}
	4.5	145.3^{b}	99.7^{b}	171.0^{ab}
Cletodim (Select super)	0.5	149.0^{b}	94.4^{b}	146.9^{bc}
	1	134.6^{b}	98.8^{b}	146.4^{bc}
	1.5	172.0^{b}	82.5^{b}	113.4^{cd}

In each column, mean with similar letters are not significantly different based on FLSD test.

References

1. Behdani MA, Fallahi HR. Saffron: Technical knowledge based on research approaches. Birjand: Univeristy of Birjand Press. 2015, 113-118.

2. Golparvar P, Mirshekari B, Borhani P. Application of herbicides with limited dose can play a major role in suitable weeds control in saffron fields. *World Appl. Sci. J.* 2012; 20(9): 1266-1269. doi: 10.5829/idosi.wasj.2012.20.09.708.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran

Poster Presentation ID: 13

Reduction of Soil Temperature during Saffron Flower Initiation Stage by Organic Mulches Application as a Strategy for Climate Change Adaptability

Hamid-Reza Fallahi[1*], Sajjad Moradi-Moghaddam[2], Mohammad-Ali Behdani[2], Sohrab Mahmoodi[1]

[1]*Plant and Environmental Stresses Research Group, University of Birjand, Birjand,, Iran*
[2]*Saffron Research Group, Department of Plant Production and Genetics, University of Birjand, Birjand,, Iran*
E-mail: Hamidreza.fallahi@birjand.ac.ir

ARTICLE INFO

Keywords:
Fatty acid
Gas chromatography
Vegetable oils
Non-polar column
Peak separation

ABSTRACT

The first stage of saffron flowering which is called flower initiation and occurs during mid-summer is very sensitive to high temperatures. Optimal temperature for this stage is ~ 25°C, while temperatures above 30 °C causes abortion of some flowers. Over the past decades, along with increasing temperature, saffron has more exposed to heat stress during flower initiation [1]. Some studies have reported that application of plant residues as organic mulch can improve flowering by reducing soil temperature during saffron flower initiation [2]. However, the effect of mulches on soil temperature was not studied practically so far and we aimed to study it. For this purpose a field experiment was carried out during 2019 in Qaen (33˚N, 59˚E, 1440 msl), Iran, with two treatments (mulch application and control), each in three replications. Corm planting was done in late spring using corms with ~14 g weight and with a density of 220 corm per m^2 in plots with $6m^2$ area. Wheat residue (8 t ha^{-1}) was used as mulch immediately after corm planting. Air and soil temperatures were measured daily from 6th to 20th, August, 2019, that is the approximate time for flower initiation [1]. Moreover, flowers were harvested during flowering season in autumn and then the flower yield was determined. Results showed that soil temperature (at corm bed) was lower than air temperature. In addition, application of wheat residue as mulch reduced considerably soil temperature compared with the control (no-mulch) (Table 1). Accordingly, flower yield was also expected to improve in this treatment, which this hypothesis was not confirmed (Table 1). The reason of this observation is not clear for us, and therefore more research needs to be done. However, it seems that mulch application may be more effective in warmer climates.

Table 1. Effect of mulch application on soil temperature (°C) and saffron flower yield

Treatment	Days after start of flower initiation period (6th to 20th, August, 2019)																Flower yield (g m^2)
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	average	-
Control	32	33	34	33	35	34	33	33	33	31	33	30	29	34	30	32.5	75.6
Residue	28	29	30	29	30	29	30	29	29	28	30	27	27	31	27	28.9	62.7
Ambient (°C)	39	40	41	41	42	40	40	39	39	38	38	36	37	39	36	39.0	-

References

1. Behdani MA, Fallahi HR. Saffron: Technical knowledge based on research approaches. Birjand: Univeristy of Birjand Press. 2015, 113-118.

2. Rezvani Moghaddam P, Koocheki A, Molafilabi A, Seyyedi M. The effects of different levels of applied wheat straw in different dates on saffron (*Crocus sativus* L.) daughter corms and flower initiation criteria in the second year. *Saffron Agron. Tech.* 2014; 1(1): 55-70. doi:10.22048/jsat.2013.4811.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran

Poster Presentation ID: 14

The role of *Paenibacillus polymixa* N179 and arbuscular mycorrhizal fungi on growth traits and essential oil of Fennel under water stressful conditions

Faezeh Sohrabi[1], Vahid Sarabi[1,*], Vahid Fallahzadeh[2], Hossein Hashempour[3]

[1]*Department of Agronomy and Plant Breeding, Faculty of Agriculture, Azarbaijan Shahid Madani University, Tabriz-Iran*
[2]*Department of Plant Protection, Faculty of Agriculture, Azarbaijan Shahid Madani University, Tabriz-Iran*
[3]*Department of Chemistry, Faculty of Basic Sciences, Azarbaijan Shahid Madani University, Tabriz-Iran*
E-mail: Sarabi20@azaruniv.ac.ir

ARTICLE INFO

Keywords:
Essential oil
Growth
Mycorrhizae
PGPR
Water-deficit stress

ABSTRACT

Water-deficit stress is one of the most important limiting factors for field crops in arid and semi-arid regions [1]. Plant growth under stress conditions may be enhanced by the application of microbial inoculation including plant growth promoting rhizobacteria (PGPRs) and mycorrhizal fungi. These microbes can promote plant growth by regulating nutritional and hormonal balance, producing plant growth regulators, solubilizing nutrients and inducing resistance against plant pathogens [2]. In order to investigate the effect of water-defict stress and the application of two biofertilizers on some growth traits and seed essential oil of fennel (*Foeniculum vulgare* Mill), an experiment was conducted as a split plots based on a randomized complete block design with three replications at the research farm, agricultural faculty of Azarbaijan Shahid Madani University, Tabriz-Iran in 2020. Factors were different levels of irrigation regimes including irrigation at the field capacity, 30% and 10% of total available moisture as the main plot and application of biofertilizers at three levels (control, *Paenibacillus polymixa* N179 and arbascular mycorrhizal fungi) as a subplot. The results indicated that the application of biofertilizers had a significant effect on the studied morphological traits under water stressful conditions, such that water deficit stress caused to less impacts on plant growth using biofertilizres than the control treatment. Maximum main root length, number of secondary roots, plant height and number of sub-stems were obtained from plants under using arbuscular mycorrhizal fungi. Essential oil content increased in fennel seeds using biofertilizers particulary *Paenibacillus polymixa* N179 by increasing water-deficit stress condition in the soil compared with control. Totally, biofertilizers improved growth traits and essential oil content measured in fennel seeds under the severity of water stressful conditions.

References

1. Gholamhoseini A, Ghalavand A, Dolatabadian A, Jamshidi E, Khodaei-Joghan A. Effects of arbuscular mycorrhizal inoculation on growth, yield, nutrient uptake and irrigation water productivity of sunflowers grown under drought stress. *Agric. Water Manag.* 2013; 117: 106-114. doi: 10.1016/j.agwat.2012.11.007.

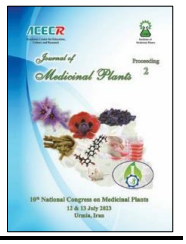
2. Nadeem SM, Ahmad M, Zahir ZA, Javaid A, Ashraf M. The role of mycorrhizae and plant growth promoting rhizobacteria (PGPR) in improving crop productivity under stressful environments. *Biotechnol. Adv*. 2014; 32(2): 429-448. doi: 10.1016/j.biotechadv.2013.12.005.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 20

Effect of *Tribulus terrestris* aqueous extract on ischemia-reperfusion injury in a rat testicular torsion-detorsion model: spermatological and histological evidence

Hediye Zoodi[1], Rahim Mohammadi[1], Ali Shalizar-Jalali[2,*], Ali Soleimanzadeh[3]

[1]*Department of Surgery and Diagnostic Imaging, Faculty of Veterinary Medicine, Urmia University, Urmia, Iran*
[2]*Department of Basic Sciences, Faculty of Veterinary Medicine, Urmia University, Urmia, Iran*
[3]*Department of Theriogenology, Faculty of Veterinary Medicine, Urmia University, Urmia, Iran*
E-mail: a.shalizar@urmia.ac.ir

ARTICLE INFO

Keywords:
Ischemia-reperfusion
Tribulus terrestris
Testis
Rat

ABSTRACT

Ischemia-reperfusion (IR) injury arising from testicular torsion can result in bilateral testicular damages via germ cell apoptosis and spermatogenesis disruption. The main objective of this study was to explore the effects of *Tribulus terrestris* aqueous extract (TTAC) on IR injury in a rat testicular torsion-detorsion model. Experiments were performed on three equal groups (each with 6 male *Wistar* rats). Following anesthesia, IR was induced by 720°clockwise torsion of the testis. In group 1 (sham), only laparotomy was performed. In group 2 (IR), a 3-hour interval ischemia followed by a 3-hour reperfusion was performed. In group 3 (IR/TTAC), 200 mg/kg TTAC (IP) was administered 30 minutes before ischemia termination. The animals were kept for 60 days and then the testes were removed for sperm parameters and histological assessments. The IR caused significant decreases in sperm concentration, motility and viability compared to the sham group. Further, IR resulted in histological damages in testicular tissue. Notably, TTAC administration improved IR-induced negative changes in the above-mentioned parameters. These findings provide evidence that TTAC could have potentially protective effects against long-term reproductive injuries following unilateral testicular IR in rat.

References

1. Aldaddou WA, Aljohani ASM, Ahmed IA, Al-Wabel NA, El-Ashmawy IM. Ameliorative effect of methanolic extract of *Tribulus terrestris* L. on nicotine and lead-induced degeneration of sperm quality in male rats. *J. Ethnopharmacol.* 2022; 295: 115337. doi: 10.1016/j.jep.2022.115337.

2. Raisi A, Davoodi F, Mohammadi R. Protective effects of rosmarinic acid on testicular torsion-detorsion in an animal model. *Iran. J. Vet. Surg.* 2022; 17(2): 80-86.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran

Poster Presentation ID: 21

Investigating the Protective Effect of the Methanolic Extract of *Salvia multicaulis* on Renal Ischemia-reperfusion Injuries in Rats

Foroogh Mirzania[1,*], Iraj Salimikia[1,*], Javad Ghasemian Yadegari[1], Javid Aalaei[2], Mohammad Amin Ghobadi[2], Majid Taheri Demneh[3], Alireza Nazarzadeh[2]

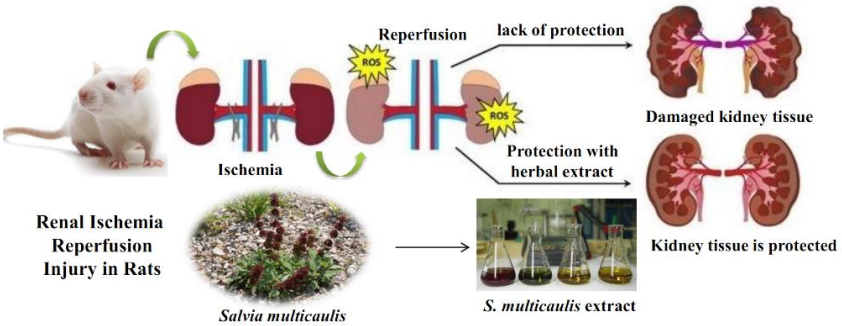
[1] *Department of Pharmacognosy, Faculty of Pharmacy, Lorestan University of Medical Sciences, Khorramabad, Lorestan Province, Iran*
[2] *Student Research Committee, Faculty of Pharmacy, Lorestan University of Medical Sciences, Lorestan, Iran*
[3] *Student Research Committee, Faculty of Medical, Shahrekord University of Medical Sciences, Lorestan, Iran*

ARTICLE INFO

Keywords:
Salvia multicaulis
Rosmarinic acid
Renal ischaemia-reperfusion

ABSTRACT

Kidney ischaemia-reperfusion injury is a condition that can cause negative consequences such as a decrease in glomerular filtration rate (GERD), decrease in tubular reabsorption of sodium and potassium, decrease in renal blood flow, high blood pressure, and acute and chronic renal failure (AKI). The causes of this damage can be kidney transplant, partial nephrectomy, renal artery revascularization, trauma, hydronephrosis, shock, sepsis, and non-emergency urology surgery [1, 2]. In this research the protective effects of the methanolic extract of *S. multicaulis* was evaluated in renal ischaemia-reperfusion injuries in rats. 42 male rats were divided into 6 groups. In the treatment groups 1-3, before causing ischemia in the kidneys, rats received 50, 100, and 150 mg/kg/day doses of the extract orally for 20 days, and in the fourth group, 20-days pretreatment with rosmarinic acid solution 0.125 mg/kg/day was administered intraperitoneally in DMSO and normal saline, and then ischaemia was created. In the evaluation of urea and creatinine factor, rosmarinic acid and extract dose of 150 mg/kg/day had a significant effect in reducing these two factors. It is estimated that doses of 100 and 150 mg/kg/day of methanol extract of *S. multicaulis* are the most effective and useful doses of this plant for renal ischemia reperfusion.



References

1. Lerink, L.J.; de Kok, M.J.; Mulvey, J.F.; Le Dévédec, S.E.; Markovski, A.A.; Wüst, R.C.; Alwayn, I.P.; Ploeg, R.J.; Schaapherder, A.F.; Bakker, J.A.; Lindeman, J.H., *American Journal of Transplantation*, 2022, *22*(2), 344-370.

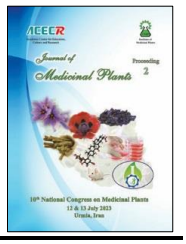
2. Zhao, F.; Zhu, J.; Zhang, M.; Dong, S.; *Cell Proliferation*, 2023, 7, 13411-18.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 23

Phytochemical Investigation of *Ferula macrecolea* Boiss. and Acute and Subacute Toxicity Evaluation of the Components in BALB/c Mice

Foroogh Mirzania[1,*] Alireza Nazarzadeh[2], Iraj Salimikia[1,*], Javad Ghasemian Yadegari[1]

[1]*Department of Pharmacognosy, Faculty of Pharmacy, Lorestan University of Medical Sciences, Khorramabad, Lorestan Province, Iran*
[2] *Student Research Committee, Faculty of Pharmacy, Lorestan University of Medical Sciences, Lorestan, Iran*
E-mail: mirzania.f@lums.ac.ir

ARTICLE INFO

Keywords:
Ferula macrecolea (Boiss.) Boiss.
Toxicity
Acute toxicity
Subacute toxicity
LD_{50}

ABSTRACT

Today, medicinal plants and their components have an important role in medicine and the treatment of diseases [1]. Therefore, due to the ever-increasing use of plant compounds, each plant product should be evaluated in terms of toxicological studies before used as a pharmaceutical form. This research designed to assess the acute and subacute toxicity of *Ferula macrecolea* essential oil (FMEO) on hematological and some serum biochemical parameters in Balb/C mice [2]. To determine the acute toxicity, four groups of mice (4 groups consisting of 6 mice) received a single dose of 1/24 ml/kg of FMEO intraperitoneally. Subacute toxicity was done by examining the liver and kidney vital organs and blood parameters after consuming doses (0.1, 0.2, 0.4 and 0.6 ml/kg) of FMEO orally for 28 days. The results of acute toxicity studies after a single dose 1.24 ml/kg of FMEO was administered intraperitoneally to mice and the mice were monitored for 28 days. The median lethal dose (LD_{50}) of this compound was determined to be 1.79 ml/kg. Considering that the study of acute toxicity in the present study was done with a dose of 1.24 ml/kg, no cases of animal death were observed, and also in the study of subacute toxicity with doses of (0.1, 0.2, 0.4 and 0.6 g/kg) had no toxic effect on vital organs such as liver and kidney as well as blood parameters. Finally, according to the results of the study, none of the blood parameters and the histological characteristics of the studied organs were changed by the consumption of FMEO. Therefore, it has no significant toxicity and it can be used for the possible effect on various diseases in future studies.

References

1. Mirzania, F.; Sarrafi, Y.; Moridi Farimani, M., *Journal of Agricultural Science and Technology*, 2019, 21(2), 331-340.

2. Rustaiyan, A.; Nadimi, M.; Mazloomifar, H.; Massudi, S., *Journal of Essential Oil Research*, 2005, 17(1), 55-56.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran

Poster Presentation ID: 25

Extraction and Identification of an Ionone-Type Sesquiterpene and a Diterpene from *Salvia sharifii* Rech. f. & Esfand.

Foroogh Mirzania[1,*] Mahdi Moridi Farimani[2], Yaghoub Sarrafi,[3] Sara Ghasemi [4]

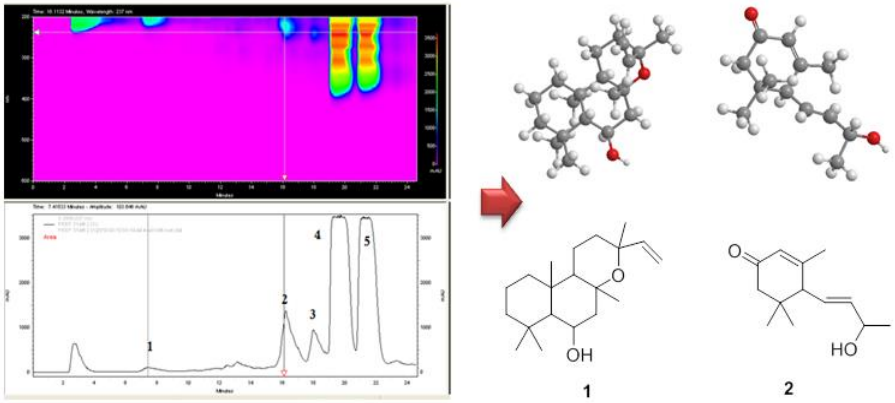
[1]*Department of Pharmacognosy, Faculty of Pharmacy, Lorestan University of Medical Sciences, P.O. Box: 6815144309, Khorramabad, Lorestan Province, Iran*
[2] *Department of Phytochemistry, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, G. C., Evin, Tehran, Iran*
[3]*Department of Organic Chemistry, Faculty of Chemistry, University of Mazandaran, Babolsar, Iran*
[4] *Student Research Committee, Faculty of Pharmacy, Lorestan University of Medical Sciences, Lorestan, Iran*
E-mail: mirzania.f@lums.ac.ir

ARTICLE INFO

Keywords:
Salvia sharifii Rech. f. & Esfand.
2D-NMR
HMQC
HMBC
COSY

ABSTRACT

Salvia sharifii Rech. f. & Esfand. (Lamiaceae) is an endemic herb which is found only in southern parts of Iran. This plant is extensively exploited as a medicinal plant and called “Maryam-Goli-e-Jonoobi” in persian language [1]. Different preparations of this plant e.g., decoctions, infusions and powders, are used in traditional medicine as antiseptic, carminative, digestive and analgesic. Significant antibacterial, cytotoxic and antioxidant potential of *S. sharifii* has also been identified. On the basis of reported traditional uses of *S. sharifii*, we carried out current phytochemical research to explore the plant on scientific grounds [2]. Fractionation of an acetone extract of the aerial parts of *S. sharifii* led to the isolation of an ionone-type sesquiterpene and a diterpene, whose structures were elucidated by 1D and 2D-NMR spectroscopic studies, in particular homo-COSY and hetero-(HMQC and HMBC).



References

1. Asgarpanah, J.; Oveyli, E.; Alidoust, S., *Journal of Essential Oil Bearing Plants*, 2017, *20*(2), 578-582.

2. Ebrahimi, S.; Farimani, M.M.; Mirzania, F.; Hamburger, M., *Planta Medica*, 2013, *79*(13), PG2.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran

Poster Presentation ID: 26

Variation of *Mentha aquatica* L. Antibacterial and Antifungal Activity in Forest and Planted Situations

Foroogh Mirzania, [1,*] Alireza Nazarzadeh [2], Iraj Salimikia[1,*], Javad Ghasemian Yadegari [1]

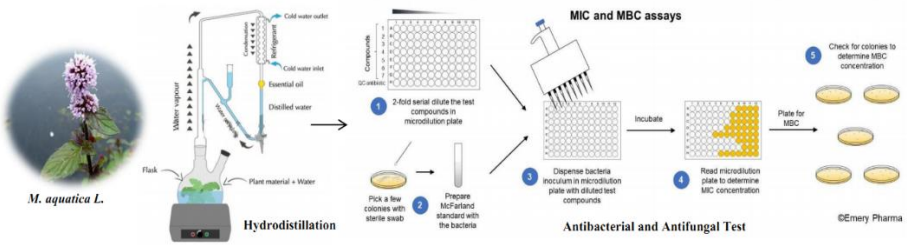
[1]*Department of Pharmacognosy, Faculty of Pharmacy, Lorestan University of Medical Sciences, Khorramabad, Lorestan Province, Iran*
[2] *Student Research Committee, Faculty of Pharmacy, Lorestan University of Medical Sciences, Lorestan, Iran*
E-mail: mirzania.f@lums.ac.ir

ARTICLE INFO

Keywords:
*Mentha aquatic*a L.
Antibacterial activity
Essentialoil
medicinal plant

ABSTRACT

Mentha aquatica L. is a perennial herb of the Lamiaceae family, common in Europe, North Africa, and West Asia. It grows on the lagoons and lakes, but prefers calcareous soils [1]. It is known for its analgesic, antipyretic, antiseptic, carminative, decongestant, antispasmodic, deodorant, diaphoretic, allergenic, digestive, diuretic, antiemetic, insecticides, sedative and vermifuge actions [2]. In this investigation essential oils of the wild and cultivated *Mentha aquatica* L. were extracted by Clevenger system and screened for their antimicrobial activities. Linalool(48.00%-29.34%),linalool acetate(20.47%-14.20%)and α- terpineol (7.45%-9.34%)were the major constituents of the wild and cultivated forms, respectively.The antibacterial and the antimycotic activities of these oils were reported against six bacterial and fungal strains (*Staphylococcus aureus, Enterococcus faecium, Escherichia coli, Pseudomonas aeruginosa, Candida albicans, Candida Krusei*). The antibacterial analysis displayed that both oils presented high activity versus all the tested strains in a range of MIC values from 2 to 8 mg ml^{-1}. The antifungal test results also proved hight activity against *Candida krusei* and *Candida albicans* (MIC values 0.25 to 1 mg ml^{-1}). The results of this research showed that both the cultivated and wild plants showed high antibacterial and antifungal properties. These are aspects that turn this plant into useful crops for domestication and commercialization and the essential oil of this plant can be used as a good food preservative in the food industries.



References

1. Ahmed, A.T.A.; Bathula, C.; Soni, R.; Kim, H.S.; Im, H.; Lee, S.W.; Kim, W.K.; Gedi, S.; Kadam, A.N., *Chemosphere*, **2022**, *289*, p.133197.

2. Pereira, O.R.; Macias, R.I.; Domingues, M.R.; Marin, J.J.; Cardoso, S.M.; *Antioxidants*, **2019**, 8(8), 267-270.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran

Poster Presentation ID: 29

Investigating the antibacterial effect of *Amygdalus scoparia* Spach. extract on anaerobic bacteria of gum infection

Gholam Reza Talei[1], Foroogh Mirzania[2,*], Zahra Asgari[3], Amir Varezardi[1], Somaieh Sabzali[4]

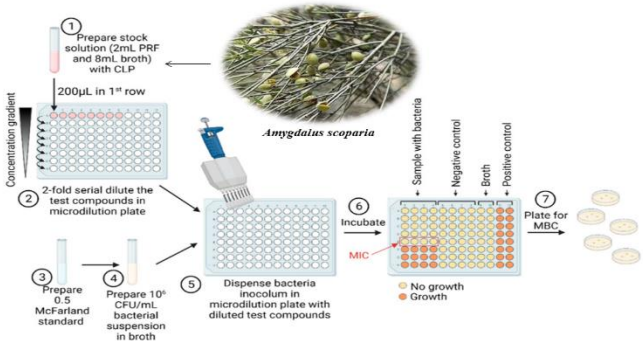
[1] *Razi Herbal Medicines Research Center, Medical School, Lorestan University of Medical Sciences, Razi Street, Khorramabad, Iran*
[2] *Department of Pharmacognosy, Faculty of Pharmacy, Lorestan University of Medical Sciences, P.O. Box: 6815144309, Khorramabad, Lorestan Province, Iran*
[3]*Student Research Committee, Faculty of Pharmacy, Lorestan University of Medical Sciences, Lorestan, Iran*
[4]*Department of Cell and Molecular Biology and Microbiology, Faculty of Biological Science and Technology, University of Isfahan, Isfahan, Iran*
E-mail: Forooghmirzania@gmail.com

ARTICLE INFO

Keywords:
Amygdalus scoparia Spach.
anaerobic bacteria
gum infection

ABSTRACT

Oral bacteria, which are mostly anaerobic, are strongly related to oral diseases. There is a strong association between periodontal bacteria and oral anaerobic bacteria with some serious human cancers, oral cavity infections, rheumatoid arthritis, ankylosing spondylitis, and even heart disease [1]. *Amygdalus scoparia* is one of the wild medicinal species of Iran that is usually used by local people in traditional medicine to treat diabetes, inflammatory diseases and microbial infections [2]. In this study, the methanolic extract of this plant was tested on several anaerobic bacteria. The results showed that the methanol extract of the *A. scoparia* can inhibit the growth of *Porphyromonas gingivalis* and *Streptococcus mutans* bacteria at a dilution of 40 mg/ml and the growth of *Lactobacillus acidophilus* bacteria at a dilution of 25 mg/ml. The minimum inhibitory concentration of vancomycin for *Porphyromonas gingivalis* and *Streptococcus mutans* is 0.002 mg/ml and for Lactobacillus acidophilus is 0.008 mg/ml. MIC values of metronidazole for *Streptococcus mutans*, *Lactobacillus acidophilus* and *Porphyromonas gingivalis* are 0.008, 0.032 and 0.064 mg/ml, respectively. So, the results demonstrated that the methanolic extract of this plant can be used in the treatment of many diseases related to anaerobic bacteria.



References

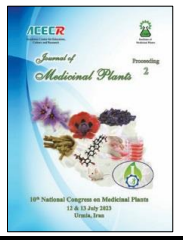
1. Kuramitsu, H.K.; Qi, M.; Kang, I.C. *Ann. Periodontol.*, **2001**, *6*(1), 41-47.
2. Fadavi, G.; Mohammadifar, M.A.; *Carbohydr. Polym.*, **2014**, *101*, 1074-1080.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 30

Effect of *Nigella sativa* Seed Extract on Periodontal Pathogens

Gholam Reza Talei[1, 2], Foroogh Mirzania[3,*], Alireza Nazarzadeh [4], Narges Ziaei[5]

[1] *Razi Herbal Medicines Research Center, Medical School, Lorestan University of Medical Sciences, Razi Street, Khorramabad, Iran*
[2] *Head of Virology Department, Medical School, Lorestan University of Medical Sciences Khorramabad, Iran*
[3] *Department of Pharmacognosy, Faculty of Pharmacy, Lorestan University of Medical Sciences, Khorramabad, Lorestan Province, Iran*
[4] *Student Research Committee, Faculty of Pharmacy, Lorestan University of Medical Sciences, Lorestan, Iran*
[5] *School of Dentistry, Periodontics Department, Kermanshah University of Medical Sciences, Kermanshah, Iran*
E-mail: mirzania.f@lums.ac.ir

ARTICLE INFO

Keywords:
Nigella sativa
Periodontal Pathogens
Metronidazole
Amoxicillin
Antimicrobial Properties

ABSTRACT

Due to the high prevalence of periodontal diseases in the society and the need for timely and low-complication treatment and also the confirmed connection of this disease with other diseases, as well as bacterial etiology disease as the main cause of the failure of conventional treatments, the need for a reliable treatment without effects were felt. Since herbal treatments are usually part of low-risk treatments [1, 2] or it is considered safe, this research aims to investigate the antibacterial effect of black seed extract on *Aggregatibacter actinomycetemcomitans* and *Porphyromonas gingivalis* was performed. In this study, in order to compare the effectiveness of *Nigella sativa* extract on preventing the growth of pathogens periodontal, amoxicillin and metronidazole were used as control groups. Results showed amoxicillin was administered at minimum dilutions of 95.3 mg/ml and 4 mg/ml on bacteria A.a, P.g, and metronidazole, respectively, at least in dilutions of 8 mg/ml and 16 mg/ml A.a and P.g bacteria are effective. Various studies have supported this finding and treatments supplementing metronidazole and amoxicillin along with SRP in improving the microbial conditions of the disease periodontal have been considered effective. In investigating the synergism effect based on our findings *Nigella sativa* extract and metronidazole in concentration it is effective on *Porphyromonas gingivalis* and *actinomycete* aggregate respectively. Comitans have antagonistic and synergistic effect. Also *Nigella sativa* extract and amoxicillin their effective concentrations on both bacteria are without mutual effect. Amoxicillin and metronidazole also has a synergistic effect on both bacteria in its effective concentration.

References

1. Aimetti, M., Romano, F., Guzzi, N. and Carnevale, G., *J. Clin. Periodontol*., 2012, 39(3), 284-294.

2. Mozaffarian V. A dictionary of Iranian plant names. Tehran: Farhang Moaser. 2022, 361-363.

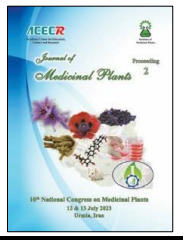
3. Silva, M.P., Feres, M., Oliveira Sirotto, T.A., Silva Soares, G.M., Velloso Mendes, J.A., Faveri, M. and Figueiredo, L.C., *J. Clin. Periodontol*., 2011, 38(9), pp.828-837.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 31

Phytochemical investigation of *Ferula macrecolea* Boiss. and evaluation of antinociceptive and anti-inflammatory properties

Foroogh Mirzania, [1,*] Negin Soltani [2], Iraj Salimikia, [1,*] Javad Ghasemian Yadegari [1]

[1]*Department of Pharmacognosy, Faculty of Pharmacy, Lorestan University of Medical Sciences, Khorramabad, Lorestan Province, Iran*

[2] *Student Research Committee, Faculty of Pharmacy, Lorestan University of Medical Sciences of Traditional*

E-mail: mirzania.f@lums.ac.ir

ARTICLE INFO

Keywords:
Ferula macrocolea
Pain
Inflammation
Formalin test
Xylene test

ABSTRACT

In this research, the analgesic and anti-inflammatory activity of the essential oil of aerial parts of *Ferula macrocolea* Boiss. were examined on male wistar rats [1, 2]. In this investigation, plant essential oil was prepared by hydrodistillation method. This study was conducted on 66 male Wistar rats; 36 rats were used for analgesic activity and 30 rats for anti-inflammatory activity. Formalin was used to induce analgesic activity. In this test, the rats were divided into 6 groups of 6. The control group received 3% DMSO, and groups 2, 3, and 4 received doses of 80, 160, and 320 mg/kg of essential oil, respectively. The fifth group received naloxone in addition to the essential oil, and the sixth group also received morphine. All injections were done intraperitoneally in all groups. In order to evaluate the anti-inflammatory effect, xylene test was used. In this test, the rats were divided into 5 groups of 6. The control group received 3% DMSO. Groups 2, 3, and 4 received doses of 320, 160, and 80 mg/kg of the aerial parts of the plant, respectively. The fifth group received dexamethasone. Essential oil, vehicle and dexamethasone were injected intraperitoneally in all groups. Data were analysed using ANOVA and Tukey statistical tests. The average intensity of acute pain at the dose of 320 mg/kg was lower than that of the control group. That the mean intensity of chronic pain in the 320 dose group was significantly lower than the 80 and 160 mg/kg dose groups ($P < 0.05$). It was no significant difference between the average swelling weight of dose 320 and dexamethasone in xylene test. As a result, its anti-inflammatory effect of *F. macrocolea* essential oil was almost similar to the anti-inflammatory effect of dexamethasone.

References

1. Alyousif, M.S.; Al-Abodi, H.R.; Almohammed, H.; Alanazi, A.D.; Mahmoudvand, H.; Shalamzari, M.H.; Salimikia, I., *Molecules*, **2021**, *26*(4), 888-891.

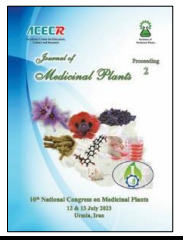
2. Mirzania, F.; Moridi Farimani, M.; Sarrafi, Y.; Nejad Ebrahimi, S.; Troppmair, J.; Kwiatkowski, M.; Stuppner, H. Alilou, M., *Frontiers in Chemistry*, **2022**, *9*,.1166-1177.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 32

Antioxidant and Anti-microbial Potential of *Astragalus rhodosemius* Boiss. & Hausskn. Extracts

Foroogh Mirzania[1,*], Negin Soltani[2], Javad Ghasemian Yadegari[1,*], Iraj Salimikia[1]

[1]*Department of Pharmacognosy, Faculty of Pharmacy, Lorestan University of Medical Sciences, Khorramabad, Lorestan Province, Iran*
[2] *Student Research Committee, Faculty of Pharmacy, Lorestan University of Medical Sciences, Lorestan, Iran*
E-mail: mirzania.f@lums.ac.ir

ARTICLE INFO

Keywords:
Astragalus rhodosemius Boiss. & Hausskn.
DPPH
Antioxidant
Anti-microbial activity

ABSTRACT

In this research, the anti-microbial and antioxidant potential of two different extracts of aerial parts (n-butanol and ethyl acetate) and also ethyl acetate extract of the root of Astragalus rhodosemius [1, 2] were investigated. Antioxidant property (DPPH) and anti-microbial activity also evaluated by some gram positive and gram negative bacteria. The ethyl acetate extract of the aerial parts (IC50 = 124.45 µg/mL) and of the root (IC50 = 166.05 µg/mL) showed the antioxidant property respectively. Gram positive bacteria showed more sensitivity to the ethyl acetate extract of the root and aerial parts of A. rhodosemius compared to gram negative bacteria MIC for aerial parts and MBC for aerial parts of A. rhodosemius for gram positive bacteria were 3828 µg/mL and 5625 µg/mL respectively. The MIC and MBC for root of A. rhodosemius for gram positive bacteria were 2270 µg/mL and 4070 µg/mL respectively; and for gram negative bacteria were 2500 µg/mL and 1167 µg/mL in order. Staphylococcus aureus bacteria showed the highest sensitivity to the ethyl acetate extract of the aerial parts and the MIC and MBC for the aerial parts was 312 µg/mL and 2500 µg/mL respectively. The ethyl acetate extract of root also showed the lowest MBC for S. aureus (1000 µg/mL). The results of this study showed that the potent antioxidant and anti-bacterial activity of A. rhodosemius make it possible to use it as a natural antioxidant or antibiotic in various medicinal formulations and cancer prevention.

References

1. Ghasemian-Yadegari, J., Fard Ardali, J.K., Rashidipour, M., Nouraie, H., Sikevandi, S.J., Rad, M.T. and Mirzania, F., *Curr. Bioact. Compd.*, 2023. *19*(3), 11-17.

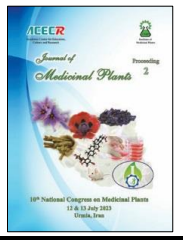
2. Asri, Y., *Rostaniha*, **2008**, *9*(1), 25-48.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 33

Effect of 8 weeks of endurance training and hydroalcoholic extract of Olive leaf on coronary vascular bed endothelial disorder and lipid profile in diabetic male rats

Samira Yarimir[1], Maryam Moghimian[2], Afshin Nazari[3,4*], Alireza Mirzaei[1], Hamed Seidi[5], Mehrnoush Sedighi[6], Pargol mansouri[7]

[1] *Master Student of Medical Physiology, Razi Herbal Medicines Research Center, Lorestan University of Medical Sciences, Khorramabad, Iran*
[2] *Associate Professor, Department of Physiology, Faculty of Medicine, Gonabad University of Medical Sciences, Gonabad, Iran*
[3] *Associate Professor, Razi Herbal Medicines Research Center , Department of Physiology, Lorestan University of Medical Sciences, Khorramabad, Iran*
[4] *Cardiovascular Research Center, Shahid Rahimi Hospital, Lorestan University of Medical Sciences, Khorramabad, Iran*
[5] *Pharmacy Student, Razi Herbal Medicines Research Center, Lorestan University of Medical Sciences, Khorramabad, Iran*
[6] *Associate Professor, Cardiovascular Research Center, Shahid Rahimi Hospital, Lorestan University of Medical Sciences,Khorramabad, Iran*
[7] *Student Research Committee, Faculty of Pharmacy, Lorestan University of Medical Sciences, Lorestan, Iran*

ARTICLE INFO

Keywords:
Diabetes mellitus
Endothelial
Endurance training
Enzyme antioxidant
Vascular complications

ABSTRACT

Due to the high rate of diabetes in the community and the importance of herbal supplements and exercise in its treatment, the present study aimed at evaluating the effects of hydroalcoholic extract of olive leaf on coronary artery function in streptozotocin-induced diabetic male rats with and without exercise training. In this experimental study, 50 male Wistar rats (250-300 g) were randomly divided into five groups (n=10 per group): 1. Healthy control (CO), 2. Diabetic control (DC), 3. Diabetic control + Exercise training (DC+EX), 4. Diabetic control + *Olea europaea L.* (D+OIL), 5. Diabetic + exercise training + *Olea europaea L.* (DC+EX+OIL). Diabetes was induced by intraperitoneal injection of nicotinamide-streptozotocin. The rats in D+OIL and DC+EX+OIL groups performed submaximal exercise on treadmill for 5 days a week/ 8 weeks and received 200 mg/kgbw *Olea europaea L.* extract by gavage at 8 AM daily for 8 weeks. Twenty-four hours after the last training session, Isolated hearts were perfused using the Langendorff method and hemodynamic parameters were assessed. Then, levels of antioxidant enzymes and lipoproteins in the blood were measured.[1] Olive leaf extract with 8 weeks of exercise training led to increased activity of superoxide-dismutase and catalaseenzymes and increased lipoprotein levels of LDL and HDL in diabetic rats but it had no effect on improving LDL levels. It also prevented increased response to coronary artery stenosis due to diabetes and increased response to coronary artery dilator. Current study could be helpful in increasing the tendency to use exercise and olive leaf extract in treatment of diabetic patients and preventing cardiovascular complications including coronary artery endothelial disorders in these patients.[2]

References

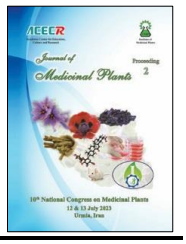
1. Nazem F, Farhangi N, Neshat-Gharamaleki M. Beneficial effects of endurance exercise with *Rosmarinus officinalis labiatae* leaves extract on blood antioxidant enzyme activities.
2. Esmaeili M, Delphan B, Tavakkoli A, Tarrahi MJ. Effect of *Morus nigra* L, *Trigonella foenum graecum* L. Seed and olive leaf.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 39

Effect of magnetic field on vegetative growth and essential oil of lemon verbena (*Lippia citriodora*) in field condition

Majid Rahmati[1, *], Davood Ghasemipour[2], Hossien Askari[3], Farahnaz Hamdi Holaso[4]

[1, 3] *University of applied science and technology of Shabahang Shahriar, Tehran, Iran*
[2] *Ms of Rural Planning, Municipality of Tehran, Iran*
[4] *Sugar Beet Seed Institute (SBSI), Agricultural Research, Education, and Extension Organization (AREEO), Karaj, Iran*
E-mail: Kolerekhodro@gmail.com

ARTICLE INFO

Keywords:
Essential oil
Lemon verbena
Medicinal plant

ABSTRACT

The magnetic field causes electrical induction in plant tissues and has significant biological effects on the growth stages of the plant from germination to reproductive growth. The effect of magnetic field improves seed and seedling growth, increases chlorophyll and some physiological factors of plants, yield, yield components in legumes, grains, vegetables and medicinal plants [1,2]. In order to investigate some characteristics of lemon verbena medicinal plant, an experiment was conducted in the research field of university of applied science and technology of Shabahang Shahriar in 2022. The treatments included placing the root of lemon verbena plant in a magnetic field of 50 militesla in five repetitions along with the control (without magnetic field). Statistical analysis of data was done with SAS 9.1 statistical software t test. The results showed that the magnetic field has a positive effect on the studied traits and caused an increase in plant height, leaf length and width, fresh and dry weight, and essential oil percentage compared to the control. The height of the plant and the dry weight of the treated lemon increased by 20% and 9%, respectively, compared to the control. The magnetic field was effective on the percentage of plant essential oil in lemon and caused a 6% increase in plant essential oil compared to the control. According to the results, it seems that the application of magnetic field treatment can be a suitable solution to increase the yield of the plant and the percentage of essential oil in lemon verbena.

References

1. Eslamnia G, Fotouhi F. The effect of hydro-priming and magnetic field on economic yield and chlorophyll of grean beans. 1st International and 5th conference on Organic. 2017; University of Mohaghegh Ardebili. Ardrbil. Iran.

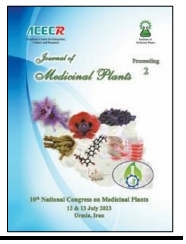
2. Marghaeizadeh GH, Gharineh M. H, Fathi G. H, Abdali A.R, Farbod, M. Effect of ultrasound waves and magnetic field on germination, growth and yeild of *Carum copticum* in lab anf field conditions. 2014; *Iranian Journal of Medicinal and Aromatic Plants* 30: 539-560.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 40

The Interaction Effects of Salinity Stress and Plant Growth-Promoting Rhizobacteria (PGPR) on the Morpho-Physiological Traits of Peppermint (*Mentha piperita* L.)

Nasrollah Soori[1,*], Amirarsalan Kavyanifard[2]

[1] *Assistant Professor of Agriculture Sciences, Payame Noor University, Tehran, Iran*
[2] *Assistant Professor of Biology, Payame Noor University, Tehran, Iran*
E-mail: Dr.soori@pnu.ac.ir

ARTICLE INFO

Keywords:
Salinity stress
Bacteria
PGPR
Morpho-Physiological Traits
Peppermint

ABSTRACT

Plant growth-promoting rhizobacteria improve the performance of plants under stress conditions by using different mechanisms. In order to investigate the effect of salinity stress and plant inoculation with rhizobacteria on the morpho-physiological traits of peppermint, an experiment was conducted in the research greenhouse of the Faculty of Agriculture of Lorestan University in 2020, as split-plot factorial in a Randomized Complete Block Design with three replications. Water salinity stress at three levels (0, 2 and 4 dS/m of sodium chloride solution) and inoculation with PGPRs at five levels (Control (No bacterial inoculation), Inoculation with *Azospirillum lipoferum*, *Bacillus* sp. strain A, *Bacillus amyloliquefaciens* and *Streptomyces rimosus*) were considered as main and sub factors, respectively. The results of the research showed that the effect of bacteria and salinity stress on plant height, number of main branches, number of sub-branches, leaf dry weight, stem dry weight, leaf area, essential oil percentage, biological yield and essential oil yield were significant. With increasing stress intensity, all studied traits were decreased., While inoculation of plants with PGPRs caused a significant increase in these traits compared to the control treatment (No bacterial inoculation).

References

1. Nikbakht, N., Danesh Shahraki, A., & Koohi Dehkordi, M. The effect of drought stress and plant growth promoting rhizobacteria on agro-morphological characters of lemon balm (*Melissa officinalis* L.). *Environmental Stresses in Crop Sciences*, 2022, 15(2), 393-405.

2. Roodbari, N., Roodbari, S. H., Ganjali, A., Nejad, F. S., & Ansarifar, M. The effect of salinity stress on growth parameters and essential oil percentage of peppermint (*Mentha piperita* L.). *International Journal of Advanced Biological and Biomedical Research*, 2013, 1(9), 1009-1015.

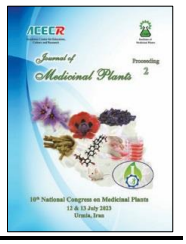
3. Ghorbani, M., Movahedi, Z., Kheiri, A., & Rostami, M. Effect of salinity stress on some morpho-physiological traits and quantity and quality of essential oils in Peppermint (*Mentha piperita* L.). *Environmental Stresses in Crop Sciences*, 2018, 11(2), 413-420.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 43

Evaluation of Therapeutic Effect of Traditional Ointment (*Phellinus pomaceus* (Pers.) Maire, egg yolk, Eucerin) on second degree burns in rat

Mohammad Azadbakht[1], Fereshte Talebpoor[2], Atefe Mohseni[3], Fateme Alizade[4,*]

[1]*Department of Pharmacognosy, Faculty of Pharmacy, Mazandaran University of Medical Science, Sari, Iran*
[2]*Department of Biochemistry, Faculty of Medicine, Mazandaran University of Medical Sciences, Sari, Iran*
[3]*Student Research Committee, Faculty of Pharmacy, Mazandaran University of Medical Science, Sari, Iran*
[4]*Medicinal Plants Research Center, Mazandaran University of Medical Sciences, Sari, Iran*
E-mail: Ft.shamalizade@gmail.com

ARTICLE INFO

Keywords:
Egg yolk
Burn wound
Silver sulfadiazine
Wound healing
Ethno botanic

ABSTRACT

Various species of plants are existing around the world which has been used as a native therapy for centuries. The present product is the result of ethnobotanical studies in the Kajur heights, Mazandaran province, which is used as a common treatment for burnt wounds. The aim of this study was to determine the healing effect of a traditional formulation containing Halipentac (*Phellinus pomaceus* (Pers.) Maire) and egg yolk, it was carried out on second degree burns of rats. The *P. pomaceus* fungi was collected from forest areas in northern Iran, and then it was evaluated for the amount of microelements such as zinc, iron and cooper by atomic absorption method. Traditional formulation of ointment prepared by the fungi's ash, egg yolk and eucerin as base. Then the healing effect evaluated on 20 rats and in 28 days. The rats divided to 4 equal groups and received base ointment (placebo), normal saline (NS), standard 1% silver sulfadiazine ointment (SSD) and the traditional ointment (TO). Average burn surface, wound contraction percent and histopathological evaluation examined during the study.The average wound surface at the end of 28 days was the lowest in TO group. Compared to the control group and the SSD group, there was a significant difference. On the 28th day, wound contraction was 98.85% in TO group and it was 91.30% in SSD group. In histopathological studies, collagen fibers in TO group are well formed compared to other groups. The formation of granule tissue is clear in TO group. Fibroblast maturation was clearly observed in TO and SSD groups. The amount of neoangiogenesis in the granular tissue of the wound area in the TO group was significantly higher than the control and negative control groups. Clearly the prepared ointment seems to be effective in burn wound healing.

References

1. Dolatkhahi M, Nabipour I. Ethnobotanical study of medicinal plants used in the northeast latrine zone of Persian Gulf. *Journal of Medicinal Plants* 2014; 13(50): 129-43.

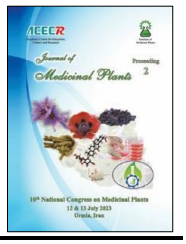
2. Razmjoue D, Zarei Z. Ethnobotanical study (identification, medical properties and how to use) of some medicinal plants of Behbahan city of Khuzestan province, Iran. *Journal of Medicinal Plants* 2017; 16(64): 33-49

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 44

Evaluation of Wound Healing by Topical Formulation of *Eryngium campester* L. and *Satureja hortensis* L. in an Animal Model

F Mohammad Azadbakht[1], Fereshteh Taleb Pour[2], Hossein Asgari Rad[3], Fatemeh Royaniyan[4], Masoumeh Bathaee[4,*]

[1] *Department of Pharmacognosy, Faculty of Pharmacy, Mazandaran University of medical Sciences, Sari, Iran*
[2] *Department of Anatomy, School of Medicine, Mazandaran University of medical Sciences, Sari, Iran*
[3]*Department of Pharmaceutics, Faculty of Pharmacy, Mazandaran University of medical Sciences, Sari, Iran*
[4]*Medicinal Plants research center, Mazandaran University of medical Sciences, Sari, Iran*
E-mail: Masoumehbathaee@yahoo.com

ARTICLE INFO

Keywords:
Wound
Eryngium campester L.
Satureja hortensis L.
Animal model

ABSTRACT

A wound is an injury caused by a variety of physical and chemical factors, and failure to repair it may lead to social problems. Due to the importance of the healing process of wounds and many side effects of chemical drugs, medicinal plants are recommended because of less side effects. *Eryngium campestre* L. (Zolang) is a plant of Apiaceae family that contains high amounts of phenolic and flavonoid compounds. *Satureja hortensis* L. (Summer Savory) is a plant of Lamiaceae family which has anti-inflammatory properties. The aim of this study was to investigate the effects of these plants on wound healing in an animal model. The ethanolic extract of leaves was prepared with maceration method for 72 hours, then concentrated and finally using a freeze dryer. In order to standardize the extract, the amount of total phenol and flavonoid was investigated.To determine the best formulation of lipogel, several formulation were designed with different ratios of paraffin, polyethene and extracts, and the best formulation was selected.20 male rats divided into four equal groups received: Normal saline, lipogel base, plant lipogel and active water. A 2 x 2 cm wound was created on their back. The healing process of the wound was examined on days 1, 3, 5, 7, 12 after the formation of wound. In order to evaluate the histopathological results, on the 12th day, a sample was taken and examined by light microscope.The results showed a significant difference in proliferation of fibroblasts , maturation of tissue and wound dimensions in the treatment group compared to other groups.($P<0.05$). The findings proved that the herbal lipogel form Zolang and Summer Savory is effective in healing and can be introduced as a suitable option in the treatment of acute wounds.

References

1. Medbouhi A, Benbelaïd F, Djabou N, Beaufay C, Bendahou M, Quetin-Leclercq J, et al. Essential oil of Algerian Eryngium campestre: chemical variability and evaluation of biological activities. *Molecules*. **2019**; 24(14): 2575.

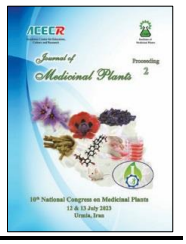
2. Sharifi A, Mohammadzadeh A, Zahraei Salehi T, Mahmoodi P. Antibacterial, antibiofilm and antiquorum sensing effects of *Thymus daenensis* and *Satureja hortensis* essential oils against Staphylococcus aureus isolates. *Journal of applied microbiology*. **2018**; 124(2): 379-88.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 45

Investigating the effect of alginate nanoparticles containing salicylic acid on the phytochemical changes of sugarcane under drought stress

Raana Fathi[1], Elham Rostami[1,*], Maryam Kolahi[2]

[1] *Department of Chemistry, Faculty of Science, Shahid Chamran University of Ahvaz, Ahvaz, Iran*
[2] *Department of Bilogy, Faculty of Science, Shahid Chamran University of Ahvaz, Ahvaz, Iran*
E-mail: e.rostami@scu.ac.ir

ARTICLE INFO

Keywords:
Drought tolerance
Sugarcane
Nanoparticles
Alginate

ABSTRACT

Sugarcane with the scientific name *Saccharum officinarum* L. is cultivated as an important source of food and bioenergy in many tropical and subtropical countries. This product supplies almost two-thirds of the world's sugar [1]. Despite advances in cultivation technology, developing sugarcane for drought tolerance remains a major challenge. In addition to the complexity of the sugarcane genome, the complexity of the plant's response to water shortage and the difficulty of identifying physiological and morphological traits add to the difficulty of this challenge. Studies have shown that nanotechnology has made it possible to increase the efficiency of nutrient use in plants. Alginate is a polysaccharide extracted from brown seaweed, including kelp, which is used as a gelling agent in the food industry [2]. Alginate is a salt of alginic acid, which is a polymer of D-β mannuronic acid (M) and L-α gluronic acid (G) units. In agriculture, alginate is used to coat seeds, fruits and stem tips. Alginate is also used as a hydrophilic coating due to its hydrophilic properties [3]. The aim of this research is to evaluate the effect of alginate nanoparticles on the phytochemical changes of different parts of sugarcane seedlings under drought stress in the cultivation environment. Some alginate was dissolved in deionized water at a temperature of 15 °C. Then 1 gram of anhydrous calcium chloride is added and after about 12 hours, 1 gram of salicylic acid is added and the solution is stirred for 24 hours. Then the resulting nanoparticles are separated by ultracentrifuge and dried at room temperature. 10 cm pieces of the end bud of sugarcane plant variety CP48 were transferred to the MS base culture medium after disinfection. After the sprouts grow and the infected samples are removed, the sprouts are transferred to the culture medium for rooting. After sprout production and proper growth, drought stress was applied using polyethylene glycol 6000 at levels of 10, 20, and 30 grams per liter for one week, and at the same time, nanoparticles were used at levels of 50 and 300 mg and in three repetitions. The results indicated that the use of alginate nanoparticles is effective in reducing the effects of dryness and in similar conditions, its use as a foliar spray can be useful.

References

1. D'Hont, A., Souza, G. M., Menossi, M., Vincentz, M., Van-Sluys, M. A., Glaszmann, J. C., & Ulian, E. Sugarcane: a major source of sweetness, alcohol, and bio-energy. In *genomics of tropical crop plants* . Springer, New York, NY. **(2008)**, 483-513

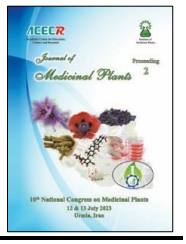
۲.برنجی اردستانی، س.، و عزیزی، م.، و ظهوریان، گ.، و هادیان، ز.، و امیری، ز. ارزیابی خواص مکانیکی و فیزیکی فیلم های خوراکی آلژینات کلسیم. *علوم و صنایع غذایی ایران*، **(۱۳۸۹)**، ۷(۴), ۵۵-۶۴ .

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 46

Investigation effect of oak (*Quercus infectoria*) and carob (*Ceratonia siliqua*) extracts on *Varroa destructor*

Farnaz Malekifard[1,*], Mousa Tavassoli[1], Paria Karimi[1]

[1] *Department of Pathobiology, Faculty of Veterinary Medicine, Urmia University, Urmia, Iran*
E-mail: f.malekifard@urmia.ac.ir

ARTICLE INFO

Keywords:
Oak
Carob
Varroa destructor
Apistan
Honey bee

ABSTRACT

Varroa destractor is one of the most important pests of honey bee (*Apis mellifera*) throughout the world [1]. Recently, pesticides supplication against *V. destractor* caused drug resistance in honey bee [2]. For this reason, the present study was carried out to evaluate the effect of oak (*Quercus infectoria*) and carob (*Ceratonia siliqua*) extracts on *V. destractor* in parallel with Apistan. This investigation was carried out to evaluate effects of three concentration of the oak and carob extracts in three replications on the *V. destractor* under laboratory condition. In control group, mites were dipped in distillate water. Twenty adult mites were used for each treatment. The adult mite mortality for the tree concentration of 1, 2, 3% was respectively recorded as 12.45%, 67.37%, and 97.18 for oak extract and 7%, 56.82%, and 89.04% , for oak extract. In an infested apiary, three groups (three hives with average of 3 mites per 20 honey bees for each hive) were chosen to evaluate basic concentration of oak and carob extracts (2.5%) in comparison with Apistan and control groups. There was significant effect between oak (37.42±2.51) and carob (29.24±12.14) extracts in treatment and Apistan group (72.05±24.58). The highest effect of oak and carob extracts and Apistan on *V. destractor* was found in 36 (37.22%), 48(32.21%) and 24 (39.91%) hours, respectively. The provided oak and carob extract similar to Apistan had no side effects on examined honey bees. It was concluded that oak and carob extracts had lethal effect on *V. destractor* infestation in honey bees.

References

1. Anderson DL, Trueman J. W. H. *Varroa jacobsoni* (Acari: Varroidae) is more than one species. *Experimental and Applied Acarology.*2000*;* 24: 165–189.

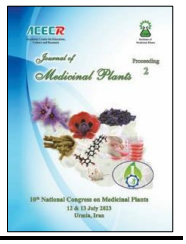
2. Spreafico M, Eördegh F, Bernardinelli I, Colombo M. First detection of strains of *Varroa destructor* resistant to coumaphos. Results of laboratory tests and field trials. *Apidologie.* 2001; 32: 49-55.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 48

Anthelmintic effects of Lavender Essential oils on *Marshalagia marshali*

Yousef Ahmadzadeh naghadeh[1], Farnaz Malekifard[1,*], Bijan Esmaeilnejad [1]

[1] *Department of Pathobiology, Faculty of Veterinary Medicine, Urmia University, Urmia, Iran*
E-mail: f.malekifard@urmia.ac.ir

ARTICLE INFO

Keywords:
Marshalagia marshali
Lavender essential oils
Oxidative stress
DNA damage
Nitric oxide

ABSTRACT

Drug resistance in parasitic disease ranked among the top public health concerns [1]. Therefore, seeking for new agents to control parasites is an urgent strategy. In the recent years, plants and a number of their active ingredients have been considerably evaluated for anthelmintic effects [2]. The current study was carried out to assess possible anthelmintic impacts of Lavender essential oils on *Marshalagia marshali*, a prevalent gastrointestinal nematode. Several biomarkers of oxidative/nitrosative stress and DNA damage were measured. Various concentrations of the Lavender extract (1, 5, 10, 25 and 50 mg/mL) and examined helminths were provided and co-incubated for 24 hours. The parasite mobility, mortality, several biomarkers of oxidative/nitrosative stress and DNA damage were measured. The mobility decreased and the mortality increased in a concentration and time dependent pattern. Lavender essential oils exerted significant wormicidal effects via induction of oxidative/nitrosative stress and DNA damage.The in-vitro antiparasitic effect of the essential oils of Lavender was satisfactory in this study, however, in-vivo efficacy of Lavender essential oils, recommended for further studies.

References

1. Jalali TS, Malekifard F, Esmaeilnejad B, Rezaie SA. Toxicities of the copper and zinc oxide nanoparticles on *Marshallagia marshalli* (Nematoda: Trichostrongylidae): evidence on oxidative/nitrosative stress biomarkers, DNA damage and egg hatchability. *Journal of Helminthology* 2021; 95: p.e70.

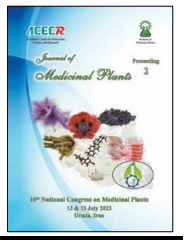
2. Ullah R, Rehman A, Zafeer MF, Rehman L, Khan YA, Khan, MAH, Khan SN, Khan A.U, Abidi SMA. Anthelmintic Potential of Thymoquinone and Curcumin on *Fasciola gigantica*. *PLoS One* 2017; 12.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 50

Changes in the activities of catalase (CAT) and phenylalanine ammonia lyase (PAL) in tomato (*Solanum lycopersicum* L) under the influence of UV-B and zinc oxide nanoparticles

Sara Khoshbakht[1,*], Latifeh Pourakbar[1]

[1]*Department of Biology, Faculty of Science, Urmia University, Urmia, Iran*
E-mail: Sarah.kh1444@gmail.Com

ARTICLE INFO

Keywords:
antioxidant enzymes
ultraviolet light
zinc oxide nanoparticle
Solanum lycopersicum L.

ABSTRACT

High light and fluctuation lead to light inhibition and accumulation of reactive oxygen species around photosystems I and II, respectively and prolonging the photoperiod causes the onset of photoperiod stress syndrome [1]. Over the past few decades, the stratospheric ozone layer has decreased due to the emission of halogenated compounds of human origin. This has increased solar UV-B radiation [2]. The aim of this work is to investigate the growth and biochemical effects on tomato (Solanum lycopersicum L.) caused by exposure to UV-B for 30-60 minutes and the application of zinc oxide nanoparticles on two levels (50 -100 ppm) in order to reduce the effects of stress. According to the obtained results, the greatest decrease in UV-B 60 minutes was observed for growth factors, which was 20.33% in shoot length and 19.67% in root, 25.80% fresh weight of shoot and 48.19% in root. Also, the dry weight of the shoot was 41.93% and that of the root was 24.85% compared to the control. Also, the highest increase in biochemical indices in UV-B 60 minutes, for malondialdehyde in shoot 14.03% and in roots 54.84%, hydrogen peroxide in shoot 40.06% and in roots 59.59%. , catalase 40.06% in the shoot and 33.76% in the root, and PAL enzyme activity in the shoot 21.14% and 17.45% in the root was observed. the use of zinc oxide nanoparticles reduced the harmful effects of UV-B stress in tomato plants and was able to compensate for the effects caused by this stress.

References

1. Roeber VM, Bajaj I, Rohde M, Schmülling T, Cortleven A. Light acts as a stressor and influences abiotic and biotic stress responses in plants. *Plant, Cell & Environment*. 2021, 44(3): 645-64.

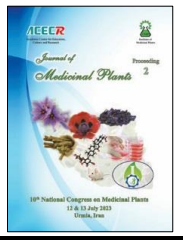
2. Hosseinnezhad S, Zadshir M, Yu X, Yin H, Sharma BK, Fini E. Differential effects of ultraviolet radiation and oxidative aging on bio-modified binders. *Fuel*. 2019, 251:45-56.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 52

Evaluation of adulteration in products containing *Lavandula angustifolia* Mill. extract using microextraction methods combined with chemometric methods

Fateme Tajabadi[1,*], Zahra Tarasoli[2], Hakim Faraji[2], Mohsen Shabani[2], Hamidreza Shahbazi[2]

[1] *Medicinal Plants Research Center, Institute of Medicinal Plants, ACECR, Karaj, Iran*
[2] *Department of Chemistry, Varamin-Pishva Branch, Islamic Azad University, Varamin, Iran*
E-mail: tajabadif@yahoo.com

ARTICLE INFO

Keywords:
Lavandula angustifolia
Extract
Adulteration
Principal component analysis
Herbal medicine

ABSTRACT

The *lavandula angustifolia* Mill. (Lavender) plant is one of the most useful and widely used medicinal plants. This plant is found in various medicines. The lack of studies into identifying the essential oil of *L. angustifolia* and its similar appearance to *Nepeta menthoides* Boiss. & Buhse *(N. menthoides)* as "Ustukhuddoos" in Iranian traditional medicine, have caused misuse and adulteration in the products [1]. In this study, the main purpose is the extraction and measurement of the main components of the lavender extract and its herbal medicines and clustering of the products based main components by principle component analasis [2]. Using clean-up method based on the hollow fiber-liquid phase mictriextraction (HF-LPME) with the help of HPLC analysis, the chromatogram pattern amount and the key components of lavender extracts and its products were investigated. Then with the help of chemometric methods the product were clustered. Based on the observations, it was concluded in the all products, the presence of lavender extract *(L. angustifolia*) were approved. Microextraction methods, along with instrumental analysis methods, provide a powerful and accurate tool to identify counterfeits.

References

1. Amin Gh, Bozorgi M, Hossein salari A, Khalaj A, Zolfaghari B, Rahimi R, Soleimani S, Shams Ardakani M, Shirzad M and Taleb T. Ostokhodus. *Teb Sonati Eslam & Iran* 1398; 10: 89-96 [In Persian].

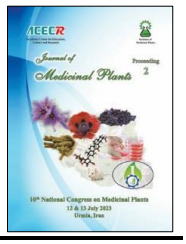
2. Kladar, N., Anačkov, G., Srđenović, B., Gavarić, N., Hitl, M., Salaj, N., & Božin, B. (2020). St. John's wort herbal teas–Biological potential and chemometric approach to quality control. *Plant Foods for Human Nutrition*, 75, 390-395.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 53

Evaluation of the quality of *Lavandula angustifolia* Mill. essential oil in the products using GC/MS with chemometric methods

Fateme Tajabadi[1,*], Zahra Tarasoli[2], Hakim Faraji[2], Mohsen Shabani[2], Hamidreza Shahbazi[2]

[1] *Medicinal Plants Research Center, Institute of Medicinal Plants, ACECR, Karaj, Iran*
[2] *Department of Chemistry, Varamin-Pishva Branch, Islamic Azad University, Varamin, Iran*
E-mail: tajabadif@yahoo.com

ARTICLE INFO

Keywords:
Lavandula angustifolia
Essential oil
Adulteration, Principal component analysis
Herbal medicine

ABSTRACT

The essential oil of *Lavandula angustifolia* Mill. (*L. angustifolia*), a species from the Lamiaceae family, possesses several biological activities; therefore it is used in some herbal medicines [1]. The lack of studies into identifying the essential oil of *L. angustifolia* and its similar appearance to *Nepeta menthoides* Boiss. & Buhse *(N. menthoides)* as "Ustukhuddoos" in Iranian traditional medicine, have caused misuse and adulteration in the products [2]. In this study, the chemical compositions of *L. angustifolia* and *N. menthoides* essential oils, and three commercial herbal medicines of *L. angustifolia* essential oil in Iranian markets were evaluated and investigated as adulteration with the help of GC/MS analysis and chemometric methods. The essential oils of *L. angustifolia* and *N. menthoides*, and commercial samples were extracted by different extraction methods. Furthermore, their chemical compositions were evaluated by GC/MS analysis. After identification of components by GC/MS, the obtained results were assessed by principal component analysis (PCA, Unscrambler X version 10.4) for clustering. Results showed that all three commercial herbal preparations matched with the manufacturer's claim about using *L. angustifolia* essential oil in the products. PCA distinguished two groups which were characterized based on different types and amounts of the components. GC/MS analysis with the help of chemometric methods is a powerful method to evaluate and discriminate between the essential oils and their products. In general, the combination of instrumental analysis and clustering chemometric analysis can provide an accurate tool for identifying misuse between plant species.

References

1. Smigielski K, Raj A, Krosowiak K and Gruska R. Chemical composition of the essential oil of *Lavandula angustifolia* cultivated in Poland. *J. Essential Oil Bearing Plants* 2009; 12(3): 338-347. doi: 10.1080/0972060X.2009.10643729.

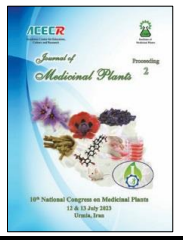
2. Amin Gh, Bozorgi M, Hossein salari A, Khalaj A, Zolfaghari B, Rahimi R, Soleimani S, Shams Ardakani M, Shirzad M and Taleb T. Ostokhodus. *Teb Sonati Eslam & Iran* 1398; 10: 89-96 [In Persian].

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 54

Choosing the most suitable season and planting date to attainment the optimal yield of medicinal plant *Securigera securidaca* L.

Seyedeh Azamat Miri[1,*] and Vahid Akbarpour[2]

[1] *Department of Science and Engineering Horticulture, Agriculture Faculty, Zanjan University, Iran*
[2] *Department of Science and Engineering Horticulture, Crop Science Faculty, Sari Agricultural Science and Natural Resources University (SANRU), Iran*
E-mail: azmiri2006@gmail.com

ARTICLE INFO

Keywords:
Medicinal plants
Securigera securidaca L.
Planting date
Yield

ABSTRACT

The increasing approach to the use of medicinal plants at the global level has increased the importance of cultivation and production of these plants. Securigera securidaca L. is one of the important medicinal plants. This plant belongs to the genus fabaceae, herbaceous and annual plants and is cultivated in the continents of Europe, Australia and Asia, including the country of Iran, especially in the northern provinces and Khuzestan [1]. In Persian, this plant is also known as mountain lentils and bitter lentil. Of the total abiotic stresses that reduce plant yield, about 40% are related to the effect of high temperature, 20% of salinity, 17% of drought, 15% of low temperature and 8% of other factors [2]. By choosing the right planting date, you can control the effects of these stresses by about 70% [3]. The present study was conducted in order to investigate the effect of planting date in spring and autumn on the yield of lentil plant in the form of a completely randomized design with three replications in the research farm of Sari Agricultural Sciences and Natural Resources University (SANRU). In the spring season, the first planting date was 15th of April, and the subsequent dates continued with a 14-day interval until the end of June. For autumn planting, planting started on October 15 and continued until mid-November. The results of the research showed that spring cultivation compared to autumn cultivation significantly improved the yield and the average yield was 250 and 180 kg per hectare, respectively. The comparison of the planting dates in the spring season showed that the beginning of May is the best time to achieve the highest yield (270 kg/ha) because on this date the plant's temperature needs for rapid germination are met and it is also possible for the plant to use periodic spring rains. It is recommended to plant this plant at the end of spring season.

References

1. Alipoor Z, Mahmodi S. Determination of Cardinal Temperatures and Response of *Securigera securidaca* L. to Different Temperatures of Germination. 2016; *Iranian Journal of Seed Research*, Vol: 2(2), 137-147. doi: 10.26252/yujs.2.2.137.

2. Musavi S F, Siahpoosh M R, Sorkheh K. Influence of sowing date and terminal heat stress in phonological features and yield components of bread wheat genotypes. 2021; *Plant Productions*, 44(2), 157-170. doi: 10.22055/PPD.2019.28957.1744.

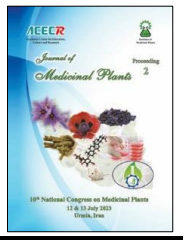
3. Tabiee H, Baradaran R. Investigating the effect of irrigation cycle and planting date on the agronomic characteristics of *Securigera securidaca* L. in Brigand region. 2014; *Iranian Journal of Field Crops Research*, 12(1), 80-90. doi: 10.22067/GSC.V12I1.36643.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 56

Germination and seedling growth of oat *(Avena sativa*) to salinity and drought stress

Javad Mohammadi[1 *], Majid Rahmati[1], Masoumeh Dehghan[1]

[1] *University of applied science and technology of Shabahang Shahriar, Tehran, Iran*

ARTICLE INFO

Keywords:
Biology
Germinayion
Medicinal plant

ABSTRACT

Salt and drought stress are two major environmental stress that affect growth and development of plants [1]. In order to assess the tolerance of this germination and seedling growth of oat (*Avena sativa*) to salinity and drought stress two separate trials in a completely randomized design with six treatments and five replications was conducted in 2022. On drought stress by solving a certain amount of polyethylene glycol 6000 for potential(-2, -4, -6, -8 and -10 Bar) and Salinity by dissolving different amounts of sodium chloride in distilled water to create potential (-2, -4, -6, -8 and -10 Bar) and distilled water for each two experiments were used for without stress conditions. At the end of experiment characteristics of such as germination percentage, speed germination, seedling vigor index were measured treatments. With increasing intensity of salt and drought stress from zero to -10 Bar oat seed germination 96 and 91 percent respectively compared to control was reduced. vigor index oat seedlings in both stress hundred percent to the highest potential for drought and salinity decreased in comparison with control. The functional three-parameter logistic model provided a successful estimation of the relationship between salt and drought stress levels germination response of oat. This model showed that salinity and drought at -4.53 and -5.25 bar, respectively caused 50% reduction in maximum germination percentage of oat.

References

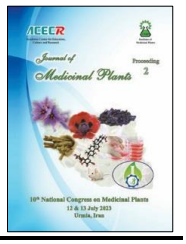
1. Gholami P, Ghorbani J, Ghaedi Sh. The effect of different levels of salinity and drought on germination charactiristics of *Secale montanum* in early growth stages. *Journal of Plant Ecophysiology*. 2011; 3: 79-81.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 57

Investigating the effect of humic acid concentrations on the morphological and biochemical characteristics of *Dracocephalum moldavica* L. and *Crocus sativus*

Sahar Shahqholi[1,*]

[1] *Department of Science and Arts university, Yazd, Iran, medicinal plants at Urmia University, Iran*
E-mail: saharshahgholi61@gmail.com

ARTICLE INFO

Keywords:
Humic acid
Chlorophyll
Total phenol

ABSTRACT

To prevent disease and improve health, nutraceuticals of plant origin are gaining popularity [1]. In present research, *Dracocephalum moldavica* L. and *Crocus sativus* L., as two medicinal plants, was investigated. The target was effect of different concentrations of humic acid on their vegetative, biochemical and physiological characteristics. The experiment was conducted as a factorial in the form of a completely random design in three replications in the research greenhouse of Shahid Bakri higher education center of Miandoab. The results of variance analysis showed that total phenol value in the *D. moldavica* L. was not significantly difference with control treatment. While in *C. sativus* L. compared to the control groups, total phenol decreased to 27.4 mg/ml. Also, carotenoids value in both plants at a concentration of 1.5 mg/ml had a significant difference compared to other concentrations and the control groups. Chlorophyll a in *D. moldavica* L. at a concentration of 1 mg/ml was the highest at 18.51 mg/ml, which was significantly different from the control groups And it increased in *C. sativus* L. compared to the control groups. Also, the total chlorophyll in *D. moldavica* L. increased compared to the control group and decreased in *C. sativus* L. on the measured traits showed that there was a significant difference in the concentration of 1.5 mg/ml in the *D. moldavica* L. compared to the control, but in the *C. sativus* L. was difference and observed in the concentration of 0.5 mg/ml. Finally, the use of humic acid can have an effective role in plant growth.

References

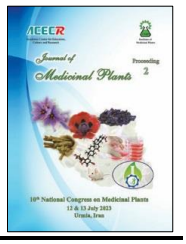
1. Husen, A. and M. Iqbal, Plant-based potential nutraceuticals for improving the human immune system, in *Traditional Herbal Therapy for the Human Immune System*. 2021, CRC Press. p. 1-12.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 59

Encapsulation *Melissa officinalis* extract by nano spray dry and investigation of the stability fabricated powder

Leila Bagherpour, **Samad N. Ebrahimi**[1,*]

[1] *Department of phytochemistry, Medicinal plants and Drugs Research Institute, Shahid Beheshti University, Evin, Tehran, Iran*
E-mail: s_ebrahimi@sbu.ac.ir

ARTICLE INFO

Keywords:
Lemon balm
Encapsulation
Phenolic compound
Alginate
Drug delivery

ABSTRACT

Melissa officinalis is an herbaceous and perennial plant of the mint family, which is one of the oldest and most common medicinal plants, which has many pharmacological properties due to its many biological compounds (volatile compounds, triter pens, phenolic acid, flavonoids)[1]. The active ingredients of plant extracts exhibit various beneficial effects such as anti-proliferative, anti-angiogenic, anti-viral, antioxidant, anti-anxiety, anti-depressant, and anti-Alzheimer. To enhance their stability and bioavailability, the spray drying technique is utilized for encapsulation. Encapsulation is commonly used in the pharmaceutical and food industries to preserve phenolic compounds. Spray drying is a popular drying method due to its efficiency, low cost, and ability to produce high-quality particles. However, even if the coating materials used are suitable, optimizing various parameters related to spray drying is necessary to achieve high efficiency for encapsulation and the desired particle quality. The aim of this research is to optimize the extraction process and investigate the role of encapsulation is to obtain high quality particles to increase product stability. For this purpose, aqueous and hydro alcoholic (٧٠ %) extracts were prepared. Rosmarinic acid was tested in different extracts by HPLC-UV method. Investigating the amount of rosemary in different extracts quantitatively and qualitatively showed that the highest amount of rosemary with a value of 4.48 mg/g DW and with a concentration of 10.8% belongs to the hydro alcoholic extract (30:70). For encapsulation, the spray drying method was utilized with the application of the sodium alginate polymer. This study aimed to investigate three parameters, which are the inlet temperature, air velocity, and atomization pressure. Results showed that particles with an average diameter of 600 to 1600 nm were obtained when the inlet air temperature ranged from 100 to 170°C. Although increasing the temperature led to an increase in production efficiency (20 to 27 percent), the encapsulation efficiency did not follow a specific pattern. This study is currently examining the humidity level at two different inlet air temperatures and atomizer pressures, specifically 100°C with 4 bar atomizer pressure and air speeds of 50 and 100, and 115°C with 4 bar atomizer pressure and air speeds of 50 and 100, where the humidity level is 5%. Additionally, the study is investigating the DPPH test and drug release.

References

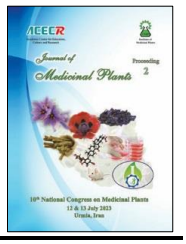
1. Miraj, S.; Rafieian-Kopaei, M.; Kiani, S. *Melissa officinalis* L: A Review Study with an Antioxidant Prospective. *J. Evid.-Based Integr*. Med. 2017, 22, 385–394.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 60

The effect of Algae and Gibberellin treatments on yield and growth indices of *Crocus sativus* L.

Sahar Shahqholi[1,*]

[1] *Department of Science and Arts university, Yazd, Iran, medicinal plants at Urmia University, Iran*
E-mail: saharshahgholi61@gmail.com

ARTICLE INFO

Keywords:
Algae
Gibberellin
mother corm
daughter corm
colorimetric

ABSTRACT

Saffron (*Crocus sativus* L.) is a medicinal plant[1]It is belonging to the family Iridaceae comprises the dried red stigma that It improves memory and learning skills [2]. For Investigating the effect of Algae, gibberellin hormone and a coupled of them on *Crocus sativus* L. yield and active ingredients, was done factorial experiment in completely randomized design on three replications in Shahid Bakri higher education center of miandoab in 2022 growing cycle. The test factors included four levels of seaweed, gibberellin and a mixture of gibberellin and seaweed hormone (zero, 0.5, 1.0, and 1.5 g/ml solution). The treatments were applied in October month after saffron ripening. The results showed that averaging weight of the mother corm was 12.96 grams. The application of these treatments increased the weight of the mother corm, fresh weight and the length of the root but decreased the weight of the daughter corm and dry weight. Total chlorophyll, carotenoids, chlorophyll and chlorophyll b illustrated a significant difference in compared control treatment. Also colorimetric parameters such as L, a, b, chroma was determined by Hunter Lab colorimeter, and the standard error (SE) was estimated 3.26, 0.66, 1.9, and 1.03, respectively, and the correlation coefficient between chroma and concentration had a significant. Finally, the use of the above treatments while improving the soil properties, led to the improvement of the flower properties and the effective substances of the saffron stigma

References

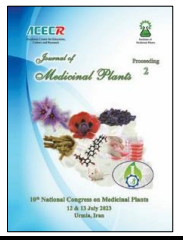
1. El Midaoui, A., et al., *Saffron (Crocus sativus* L.*):* A source of nutrients for health and for the treatment of neuropsychiatric and age-related diseases. *Nutrients*, 2022. **14**(3): p. 597.
2. Srivastava, R., et al., *Crocus sativus* L.*:* a comprehensive review. *Pharmacognosy reviews*, 2010. **4**(8): p. 200.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 61

Investigating the Obstacles to Success the Business of Medicinal Plants in the Country

Morteza Nasiri Alvandpour[1,*], Abazar Nemati[1]

Administration University of Applied Science and Technology Parts Makers of Fajr-e-Misagh
E-mail: morteza69nasirialvand@gmail.com

ARTICLE INFO

Keywords:
Entrepreneurship
Medicinal plants
Economy
Law

ABSTRACT

The medicinal plants industry is one of the industries that can have many jobs and businesses (Small to Large). Small businesses are known as the main sources of job creation in countries. These businesses are very important due to their special characteristics and also because of their important contribution to the level of employment in countries, increasing the economic growth and developing societies. One of the obstacles to the development of small businesses is the existence of severe and unstable administrative bureaucracies. The next is the laws of control the companies. Company registration laws for business creation and also complex tax systems are main obstacles against the creation and growth of businesses. Various laws, including laws related to contracts, intellectual property rights, enforcement procedures, bankruptcy laws, and private property laws are not well designed. Businesses related to medicinal plants are also involved in these problems. According to many economists, the existence of a leading and strong agricultural sector is one of the necessities of the country's economic development, and until the obstacles to the development of this sector are removed, other sectors will not achieve prosperity, growth and development [1]. Surveys show that the demand for the consumption of medicinal plants in the country has increased in recent years. The major problems faced by the production and export of medicinal plants include the high price of products compared to many exporting countries, lack of sufficient knowledge of foreign markets and lack of direct communication with the main buyers. Other problems are the standard level, not having sufficient government investment in the field of foreign market recognition, lack of training of exporters and also the economic capacity of cultivation and processing in domestic and global markets. The present research was conducted in the form of a questionnaire in 2022 (Survey of about 100 people) and the relevant forms were completed and reviewed with the help of economic and entrepreneurial experts (in Research Institute of Forests and Rangelands), factory managers, sellers and buyers (in Alborz- Karaj). In summing up the comments from the questionnaires, the major problems of producers in the field of medicinal plant marketing are lack of guaranteed purchase of medicinal plants, lack of necessary technology for the processing of medicinal plants, lack of transformation and complementary industries of herbalism, non-compliance with technical points and hygiene in the production and processing and packaging of medicinal plants, the weakness of the production standards of medicinal plants, the high cost of harvesting some medicinal plants, the lack of awareness of farmers regarding the relative advantage of medicinal plants, the weakness of support services in the production, packaging and processing medicinal plants, minor ownership and limited harvesting and wholesale of medicinal plants without a single processing by the farmer.

References

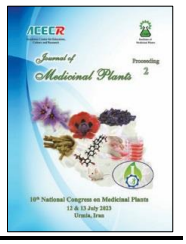
1. Svetlicic, M., Gilmore, A. and Cummins, D., 2007. Internationalization of small and medium-size enterprises from selected central European economies. *Eastern European Economics*, 45: 36-65.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 63

Effects of environmental factors stress on seed germination *Datura metel* L.

Mohammad Nodrati [1,*], Mehdi Hosseinzadeh[1], Akram Karimi[1] , Masoumeh Dehghan[1]

[1]*University of applied science and technology of Shabahang Shahriar, Tehran, Iran*
E-mail: mohammadnodrati7931@gmail.com

ARTICLE INFO

Keywords:
Biology
Medicinal plant
Seedling

ABSTRACT

Germination of medicinal plant has an important role in its establishment in an agricultural and seed germination and seedling establishment are critical and important stages in plant life cycle caused by environmental factors [1 , 2]. Seeds of *Datura metel* were sterilized with 5% sodium , hypochlorite solution for 5 min. Salinity stress was induced by using sodium chloride (NaCl) and drought stress by using Polyethylene Glycol (PEG-6000). five ml NaCl solution and PEG-6000 (-0.2, -0.4, -0.6, -0.8, -1 MPa) were added in different petri plates [1]. The control contained five ml of sterile distilled water. to study the effect of pH on germination, pH solutions with acidity of 4 to 9, and depth effect on seeds cultivated at depths of 0, 3, 6, 9 and 12 cm. Germination was carried out in a germination chamber with a regime of 24 h dark at 25 °C. Analysis of variance of the effects of salinity and drought stress on seed germination of *D.metel* suggested that these treatments made significant changes at ($P<0.05$). Three-parameter logistic model showed that salinity and drought stress at -0.4 and –0.3 MPa, respectively caused 50% reduction in maximum germination percentage of *D.metel*. In addition 50% decrease in germination speed caused by salinity and drought stress, were observed in -0.38 and -0.30 MPa, respectively. The optimum pH for germination was 7.5. The highest percentage of emergence of in surface soil seeds was 85.50% and with increasing soil depth the percentage of seedling emergence decreased.

References

1. Zare A, Ghorbani F. The effect of environmental factors on germination of seed of the medicinal plant Kakuti (*Ziziphora* sp.). The 16th National Congress of Agricultural Sciences and Plant Breeding of Iran. 2020.

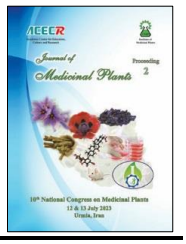
2. Kumar M, Agnihotri R.K, Vamil R, Sharma R. Effect of phyto hormones on seed germination and seedling growth of *Coriandrum sativum* L. *Pak. J. Biol Sci* 2014; 17: 594-596.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 65

Simultaneous Application of Salicylic Acid and Silicon on Some Growth Indicators and Photosynthetic pigments in (*Scrophularia striata* L.) under drought stress.

Fariba Shohani[1], Siavash Hosseinin Sarghein[1], Arash Fazeli[2,*]

[1]*Department of Biology, Faculty of Sciences, Urmia University, Urmia, Iran*
[2] *Department of Agronomy and Plant Breeding, Ilam University, Ilam, Iran*
E-mail: a.fazeli@ilam.ac.ir

ARTICLE INFO

Keywords:
drought stress
salicylicacid
silicon
Srophularia striata L.

ABSTRACT

Drought is one of the most important growth-limiting factors that greatly impacts the quality and quantity of plants. On the other hand, the increase of lands exposed to drought and the lack of sufficient access to water resources have focused a lot of attention on drought-related issues[1]. In the present study, A factorial experiment was conducted based on a completely randomized design in three replications to investigate the effect of salicylic acid and silicon on some morphological and physiological indicators of *Srophularia striata* L. drought stress conditions. For this purpose, plants were exposed to salicylic acid (SA) treatments at two levels (0 and 100 PPM), silicon (Si) at two levels (0 and 1 g/L) and drought stress at two levels (100 and 50 percent of agricultural capacity) in greenhouse conditions [2-3].Four weeks after applying the treatments, the morphological and physiological indicators of the plants were checked. The results of data analysis showed that drought caused a decrease in growth factors (stem length and root length), the content of Photosynthetic pigments, and carotenoid compared to the control samples. Treatment of plants with silicon and salicylic acid reduced the effects of drought stress and increased root length and the content of photosynthetic pigments. In the present study, the simultaneous application of salicylic acid and silicon increased the content of chlorophyll b and carotenoid content compared to treatments exposed to drought, confirming the role of silicon and salicylic acid in reducing osmotic tension.

References

1. Dianat M, Saharkhiz M.J, Tavassolian I, 2016. Salicylic acid mitigates drought stress in *Lippia citriodora* L.: Effects onbiochemical traits and essential oil yield. *Biocatalysis and Agricultural Biotechnology* 8, 286-293. doi: 10.1016/j. bcab. 2016.10.010.

2. Rostami Z, Fazeli A, Hojati Z, 2022. The isolation and expression analysis of cinnamate 4-ydroxylase and chalcone synthase genes *Scrophularia striata* under different abioticelicitors. *Scientific Reports*, 12: 8128. doi: 10.1038/s41598-022-12361-8.

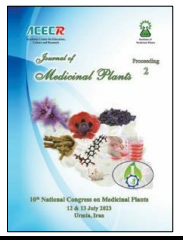
3. Gengmao Z, Shihui L, Xing S, Yizhou W, Zipan C. 2015. The role of silicon in physiology of the medicinal plant (*Lonicera japonica* L.) under salt stress. *Scientific Reports*, 5:12696. doi: 10.1038/srep12696.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 67

Wheat germ, a byproduct of the wheat milling industry, as a good source of anti-aging polyamines: a quantitative comparison of various forms

Maryam Mohajeri[1], Maryam Khandan[1,*]

[1] *Phytochemistry Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran*
E-mail: m.khandan@sbmu.ac.ir

ARTICLE INFO

Keywords:
Polyamine extraction
Wheat germ
Isobutyl Chloroformate
HPLC-MS/MS method

ABSTRACT

Polyamines have received a lot of attention since the 1990s because of their anti-aging, anti-chronic disease, and proliferative effects (1). Wheat germ was reported as one of the high natural polyamine sources, especially spermidine (2). The current study used three types of wheat germ: group A was industrially separated germ from whole grain, group B was commercially available germinated wheat germ, and group C was manually separated wheat germ from germinated grain. The polyamine content of putrescine, spermidine and spermine has been determined using a simplified isocratic LC-MS/MS method. An optimized extraction procedure was performed on all seven samples for obtaining a polyamine enriched extract. The three dominant carbomylated polyamines were identified by analyzing the extracted samples in order to determine their relative abundance. Wheat germ powders contain the highest amount of polyamines (220-337 µg/g) of which spermidine is one of the most important. Germinated wheat grains, on the other hand, contain the least amount of this polyamine. The commercially available separated wheat germs are suggested as a good nutrition source of these polyamines.

References

1. Minois, Nadège. 2014. “Molecular Basis of the ‘anti-Aging’ Effect of Spermidine and Other Natural Polyamines - A Mini-Review.” *Gerontology* 60(4):319–26. doi: 10.1159/000356748.

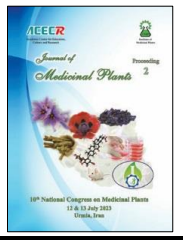
2. Tong, Dan and Joseph A. Hill. 2017. “Spermidine Promotes Cardioprotective Autophagy.” *Circulation Research* 120(8):1229–31. doi: 10.1161/CIRCRESAHA.117.310603.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 68

Comparison of essential oil composition of *scoparia* subspecies from *Ajuga chamaecistus* species in Yazd province of Iran

Farahza Kazemi Saeed[1,*], Fatemeh Sefidkon[1], Ziba Jamzad[1], Atousa Vaziri[2] and Adel Jalili[1]

[1] *Research Institute of Forests & Rangelands, Research Institute of Forests & Rangelands, Tehran, Iran*
[2] *Department of Biology, Payame Noor University (PNU), Tehran, Iran*
E-mail: farahzakazemisaeed@gmail.com

ARTICLE INFO

Keywords:
Ajuga chamaecistus
essential oil
Thymol
Isopropyl Tetradecanoate
Isopropyl Hexadecanoate

ABSTRACT

Ajuga is one of the genera of the *Lamiaceae* family. The plants of this genus are among valuable medicinal plants whose properties are less known. One of these species that has the most distribution in Iran is *Ajuga chamaecistus*, which has several subspecies and most of its subspecies are endemic to Iran. Few researches about the essential oil of this plant in Tehran and Semnan (1, 2) provinces have determined that the essential oil of these plants includes thymol, linalool, carvacrol, Spathulenol and 1,8-cineole, which are known as strong antioxidants. Also, the essential oils of these plants contain large amounts of isopropyl tetradecanoate and isopropyl hexadecanoate, which are widely used substances in the cosmetic industry. In this research, the species *Ajuga chamaecistus* was collected from two regions of Yazd province, Chenarnaz region and Barfkhaneh mountains. Identification of the plants revealed that both plants belong to the *scoparia* subspecies. The results of essential oil analysis revealed the presence of 14 compounds in the Chenarnaz region subspecies and 18 compounds in Barfkhaneh subspecies. Although these compounds were similar in terms of type, their amount was different in two subspecies. The subspecies of Chenarnaz region contained 8.5% thymol, while the amount of this compound was found to be 1.8% in Barfkhane subspecies. The amount of isopropyl tetradecanoate and isopropyl hexadecanoate in Chenarnaz subspecies was 4.3% and 20.1%, respectively, and in Barfkhane subspecies was 10.9% and 11.3% respectively.

References

1. Mohammadhosseini, M., Pazoki, A., Zamani, H. A. and Akhlaghi, H., 2011. Chemical Composition of the Essential Oil from Aerial Parts of *Ajuga chamaecistus* Ging. subsp. *Scopria* in Brackish Regions of Iran, *Jeobp*, 14 (1): 101-105 Pp.

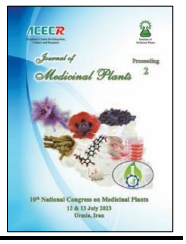
2. Shams Ardekani, M. R., Khanavi, M., Taheri, P., Samadi, N., Safaripour, E. and Salimpour, F., 2010. The essential oil composition of *Ajuga chamaecistus* Ging: subsp. *tomentella* Rech. f., *Jeobp* 13 (1): 45-51 Pp.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 69

Chewing Gum Containing Natural Anti-Alzheimer Disease and Anti-cancer Nano Fenchol and Nano Quercetin

Maria Beihaghi[1, *], Zahra Jannati[1], Mahdieh Marei[1], Sahar Salehi[1]

[1] *Department of Biology, Kavian Institute of Higher Education, Mashhad, Iran*
E-mail: maria_beihaghi@yahoo.com

ARTICLE INFO

Keywords:
ROS
Cancer
Gum
Alzheimer
Fenchol

ABSTRACT

The chewing gum consisting of natural Nano Fencol and Nano Quercetin which is anti-Alzheimer and also anticancer in the fields of food and medical industry. The main and common component in all diseases such as different types of Cancers and alzheimers is the existent of oxidative stress and oxygen free Radicals production. Quercetin and Fencol not only restrain producing ROS inside the body cells but also, they prevent forming Amyloid plaques in brain as well as stimulating pathways of apoptosis inside the cancer cells besides having barrier properties for cardiovascular system. These substances are primarily produced in size of nanoparticles then are used in Saghez chewing gum produced from Van trees.So, Nano Fencol and Nano Quercetin are two of the components employed in this product. This research was conducted on Alzheimer's model mice. This model was created using manganese nano powder. Alzheimer's rats were split into three groups: gavage treatment, oral treatment, and intraperitoneal injection treatment. Molecular and histopathology tests were performed on hippocampus samples. Because pharmaceutical forms and other combinations of substances containing Fencol and Quercetin are not easily available and usable, chewing gum to administer Fencol can easily solve this problem. Nanostructures, on the other hand, have the properties of gradual release as well as high penetration. Drug delivery is gradually done having high permeation because of Saghez and Nano structure. Producing nanostructured drugs can increase its penetrance as well as targeted transmission. Hence, producing every kind of food supplement, types of filling materials and flavored chewing gum including Curcumin can be effective for various diseases such as cancers of tongue, esophageal, stomach as well as alzhimer.

References

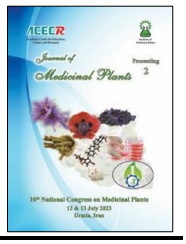
1. Liczbiński and et al 2020, University of South Florida (USF Health), October 5, 2021.
2. Rana Shafabakhsh and Zatollah Asemi. 2019
3. Prajwal, S., and M. Rupesh Kumar. "The Neuroprotective Effects of Medicinal Plants on Alzheimers Disease: A Review". *Asian Journal of Advances in Medical Science* (2022): 5-16.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 70

Genetic diversity of *Erodium* species in Iran using ISSR markers

Sanaz Namanloo Beik[1], Samaneh Mosaferi[1,*], Maryam Keshavarzi[1]

[1]*Department of Plant Sciences, Faculty of Biological Sciences, Alzahra University, Tehran, Iran*
E-mail: s.mosaferi@alzahra.ac.ir

ARTICLE INFO

Keywords:
Erodium
Genetic diversity
ISSR markers

ABSTRACT

Erodium ĹHér. ex Aiton (Geraniaceae) comprises 120 species in the world and 14 species in Iran [1]. *Erodium* is an important medicinal plant and different species of this plant have been recognized to treat diseases such as colds, coughs, diarrhea, and wounds [2]. Despite the importance and distribution of *Erodium* species in Iran, genetic diversity of this genus is not completely studied. Present study illustrates the level of genetic diversity and population structure of these species in Iran. In total, 89 individuals from seven species of *Erodium* were sampled from 24 localities in Iran. Total genomic DNA was isolated using the modified CTAB method [3]. Inter- simple sequence repeat markers were selected. Assessment of 14 primers resulted in selection of 9 primers. After doing PCR and visualizing the products on Agarose gel, reproducible amplified bands were scored in a binary format as present (1) or absent (0). Data analyses were done using GenAlex, PopGene, DARwin softwares. AMOVA test showed that most of variations were within taxa. Nei's genetic identity compared to genetic distance revealed that *E. oxyrrhynchum* and *E. cicutarium* had the highest similarity but *E. malacoides* and *E. griunum* showed the lowest one. Mantel test showed significant correlation between genetic and geographical distances. UPGMA tree (Nei's genetic distance) showed that all the species studied are placed in the first cluster while *E. griunum* was placed in a separate cluster. Within first cluster, *E. oxyrrhynchum* and *E. cicutarium* had more affinity. Our findings are in concordance with previous morphological studies.

References

1. POWO. Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew. 2023; http://www.plantsoftheworldonline.org/ Retrieved 03 May 2023."

2. Fecka I, Kowalczyk A, Cisowski W. Phenolic acids and depsides from some species of the *Erodium* genera. *Z. Naturforsch C.* 2001; 56: 943-950. doi: 10.1515/znc-2001-11-1205.

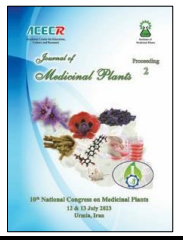
Doyle JJ, Doyle JL. A rapid DNA isolation procedure from small quantities of fresh leaf tissues. *Phytochem Bull*. 1987; 19: 11-15.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 71

Micromorphological study of medicinal plant, *Tribulus* in Iran

Elham Ebrahimnia[1], Maryam Keshavarzi[1,*], Samaneh Mosaferi[1], Zahra Nazem Bokaei[1]

[1]*Department of Plant Sciences, Faculty of Biological Sciences, Alzahra University, Tehran, Iran*
E-mail: m.keshavarzi@alzahra.ac.ir

ARTICLE INFO

Keywords:
Tribulus
Micromorphology
Leaf
Mericarp

ABSTRACT

Tribulus L. as a member of Zygophyllaceae contains annual and perennial species which are widely distributed in tropical regions of the world [1]. These plants contain secondary metabolites such as alkaloids, steroids, saponins, and vitamins. Medicinal properties such as antioxidant, anti-cancer, and anti-inflammatory have been mentioned for this genus [2]. Since systematics of this taxon is not studied in Iran, in this project we focused on micromorphological characters to determine diagnostic features between different species. Fifteen populations from four species of *Tribulus* were gathered from different localities in Iran and after identification, leaf and mericarp of these species were studied micromorphologically. Samples were mounted on metallic stubs, coated with 100Å layer of gold and photographed with a Scanning Electron Microscope (TESCAN model). Our results showed that characters such as trichome destiny in leaf surface, length/width of stomata, anticlinal cell walls of dorsal leaf surface, length/width of mericarp, presence/ absence of trichome and shape of trichome on mericarp surface were among diagnostic features to delimit species studied. Based on our observation, dorsal surface of leaf in *T. mollis* Ehrenb. Ex Schweinf. showed the highest level of trichome density and mericarp of surface of *T. parvispinus* C. Presl was without trichome.

References

1. POWO. Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew. 2023; http://www.plantsoftheworldonline.org/ Retrieved 03 May 2023."

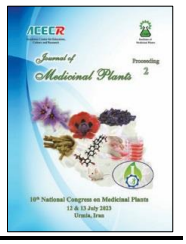
2. Parham S, Kharazi AZ, Bakhsheshi-Rad HR, Nur H, Ismail AF, Sharif S, RamaKrishna S, Berto F. Antioxidant, antimicrobial and antiviral properties of herbal materials. *Antioxidants*, 2020; 9(12), 1309. https://doi.org/10.3390/antiox9121309

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 72

A Mixture of *Foeniculum vulgare*, *Lavandula angustifolia*, and *Pimpinella anisum* Extracts Ameliorates Letrozole-Induced ovarian malfunction in Polycystic Ovarian Syndrome Rats by balancing hormones

Mohammad Jafari Shiran[1], Saeed Khani[1], Fatemeh Shabani[2], Saeed Naseri[1,*]

[1] *Center of Herbal Medicine, Iranian Academy Center for Education, Culture, and Research (ACECR), Ardabil, Iran*
[2] *Midwifery Department, Faculty of Nursing and Midwifery, Tabriz University of Medical Sciences, Tabriz, Iran*
[3] *Department of Pharmacology and Toxicology, Faculty of Pharmacy and Pharmaceutical Sciences, Tehran Medical Sciences, Islamic Azad University, Tehran, Iran*
E-mail: herbalpharma07@gmail.com

ARTICLE INFO

Keywords:
Anovulation
Polycystic Ovary Syndrome (PCOS)
Rats
Herbal medicine

ABSTRACT

Polycystic ovary syndrome (PCOS) is one of the most common causes of infertility among females in their reproductive age. There are many medications for PCOS, but they have several side effects (1, 2). In this regard, natural products could offer less invasive and high-efficacy treatment for PCOS patients. The present study aimed to evaluate the impact of Farafavania herbal extract containing *Foeniculum vulgare*, *Lavandula angustifolia*, and *Pimpinella anisum* on letrozole-induced PCOS in rats. Forty-five adult female Wistar rats were randomly divided into five groups (n=9), including Control, PCOS, Metformin (Met), Farafavania1 (F1), and Farafavania2 (F2). After induction of PCOS using letrozole (1 mg/kg/day), animals in the PCOS, Met, F1, and F2 groups were treated orally for 15, 30, or 45 days with distilled water (1 ml/day), Metformin (500 mg/kg/day), Farafavania extract 1 (0.6 ml/day), and Farafavania extract 2 (1.2 ml/day) respectively. Serum levels of several hormones and the histopathological status of ovaries were measured on days 15, 30, and 45 of treatment. Based on our findings, serum levels of testosterone and LH in Met, F1, and F2 groups significantly reduced compared to the PCOS group, while estradiol and progesterone levels significantly increased ($p < 0.05$). The number of primary, Graafian, antral follicles, and corpora lutea significantly increased. In contrast, the number of follicular cysts significantly decreased in Met, F1, and F2 groups compared to the PCOS group ($p < 0.05$). Using Farafavania extract would help restore ovarian function and modulate hormonal imbalances related to PCOS.

References

1. Farideh ZZ, Bagher M, Ashraf A, Akram A, Kazem M. Effects of chamomile extract on biochemical and clinical parameters in a rat model of polycystic ovary syndrome. *J Reprod Infertil*. 2010; 11(3): 169-74.

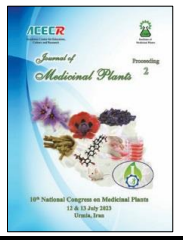
2. Ryan GE, Malik S, Mellon PL. Antiandrogen treatment ameliorates reproductive and metabolic phenotypes in the letrozole-induced mouse model of PCOS. *Endocrinology*. 2018; 159(4): 1734-47.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 74

Assessment of the potential of putrescine and zinc sulfate foliar application to enhance growth and phytochemical properties of black cumin (*Nigella sativa* L)

Nesa Hamidieh[1,*], Hassan Sarikhani[1], Ali Azizi[1]

[1]*Department of Horticultural Science, Bu-Ali Sina University, Hamedan, Iran*
E-mail: nesa.hamidieh@gmail.com

ARTICLE INFO

Keywords:
Black cumin
Oil percentage
Polyamines
Root growth
Zinc sulfate

ABSTRACT

Polyamines, in addition to promoting root growth, have been found to stimulate the production of essential compounds in plants and modulate the biosynthesis pathways of plant metabolites [1, 2]. Micronutrients are also essential for optimal plant growth, product performance, and quality [3]. In this study, a factorial experiment was conducted to investigate the effect of putrescine and zinc sulfate on the growth and phytochemical characteristics of black cumin (*Nigella sativa* L.) plants. Putrescine was applied in three concentrations (0 mM, 0.25 mM, and 0.5 mM), while zinc sulfate was applied in three concentrations (0%, 0.05%, and 0.1%) via foliar spraying. Growth characteristics, phytochemical characteristics, and oil percentage and quality were evaluated. Results showed that the use of putrescine increased root length, seed weight, shoot dry weight, and total polyphenols, while the application of zinc sulfate increased root length, seed weight, and shoot dry weight. The combined application of putrescine and zinc sulfate significantly increased the number of flowers, fresh weight of shoot and root, dry weight of root, chlorophyll b, flavonoid content, and oil percentage. The treatment with 0.25 mM putrescine and 0.1% zinc sulfate resulted in the highest plant height, number of flowers, fresh weight of roots and shoots, and dry weight of roots. Fatty acid analysis revealed that the treatments significantly affected the percentage of oleic acid, 2-cis-alpha linoleic acid, palmitic acid, and stearic acid. The highest percentage of oleic acid was obtained in the treatment with 0.25 mM putrescine and 0.05% zinc sulfate.

References

1. Abd Elbar OH, Farag RE, Shehata SA. Effect of putrescine application on some growth, biochemical and anatomical characteristics of *Thymus vulgaris* L. under drought stress. *Ann. Agric. Sci.* 2019; 64(2): 129-137. doi: 10.1016/j.aoas.2019.10.001

2. Mahdavian M, Sarikhani H, Hadadinejad M, Dehestani A. Exogenous application of putrescine positively enhances the drought stress response in two citrus rootstocks by increasing expression of stress-related genes. *J. Soil Sci. Plant Nutr.* 2021; 21: 1934-1948. doi:10.1007/s42729-021-00491-3

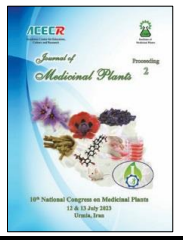
3. Ashkiani A, Sayfzadeh S, Shirani Rad AH, Valadabadi A, Hadidi Masouleh E. Effects of foliar zinc application on yield and oil quality of rapeseed genotypes under drought stress. *J. Plant Nut.* 2020; 43(11): 1594-1603. doi: 10.1080/01904167.2020.1739299

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 75

Investigation of anthocyanin content in sour tea (*Hibiscus sabdariff*) and the effect of copigments on it

Mandana Ebrahimzadeh*, Rashid Jamei

[1] *Department of Biology, Faculty of Sciences, Urmia University, Iran*
E-mail: man.ebrahimzadeh@gmail.com

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.

References

1. Shen Y, Zhang N, Tian J, Xin G, Liu L, Sun X, Li, B. Advanced approaches for improving bioavailability and controlled release of anthocyanins. *Journal of Controlled Release*. 2021, 341: 285-299.

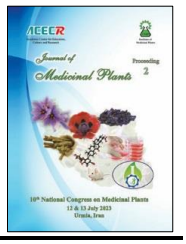
2. Babaloo F, Rashid Jamei R. Anthocyanin pigment stability of *Cornus mas*–Macrocarpa under treatment with pH and some organic acids. *Food Science and Nutrition*. 2018, 6(1): 168-173.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 76

Effect of different levels of garlic essential oil on rumen metabolism and methane production in a ration containing apple pomace by *in vitro* techniques

Behzad Asadnezhad[1,*], Rasoul Pirmihammadi[1], Hamed Khalilvandi[1], Zahra Salehian[1]

[1]*Department of Animal science, Faculty of Agriculture, Urmia University, Urmia, Iran*
E-mail: b. asadnezhad@urmia.ac.ir

ARTICLE INFO

Keywords:
Garlic essential oil
Rumen metabolism
Methane production
Gas production

ABSTRACT

Due to the prohibition of the use of growth-promoting antibiotics, the use of plant essential oils has attracted more attention from animal nutritionists. Essential oils increase the production of volatile fatty acids, reduce methane production, improve metabolism and increase the efficiency of feed utilization in animal feed (Patra, 2011). A suitable alternative to antibiotics should have a strong antibacterial ability, so that by selectively affecting the microflora of the digestive system, it leads to the improvement of digestion, metabolism and absorption of nutrients. Therefore, the aim of this project was the effect of different levels of garlic essential oil on fermentation properties and methane gas production in a ration containing apple pomace using the in vitro techniques. This research was conducted at the Animal Science Research Station of the Faculty of Agriculture, Urmia University. Apple pomace 24% dry matter was obtained from Urum Narin factory in Urmia city. In order to determine the amount of methane produced in 24 hours, separate incubation was used during the gas production test. The experimental treatments included: control (basic diet), basic diet with 0.02% garlic essential oil, basic diet with 0.04% garlic essential oil, and basic diet with 0.06% garlic essential oil. The basic diet contained 25% alfalfa, 25% barley, 25% corn silage, and 25% apple pomace. In order to determine the effect of treatments on the kinetics and parameters of gas production, it was used to determine the pressure of produced gas in three separate run and three repetitions for each sample in each run. Ruminal fluid was obtained from three fistulated Holstein bulls weighing 280 kg. The amount of gas production under the influence of the treatments showed a significant decrease compared to the control ($P<0.05$). The pH value under the influence of the treatments showed a significant increase compared to the control ($P<0.05$). Methane gas production showed a significant decrease in all treatments compared to the control ($P<0.05$). According to the results of this experiment, it can be concluded that the addition of garlic essential oil by reducing gas production and thus reducing the decomposition of fast-fermenting diets in the rumen prevents a sharp drop in rumen pH and metabolic acidosis, and also causes a decrease Methane production, which is one of the problems in the animal husbandry industry today.

References

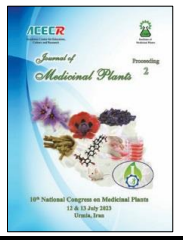
1. Patra K. 2011. Effect of Essential Oils onRumen Fermentation, Microbial Ecology and Ruminant Production. *Asian Journal of Animal and VeterinaryAdvances* 6: 416-428, 2011.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 77

Effects of fennel seed (*Foeniculum Vulgare*) powder in apple pomace based diets on ruminal metabolism, and fermentation parameter by in vitro techniques

Behzad Asadnezhad[1,*], Rasoul Pirmihammadi[1], Hamed Khalilvandi[1], Zahra Salehian[1]

[1]*Department of Animal science, Faculty of Agriculture, Urmia University, Urmia, Iran*
E-mail: b. asadnezhad@urmia.ac.ir

ARTICLE INFO

Keywords:
Fennel seed
Rumen fermentation, Methane production, Apple pomace

ABSTRACT

Even though diets containing high dense substances have higher energy production efficiency compared to diets containing high fiber, they can increase the risk of acidosis by reducing rumen pH (Abdullah et al, 2009). Considering that no data has been published regarding the effect of ground fennel seeds on ration containing apple pomace, so the aim of this study is to determine Effects of fennel seed (*Foeniculum Vulgare*) powder in apple pomace based diets on ruminal metabolism, and fermentation parameter by in vitro techniques**.** This research was conducted at the Animal Science Research Station of the Faculty of Agriculture, Urmia University, Apple pomace 24% dry matter was obtained from Urom Narin factory in Urmia. In order to determine the amount of different rumen parameters such as pH, protozoan population and the amount of methane produced in 24 hours, separate incubation was used during the gas production test. The experimental treatments included: control (basic diet), basic diet with 3 g/kg of fennel seed powder, basic diet with 6 g/kg of fennel seed powder, and basic diet with 9 g/kg of fennel seed powder. The basic ration contained 25% alfalfa, 25% barley, 25% corn silage and 25% apple pomace. In order to determine the effect of treatments on the kinetics and parameters of gas production, it was used to determine the pressure of produced gas in three separate run and three replication for each sample in each run. Ruminal fluid was obtained from three fistulated Holstein bulls weighing 280 kg. The amount of gas production under the influence of the treatments showed a significant decrease compared to the control. The gas production of the fermentable part showed a significant reduction in all treatments compared to the control ($P<0.05$). The constant part of the degradation rate (c) did not show a significant difference compared to the control, but it showed a significant difference between the treatments ($P<0.05$). Methane gas production showed a significant decrease in all treatments ($P<0.05$). The pH value showed a significant increase in all treatments compared to the control ($P<0.05$). The protozoan population in all treatments showed a significant decrease compared to the control ($P<0.05$). According to the results of this experiment, it can be concluded that the addition of fennel seeds by improving rumen parameters reduces acidosis and methane production in dense diets, which is one of the biggest problems in the animal husbandry industry.

References

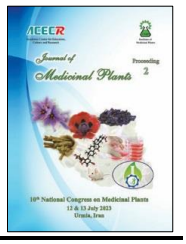
1. Abdullah A. Mohamme and Rabia j. Abbas. The Effect of using Fennel Seeds (*Foeniculum vulgar* L.) on Production Performance of Broiler chickens. *Br. Poult. Sci*. 2009; 8: 642-644

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 78

Investigating the antioxidant and antiradical properties of phenolic compounds in pomegranate (*Punica granatum*)

Mina Taheri Asl Kharabeh*, Rashid Jamei

[1] *Department of Biology, Faculty of Sciences, Urmia University, Iran*
E-mail: m.taherie1994@gmail.com

ARTICLE INFO

Keywords:
Pomegranate
Free radicals
Antioxidant
Phenolic compounds

ABSTRACT

Pomegranate (*Punica granatum*) belongs to the Punicaceae family (1). Due to its color, pomegranate has phenolic compounds that play a significant role in the treatment of various diseases, including diabetes, inflammation, and cardiovascular problems. Phenolic compounds are a group of biologically active compounds and plant secondary metabolites synthesized to protect the plant and possess significant antioxidant and antiradical capacity (2). This study aims to investigate the antioxidant and antiradical properties of phenolic compounds in pomegranate. Pomegranate extracts were obtained using 100%, 70%, 30% methanol solvents, and distilled water. The amount of total phenol, total flavonoid, and fat peroxidation inhibitory capacity were measured by the thiobarbituric acid (TBA) method, and the percentage of nitric oxide radical collection was determined to identify the solvent with the best antioxidant and antiradical properties of phenolic compounds in pomegranate. The results showed that the highest phenolic content was observed in the 100% methanol solvent, while the lowest was in distilled water. Similarly, the highest flavonoid content was found in the 100% methanol solvent, and the lowest was in distilled water. The 100% methanol solvent had the highest ability to inhibit fat peroxidation, whereas distilled water had the lowest. In terms of the capacity to collect nitric oxide free radicals, the lowest amount was observed in distilled water, and the highest was in 100% methanol. According to the results of this study, it appears that all the tests have a direct relationship with the amount of phenol. All the tests were repeated three times, and there was a significant difference between the results obtained, indicating the impact of methanol extraction on phenol content. The most phenol was found in the 100% methanol solvent in all experiments.

References

1. Hosseini, A., Razavi, B. M., & Hosseinzadeh, H. (2022). Protective effects of pomegranate (*Punica granatum*) and its main components against natural and chemical toxic agents: A comprehensive review. *Phytomedicine*, 154581.

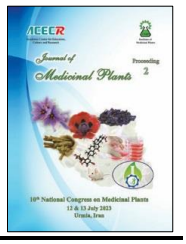
2. Vargas-Ramella, M., Pateiro, M., Gavahian, M., Franco, D., Zhang, W., Khaneghah, A. M., ... & Lorenzo, J. M. (2021). Impact of pulsed light processing technology on phenolic compounds of fruits and vegetables. *Trends in Food Science & Technology*, 115, 1-11.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 79

Qashqai People Indigenous and Local Knowledge of Medicinal Plants

Danial Shojapour[1,*], Mohammad Rahim Frouzeh[1], Hossein Barani[1], Abolfazl Sharifian[1,2]

[1]*Department of rangeland management, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Iran*
[2]*Centre for Ecological Research, Institute of Ecology and Botany, Vácrátót, Hungary*
E-mail: danialsh9899@gmail.com

ARTICLE INFO

Keywords:
Ethnobotany
Ethnopharmacology
Qashqai nomads
Fars province
Medicinal plants

ABSTRACT

Indigenous communities and local populations have an inherent and inseparable relationship with the natural environment, and their knowledge system is considered an invaluable resource (1). This knowledge is a result of centuries of observations and empirically tested hypotheses about the environment (2). The Qashqai tribe, being one of the largest ethnic groups in the country, have gained a profound understanding of their natural surroundings during their early lives in the southern Iranian mountains. The research area consisted of Hengam and Jaydasht, two villages situated in the Fars province, approximately 208 km southeast of Shiraz city. The study used the snowball sampling technique to conduct semi-structured interviews with 92 participants, both men and women, from two clans, Amaleh and Kashkuli Koochak, of the Qashqai tribe. The data collected consisted of the vernacular names of 24 important medicinal plant species, their medicinal properties, the plant parts used for medicine, methods of preparation, and consumption techniques. The Asteraceae family was the most abundant, consisting of five species. The leaves were the most frequently used medicinal parts (66.6%), while the infusion method was the preferred preparation technique (54.2%). The most commonly treated ailments were related to the digestive system (32.4%), with the *Glycyrrhiza glabra* having the highest Use-Value index. In summary, the Qashqai nomads in the study area possess a unique and valuable body of indigenous knowledge about medicinal plants. This information can provide a basis for developing phytochemical knowledge and producing herbal medicines.

References

1. Gorenflo, L.J., Romaine, S., Mittermeier, R.A. and Walker-Painemilla, K. 2012. Co-occurrence of linguistic and biological diversity in biodiversity hotspots and high biodiversity wilderness areas. *Proceedings of the National Academy of Sciences*. 109(21): 8032-8037.

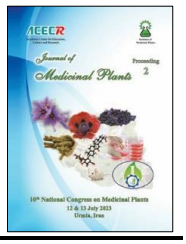
2. Pearce, F. 2016. Common Ground: Securing land rights and safeguarding the earth. *Oxfam International*.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 80

The effects of polyamine supplement on some phytochemical parameters of *Stevia rebaudiana* Bert.

Seyed Mehdi Razavi[1,*], Kamran Moradi[1,]

[1] *Department of Biology, Faculty of, Science, University of Mohaghegh Ardabili, Ardabil, Iran*
E-mail: razavi694@gmail.com

ARTICLE INFO

Keywords:
Stevia
Polyamine
Anthocyanin

ABSTRACT

Stevia (*Stevia rebaudiana*) is regarded as a well known medicinal plant of Asteraceae family of plants. It is indigenous to south America, however, it has been cultivated in all over of the world for its sweetener compounds, steviol glycosides. In the present investigation, to evaluate the effects of polyamine supplement on Stevia phytochemicals an experiment was carried out using a randomized design plane with three replications. The results showed that free amino acid and anthocyanin content of Stevia plants were increased approximately to 35 percent in polyamin treated group than control. However, At this treatment group, total flavonoid, total phenol, steviol glycosides and tannin contents were not changed compared to control group. It can be concluded that Stevia treatment with polymanin supplement can induced only anthocyanin group of the secondary metabolites biosynthesis in the Stevia plant.

References

1. Alcázar, R., Altabella, T., Marco, F., Bortolotti, C., Reymond, M., Koncz, C., Carrasco, P. and Tiburcio, A.F. (2010). Polyamines: molecules with regulatory functions in plant abiotic stress tolerance. *Planta*, 231(6): 1237-1249. doi: 10.1007/s00425-010-1130-0.

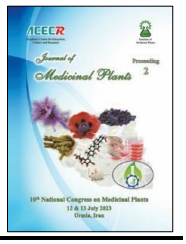
2. Chanturvedula, V.S.P. and Prakash, I. (2011). Isolation and NMR spectral assignments of steviolbioside and stevioside. *Int. J. Res. Ayuv. Pharm*., 2(4): 1395-1401.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 81

Induction of Hairy root in the Medicinal plant *Withania somnifera* using *Agrobacterium rhizogenes* Strain Atcc-15834

Nasibe Soltaninezhad [*1], Seyed.Ahmad Sadat- Noori [2], Ali Izadi-Darbandi [3], Ali Fadavi[4], Fateme Amini [5], Mohammad.Hossein Mirjalili[6].

[1,2,3,5] *Department of Agronomy and Plant Breeding Sciences, College of Aburaihan, Pakdasht, Tehran, Iran*
[4] *Department of Food Industry Sciences, College of Aburaihan, Pakdasht, Tehran, Iran*
[6] *Department, Research Institute of Medicinal Plants and Raw Materials, Shahid Beheshti University, Tehran, Iran*
E-mail: soltaninezhad.na@ut.ac.ir

ARTICLE INFO

Keywords:
Withania somnifera
Atcc-15834
Hairy root
Growth pattern
Biomass

ABSTRACT

Withania somnifera, from the Solanaceae family, is rich in valuable steroid lactones (withanolides) for which many therapeutic properties have been reported. Hairy root culture is a production process that offers high genetic stability and rapid growth and increase in metabolites without the use of hormones. In this research, *Agrobacterium rhizogenes* strain Atcc-15834 and different explants (leaf, stem, hypocotyl, cotyledon) were used to produce hairy roots and increase withanolide. The best induction was done in the leaf explants. The percentage of hairy root induction with the studied strain was determined to be 72 %. Different lines produced were examined in terms of morphology and other characteristics and the best line was selected for further investigation. Confirmation of transgenic hairy roots was done by PCR using specific primers of *rolA*, *rolB* and *rolC* genes.In examining the growth pattern of the lines, the maximum growth time of the superior line was determined in the fifth week with the highest biomass (2.38 grams) and the highest dry weight (0.28 grams). The root hair doubling time in the superior line was obtained on the 9th day.

References

1. Singh, M., Suyal, D., Dinkar, N., Joshi, S., Srivastava, N., Maurya,V., Agnihotri, A., v Agrawal, S. 2023. Agrobacterium rhizogenes as molecular tool for the production of hairy roots in *Withania somnifera*. *Journal of Applied Biology & Biotechnology* Vol. 11(2), pp. 1-10. DOI: 10.7324/JABB.2023.110201.

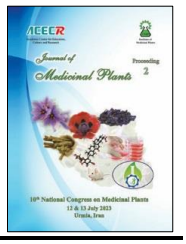
2. Kim, S., Yu, J.S., Lee, J.Y., Choi, S.U., Lee, J., Kim, K.H. 2019. Cytotoxic withanolides from the roots of Indian Ginseng (*Withania somnifera*). *J. Nat. Prod*. 82, 765–773.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 82

Investigating the lethal effect of medicinal plant Matrine® on different ages of Indian moth *Plodia interpunctella* (Lepidoptera: Pyralidae) larvae

Shahram Aramideh[1,*], Abbas Hosseinzadeh[2], Maryam Azimi[1]

[1]*Department of Plant Protection, Faculty of Agriculture, Urmia University, Urmia. Iran*
[2]*Department of Plant Protection, Faculty of Agriculture, Mahabad University, Mahabad, Iran*
E-mail: Ma_azimi58@yahoo.com

ARTICLE INFO

Keywords:
Medicinal plants
Indian moth
Lethal effect

ABSTRACT

Considering the economic importance of stored pests and the occurrence of environmental problems and the dangers of using fumigant chemical insecticides in store, the use of medicinal plants and biological pesticides has received more attention (1). Matrine as botanical insecticide, natural alkaloid extracted from *Sophora flavescens Ait.* Plant with contact, digestive function is used in pest control (2). In this research, the lethal effect of extracts and essential oils of Matrine®on the second and third instar larvae of Indian moth, *Plodia interpunctella* (Lepidoptera: Pyralidae) after 24 and 72 hours in laboratory conditions was investigated. The contaminating artificial food method was used in bioassay larvae. The LC_{50} value of Matrin® on second instar larvae of Indian moth after 24 and 72 hours was 130.38 and 65.23 ppm, and on third instar larvae after 24 and 72 hours it was 142.97 and 87.02 ppm, respectively. The results of the present research showed that Matrine® has a significant lethal effect on the larvae of the Indian moth, so this medicinal plant with low-risk insecticide can be used in the stored pest management program.

References

Mohandass S., F.H. Arthur., K.Y. Zhu & J.E. Throne. 2007. Biology and management of *Plodia interpunctella* (Lep.: Pyralidae) in stored products. *Journal of Stored Products Research*. 43: 302-311.

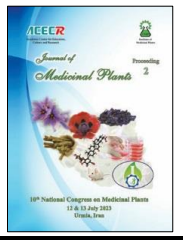
Hikal, WM., R.S. Baeshen & A.H. Said-Al. 2017. Botanical insecticide as simple extractives for pest control. *Cogent Biology*. 3(1): 1404274.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 83

Foliar application of *β*-aminobutyric acid improves the grapefruit mint (*Mentha suaveolens* × *M. piperita*) phytochemicals under water deficit stress

Soghra Akbarzadeh[1], Mohammad Reza Morshedloo[1,*]

[1]*Department of Horticultural Science, Faculty of Agriculture, University of Maragheh, Maragheh, Iran*
E-mail: morshedlooreza@gmail.com

ARTICLE INFO

Keywords:
Linalool acetate
Linalool
essential oil
dry weight
grapefruit mint

ABSTRACT

Grapefruit mint (*Mentha suaveolens* × *M. piperita*) is an important medicinal herb in the cosmetic, health, food and medical industries. Water deficit is one of the most common environmental stress, which limiting the agricultural industry all over the world. *β*-aminobutyric acid (BABA) as an elicitor compound leads to the induction of resistance in plants under water stress. The present study was carried out in order to investigate the antioxidant properties, essential oil compounds, essential oil yield and content of grapefruit mint under water deficit stress and foliar application of BABA. For this purpose, a factorial experiment was carried out in a completely randomized design (CRD) with three replications in a glass greenhouse. The first factor includes three levels of irrigation (0, 35%, 55%, and 100% FC) and second factor includes three levels of BABA spraying (0, 0.8, 1.6, and 100 mM). Based on the results obtained, drought stress treatment significantly increased total phenol and flavonoid contents and antioxidant activity. The highest value for phenol and flavonoid contents and antioxidant activity were observed in severe drought stress with foliar application of BABA (2.4mM), which increased by 88.29%, 73.11%, and 65% respectively, compared with the control condition. The EO components were identified using GC-FID and GC-MS analysis. Linalool (33.7–47.3%) and linalool acetate (31.2–52%) were the most abundant compounds. The highest content of linalool acetate was observed in severe drought stress with foliar application of BABA (1.6 mM), which increased by 33.86% compared with the control condition. However, the highest content of linalool was observed under normal irrigation with foliar application of 0.8 to 1.6 mM BABA. Furthermore, highest amount of EO content and EO yield was observed in mild drought stress and foliar application of BABA (2.4 mM), which increased by 33% and 75% respectively compared with the control condition. The results of this experiment showed that the use of BABA (mainly 1.6 to 2.4 mM) can improve the antioxidant properties and EO profile of grapefruit mint under drought stress condition.

References

1. Morshedloo, M.R.; Mumivand, H.; Craker, L.E.; Maggi, F. Chemical composition and antioxidant activity of essential oils in *Origanum vulgare* subsp. gracile at different phenological stages and plant parts. *J. Food Process. Preserv.* **2018**, *42*, e13516.

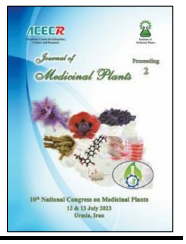
2. Cohen, Y.; Vaknin, M.; Mauch-Mani, B. BABA-induced resistance: Milestones along a 55-year journey. *Phytoparasitica* **2016**, *44*, 513–538.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 84

The Effects of *Calendula officinalis*, *Urtica dioica*, and *Sesamum Indicum* Herbal Extract Blend on Letrozole-Induced Polycystic Ovarian Syndrome Rat Model

Javad Amirpour[1], Seyed Hamed Mostafavi[1], Fatemeh Shabani[2], Elham Moghtadaei Khorasgani[3], Tohid Behpoor Anzabi[1], Saeed Naseri[*]

[1] *Center of Herbal Medicine, Iranian Academy Center for Education, Culture, and Research (ACECR), Ardabil, Iran*
[2] *Midwifery Department, Faculty of Nursing and Midwifery, Tabriz University of Medical Sciences, Tabriz, Iran*
[3] *Pathobiology department, Shahrekord Branch, Islamic Azad University, Shahrekord, Iran*
[4] *Department of Pharmacology and Toxicology, Faculty of Pharmacy and Pharmaceutical Sciences, Tehran Medical Sciences, Islamic Azad University, Tehran, Iran*
E-mail: herbalpharma07@gmail.com

ARTICLE INFO

Keywords:
Anovulation,
PCOS,
Rats,
Herbal medicine,
Metformin

ABSTRACT

Although many pharmacological therapies treat Polycystic Ovary Syndrome (PCOS), plant extracts-based medicine has been considered these days. The current study investigated the effects of an herbal extract blend (HEB) containing Calendula officinalis, Urtica dioica, and Sesamum indicum on the letrozole-induced rat model of PCOS. Sixty adult female Wistar rats were divided into five groups: PCOS, Metformin, HEB 1, HEB 2, and control. Animals in the mentioned groups were orally given letrozole once daily (OD) for 21 days, followed by distilled water, Metformin, and 0.1 and 0.2 ml of HEB for 44 days (OD). The serum level of follicle-stimulating hormone (FSH) was significantly increased in HEB 2 compared to other groups. The results also indicated that serum levels of luteinizing hormone (LH) and estradiol (E2) in all three HEB 1, HEB 2, and Metformin groups were significantly decreased. However, the serum level of progesterone was increased dramatically in the metformin group. There was no significant difference in testosterone levels among groups. More the histopathological image of the uterine tissue after 44 days showed that the cyst increased in the PCO group and decreased significantly in the heb2 group($p<0/01$). Significant increase in the endometrium thickness in the group receiving the extract compared to other groups ($p<0/01$). The present study has confirmed that HEB could alleviate hormonal and histopathological disturbances arising from PCOS.

References

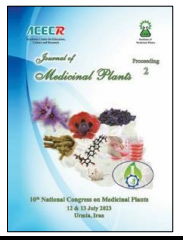
1. Pachiappan S, Matheswaran S, Pushkalai P, Muthusamy G. Medicinal plants for polycystic ovary syndrome: A review of phytomedicine research. *International Journal of Herbal Medicine*. 2017; 5:78-80.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 85

Effect of seed processing and plant density on the trend of dry matter changes of sugar beet

Alireza Safari[1,*], Saeed Sadeghzadeh Hemayati [2], Faegheh salighehdar[3]

[1]*Faculty of Agriculture and Natural Resources, Islamic Azad University, Chalus Branch, Chalus, Iran.*
[2]*Agricultural Research, Education & Extension Organization (AREEO), Karaj, Iran.*
[3]*Horticultural Department, Faculty of Agriculture, Unnersity of Guilan, Rasht. Iran. I.R*
E-mail: alireza_s_839@yahoo.com

ARTICLE INFO

Keywords:
Underground organs
Dry matter partitioning
Cruiser
Gaucho
Dry weight

ABSTRACT

In recent years, seed processing methods have been used to enhance the seed value. In relation to sugar beet seed processing, there are two types of processing including normal (seed size 3.00-4.74 mm round sieve with coating by gaucho insecticide) and super or special (seed size 4-4.5 mm round sieve and top 2.2 Long sieves are commonly covered with cruiser insecticides. This study was conducted to evaluate the effects of seed processing and plant density on the trend of dry matter changes of sugar beet based on combined analysis across locations as factorial experiment according to a randomized complete block design with for replications in two Karaj and Kermanshah regions in 2018 growing season. The studied factors were Shokofa Iranian cultivar with four compounds caused by insecticides and sifting, including: (a_1) Shokoofa seeds with normal sifting (coating with gaucho toxin); (a_2) Shokoofa seeds with normal sifting (coating with Cruiser poison); (a_3) Shokoofa seeds with special sifting (coating with gaucho poison); (a_4) Shokoofa seeds with special sifting (coating with Cruiser poison) And (a_5) seeds of foreign cultivar (F20909) from KWS Germany with size 4.75-3.25 and planting density included 7, 10 and 13 plants per square meter. All Iranian cultivars were disinfected using Carboxin Thiram fungicide. The results showed that the highest root dry weight, underground dry weight and total dry weight were obtained in Kermanshah. Moreover, foreign KWS cultivar had the highest underground dry weight and total dry weight. During the growing season, dry matter partitioning, herbage dry weight and total dry weight of sugar beet, increased and then decreased in both regions. Overall, according to the obtained results, the cultivation of foreign KWS cultivar at 10 and 13 plants m^{-2} is recommended especially in the Kermanshah region

References

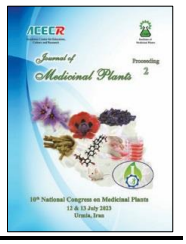
1. Hamidi A, Chegini MA. Seed size effect on sugar beet various cultivars some germination and seedling vigor traits. *Journal of Sugar Beet*. 2015; 31(2): 157-166. (in Persian, abstract in English).
2. Mirzaei MR, Abdollahian-Noghabi M. Study of sugar beet growth pattern in Hamedan. *Journal of Sugar Beet*. 2012; 27(2): 117-134. (in Persian, abstract in English).
3. Sadeghzadeh Hemayati S, Khodagoo Abianeh M, Fasahat P. Effects of plant population reduction time and rate on sugar beet yield and quality. *Seed and Plant Production*. 2017; 33(2): 231-248. (in Persian, abstract in English).

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 86

Evaluation the effect of Viola odorata vaginal suppository on Vaginal Maturation Index and vaginal PH in postmenopausal women

Fataneh Amindehghan[1,*], Samira Shahbazzadegan[2], Susan Houshmandi[3], Leili Amani[4]

[1] *Department of Midwifery, Faculty of Nursing and Midwifery, Ardabil University of Medical Sciences, Ardabil, Iran*
[2] *Department of Midwifery, Faculty of Nursing and Midwifery, Ardabil University of Medical Sciences, Ardabil, Iran*
[3] *Department of Midwifery, Faculty of Nursing and Midwifery, Ardabil University of Medical Sciences, Ardabil, Iran*
[4] *Department of Traditional Pharmacy, School of Persian Medicine, Tehran, Iran*
E-mail: amindehghanfataneh@gmail.com

ARTICLE INFO

Keywords:
Vaginal atrophy
Menopause
Viola odorata

ABSTRACT

Background: Vaginal atrophy is a structural changes which occurs due to the lack of estrogen in the vaginal epithelium [1].Vaginal Maturation Index (VMI) and vaginal PH are two appropriate instruments for measuring vaginal atrophy[2]. The aim of this study is to examine the effect of Viola odorara vaginal suppositoriy on Vaginal Maturation Index and vaginal PH in postmenopausal women in Tehran, Iran. **Methods**: This study was a three-blind randomized clinical trial conducted on 60 postmenopausal women. The participants were randomized to Viola odorata group (n=30) and a placebo group (n=30). The both groups received one vaginal suppository of viola odorata per night for 8 weeks. The Vaginal Maturation Index and PH were measured at baseline and weeks 8. **Results**: The number of superficial cells increased in the Viola odorata group after 8 weeks compared to the placebo ($P < 0.001$). The number of intermediate and parabasal cells decreased significantly in the Viola odorata group compared to the placebo group ($P < 0.001$). The vaginal PH decreased significantly at the 8-week follow-up in the Viola odorata group compared to the placebo group ($P < 0.001$).**Conclusion**: Based on the findings of the present study, vaginal suppository of viola odorata significantly improved vaginal PH and VMI.

References

1. Moghassemi, S. and A. Marjani, The effect of short-term vitamin D supplementation on lipid profile and blood pressure in post-menopausal women: A randomized controlled trial. *Iran. J. Nurs. Midwifery Res*. 2014. **19**(5): p. 517-21.

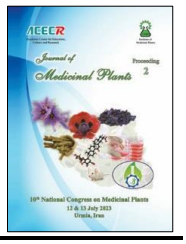
2. Cotreau, M.M., et al., A study of 17 β-estradiol-regulated genes in the vagina of postmenopausal women with vaginal atrophy. *Maturitas*, 2007. **58**(4): p. 366-376.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 87

The effect of potassium-based stress modifiers on phenol and flavonoids of (*Echinacea purpurea* (L.) Moench) under drought stress in hydroponic culture

Mahdi Hajizadeh[1,*], Amir Rahimi[1], Sina Siavash Moghadam[1], Saeid Heydarzadeh[1]

[1] *Department of Production Engineering and Plant Genetics, Faculty of Agriculture, Urmia University, Urmia, Iran*

E-mail: Mahdihajizadeh928@gmail.com

ARTICLE INFO

Keywords:
Echinacea
Drought Stress
Phenol
Flavonoid
Potassium

ABSTRACT

The medicinal plant Echinacea purpurea (L.) Moench is native to North America and is a perennial herbaceous plant of the Asteraceae family. This plant has long been used by Native Americans to strengthen the immune system [1]. This type of medicinal plant has been used for centuries to treat toothache, sore throat, common cold, rabies, snake bite, wounds and burns [2]. In order to investigate the effect of potassium-based stress modifiers on the phenolic and flavonoid content of the roots and shoots of the medicinal plant Echinacea, a factorial experiment was conducted in the form of a ompletely randomized design under drought stress conditions in 2022 in the research greenhouse of Urmia University's Faculty of Agriculture with three replications. The investigated treatments included drought stress at three levels (0, -2 and -4 bar) and stress modifiers at 4 levels (control, amino acid, potassium and potassium silicate). The results showed that the phenolic and flavonoid content of roots and shoots increased with increasing drought stress intensity, and foliar spraying of stress modifiers also increased its amount compared to the treatment. The highest amount of phenol in shoots and roots were obtained under conditions of drought stress of -4 bar and pure potassium consumption. Also, the highest amount of flavonoid in shoots and roots observed as a result of using potassium silicate under drought stress conditions -4 bars. Therefore, the use of potassium base stress modifiers in water deficit conditions can improve the phenol and flavonoid content.

References

1. Ghatas, Y. A. A. and W. H. Abdallah (2016). *Journal of Plant Production* 7(7): 709-719.

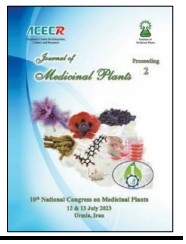
2. Mizgin B, TUNÇTÜRK R and TUNÇTÜRK M. (2019). *Yuzuncu Yıl University Journal of Agricultural Sciences* 29(3): 496-505.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 88

The effect of Arbuscular mycorrhiza on *Altheae officinalis* L.

Leyla Cheheltanan[1,*], Saeed Khosravi[1]

[1] *Department of Horticultural Science and Landscape Architecture, Faculty of Agriculture, Ferdowsi University, Mashhad, Iran*
E-mail: l.cheheltanan@ag.iut.ac.ir

ARTICLE INFO

Keywords:
Mycorrhizal fungi
Organic farming
Altheae officinalis

ABSTRACT

Due to the exponential growth of the world's population in recent years, it is inevitable to produce more agricultural products. However, excessive use of chemical fertilizers results in environmental pollution, which is one of the current concerns of humans. One useful solution to reducing the consumption of various types of chemical fertilizers and subsequent environmental pollution is the use of arbuscular mycorrhizal fungi in plant cultivation. In other words, mycorrhizal fungi, through their symbiosis with plants and absorption of immobilized elements, accelerate the transfer of nutrients to the host plant and improve its growth and performance. Therefore, the aim of this research was to investigate the effect of mycorrhizal fungi on improving the growth of *Altheae officinalis*. This experiment was designed and conducted in a completely randomized design with three inoculation treatments of M0 (control), M1000 (1000 spores), and M2000 (2000 spores) in each pot and with five replications on *Altheae officinalis* plants in research greenhouses of Ferdowsi University of Mashhad. According to the results, root volume, stem length, and root fresh and dry weight were improved under mycorrhizal inoculation treatments, and the best results were related to the application of M1000 treatment, which caused an increase of 18.75%, 46.59%, 36.9%, and 30.49% in the mentioned traits compared to the control treatment, indicating the positive role of this treatment in improving the growth of *Altheae officinalis*. Meanwhile, shoot fresh and dry weight and chlorophyll content were not affected by mycorrhizal treatment.

References

1. Baslam, M., Garmendia, I., & Goicoechea, N. (2011). Arbuscular mycorrhizal fungi (AMF) improved growth and nutritional quality of greenhouse-grown lettuce. *Journal of agricultural and food chemistry*, 59(10), 5504 - 5515. doi.org/10.1021/jf200501c

2. Tahat, M. M., & Sijam, K. (2012). Mycorrhizal fungi and abiotic environmental conditions relationship. *Research Journal of Environmental Sciences*, 6(4), 125-133 .doi.org/10.3923/rjes.2012.125.133.

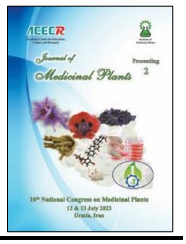
3. Turjaman, M., Tamai, Y., Santoso, E., Osaki, M., & Tawaraya, K. (2006). Arbuscular mycorrhizal fungi increased early growth of two nontimber forest product species Dyera polyphylla and Aquilaria filaria under greenhouse conditions. *Mycorrhiza*, 16, 459-464.doi.org/10.1007/s00572-006-0059-4.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 89

Phytochemical properties and biological activities of *Phlomoides binaludensis* various extracts

Samin Mohammadi[1], Parina Asgharian[1,*]

[1]*Department of Pharmacognosy, Faculty of Pharmacy, Tabriz University of Medical Sciences, Tabriz, Iran*
E-mail: parina.asgharian@gmail.com

ARTICLE INFO

Keywords:
P. binaludensis
Essential oil
Antioxidant
Cytotoxicity
Antimicrobial

ABSTRACT

The essential role of plant resources is evident in drug discovery. Numerous active compounds with antioxidant, antimicrobial, and cytotoxic effects are originated from herbals [1]. In the current work, some biological and phytochemical characteristics of *Phlomoides binaludensis* were investigated. Aerial parts were air-dried, powdered and extracted using various solvents with increasing polarity, including n-hexane, dichloromethane, ethyl acetate, and methanol, by soxhlet apparatus. Hydrodistillation operation was used to obtain the essential oil which was analyzed via GC/MS method subsequently. Total phenol and flavonoid contents of extracts were measured by modified Folin-ciocalteu and aluminum chloride tests, respectively. All extracts were also evaluated *in vitro* for antioxidant effect (DPPH method), antimicrobial activity against a fungal strain, two gram-positive and two gram-negative bacterial strains (through recording the average diameter of inhibition zones and minimum bactericidal concentrations (MBCs)), and cytotoxicity against MCF-7 cells (MTT assay) [2]. Obtained results indicated that Terpenes made up the majority of the essential oil content (61.99%) and Phytol (49.55%) was the most abundant constituent of the essential oil. In addition, Ethyl acetate and methanol extracts demonstrated antioxidant activity in line with their phenolic contents. Methanol, ethyl acetate and n-hexane extracts indicated antibacterial effect against *S. epidermidis* (MBC=12.5 mg/mL), *E. coli* (MBC=12.5 mg/mL), and *S. aureus* (MBC=25 mg/mL), respectively. *C. albicans* and *P. aeruginosa* strains were not inhibited by any examined samples. In addition, ethyl acetate extract with IC_{50} value of 846±32.60 µg/mL and dichloromethane extract with IC_{50} value of 1146±5.35 µg/mL were demonstrated significant cytotoxicity against the MCF7 cell line (P-value<0.001).

References

1. Karim A, Shinwari Z, Malik S. Biological activities of commonly used medicinal plants from Ghazi Brotha, Attock district. *Pakistan Journal of Botany*. 2015; 47:113-20.

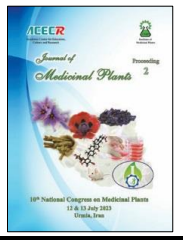
2. Mohammadi, S., Valizadeh, H., Khaleseh, F., Bastani, S., Delazar, A., Asgharian, P., Biological activities of extract-loaded nanocarriers: A comparison of aerial part, seed, and rhizome of Phlomoides labiosa. *European Journal of Integrative Medicine*. 2022; 52.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 92

Effects of sucrose concentration and days after anthesis on in vitro pollen germination and pollen viability of (*Allium hirtifolium Boiss*.)

Sahar Khakpour[1], Juber Panahandeh[1,*], Alireza Motallebi-Azar[1]

[1]*Department of Horticultural Sciences, Faculty of Agriculture, Tabriz University, Tabriz, Iran*
E-mail: panahandeh@tabrizu.ac.ir

ARTICLE INFO

Keywords:
Allium Hirtifolium
Ecotype
Pollen grains
Pollen germination
Anthesis

ABSTRACT

In vitro pollen germination provides a novel approach and strategy to accelerate genetic improvement of plant breeding. There is no study about pollen germination of Allium hirtifolium. Therefore, this study aimed to investigate the effects of sucrose, and days after anthesis on pollen viability and in vitro pollen germination rate. Six Shallot populations collected from different parts of Iran were evaluated for Pollen in vitro germination. In vitro germination was performed in the basic media consisting of different concentrations of sucrose (1, 2, 3, 4 and 5%). Pollen germination rates were recorded periodically at 1, 3, 5, 7 days after anthesis. Also, pollen was kept freezing for 30 days. The results showed that sucrose concentration and ecotype impose significant effects on pollen germination rate. The effects are most obvious at the concentration of 2%. The optimum and minimum time for germination rate after anthesis was 1 day and 30 days for pollen germination, respectively. Sucrose concentration, days after anthesis and ecotype were correlated with pollen germination. This study provided experimental evidence for selecting the best media, best time, and best ecotype for studying invitro pollan germination in *Allium hirtifolium*.

References

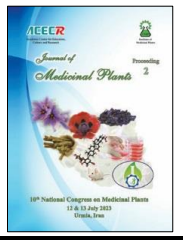
1. Abdelgadir H.A, Johnson S.D, Van Staden J. Pollen viability, pollen germination and pollen tube growth in the biofuel seed crop *Jatropha curcas* (Euphorbiaceae*) South African Journal of Botany*Volume 79, March 2012, Pages 132-139

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 97

Position of Medicinal Plants in Optimal Cultivation Pattern Using Integration of Multi-Period Investment and Multi-Criteria Decision Making Methods

Farzaneh Abdollahi[1], Masoud Fehresti-Sani[1,*], Akram Neshat[1], Ahmad Fatahi[1]

[1]*Department of Agricultural Economics, Faculty of Agriculture and Natural Recourses, Ardakan University, Ardakan, Iran*
E-mail: mfehresti@ardakan.ac.ir

ARTICLE INFO

Keywords:
Multi-period planning
Medicinal plants
Mathematical Programming
Economical Evaluation

ABSTRACT

Population growth, the urgent need of pharmaceutical industries for medicinal plants and the importance of their active ingredients in food, cosmetic and health industries have caused the particular attention of this category of plants specially their economic aspects. Therefore, the main goal of this research was to evaluate the feasibility of improving the position of medicinal plant cultivation in the optimal pattern of agricultural production in Ardakan city. The model used in this study is a combination of multi-period mathematical planning and multi-criteria decision-making models. The required statistics and information were collected from the experts of the Jihad Agriculture organization and farmers through interviews. The results of the model implementation show that the cultivation of Ronas plant is recommended due to its higher profitability than other plants in all scenarios. Also, due to low profitability, wheat and barley are not included in the 10-year pattern of cultivation. In the models of optimal cultivation with the goals of profitability, reduction of water consumption and increase of employment, the program has the highest efficiency with the cultivation of Ronas, sour tea and wheat. Balancing the guaranteed price of wheat and barley, setting up transformation industries related to medicinal plants and their marketing facilities, and implementing support and encouragement policies, as well as increasing the awareness of farmers and operators in the city in order to develop the cultivation of medicinal plants, are among the suggestions of this study.

References

1. Singh, P. A., Bajwa, N., Sharma, L., Baldi, A. Farm-level medicinal plants production and economic analysis in the Indian state of Punjab. *Journal of Applied Research on Medicinal and Aromatic Plants*, 2023; 34, 100486. doi: 10.1016/j.jarmap.2023.100486.

2. Kliestik, T. Application of Multi Criteria Goal Programming Approach for Management of the Company. *Applied Mathematical Sciences*, 2015; 9(115), 5715 – 5727. doi: 10.12988/ams.2015.57488.

3. Majeke, F., Ticharwa Mubvuma, M., Makaza, K., Mutambara, J. Optimum combination of crop farm activities: Application of a Linear Programming Model. *Greener journal of Economics and Accountancy*, 2013, 2 (2): 58-61. doi: 10.15580/GJEA.2013.2.052213634.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran

Poster Presentation ID: 99

Treatment of Helicobacter pylori infected mice with Anthemis pseudocotula, Trachyspermum, and Dracocephalum, a Combined herbal extract with antioxidant and antimicrobial properties, reduces the bacterial load.

Tohid Behpoor Anzabi[1, *], Haniyeh Sabahi[2], Javad Amirpour[1], Saeed Naseri[3]

[1] *Incubation and Innovation Center of Mohaghegh Ardabili University, Ardabil, Iran*
[2] *Department of Clinical Laboratory Sciences, Tehran Medical Sciences, Islamic Azad University, Tehran, Iran*
[3] *Department of Pharmacology and Toxicology, Faculty of Pharmacy and Pharmaceutical Sciences, Tehran Medical Sciences, Islamic Azad University, Tehran, Iran*
E-mail: z.sportes.z@gmail.com

ARTICLE INFO

Keywords:
Gastroduodenal Infection
Anti-Helicobacter pylori
Herbal drug

ABSTRACT

Helicobacter pylori (*H. pylori*) is regarded as the primary etiological agent of peptic ulcer and gastric carcinoma. Claiming about 50 percent of the world population is infected with *H. pylori*, therapies for its eradication have failed for many reasons, including the acquired resistance against its antibiotics. Hence, the need to find new anti-*H.pylori* medications have become a hotspot with the urge to search for alternative, more potent, and safer inhibitors. Medicinal plants are suggested as repositories for novel synthetic substances in recent drug technology scenarios (1). In this study, 35 male rats were selected in five groups to investigate the effects of three plants' combination of aqueous extracts. After the injection of the Helicobacter bacteria strains into the stomach of the rats, sampling of the stomach tissue and blood was done. The results were classified as pathological and microbial findings and checked boxes. After the interpretation of gastric tissue pathology sections in mice, the treatment group with combined herbal extracts had a significant difference compared to other groups in terms of gastric ulcer healing and microbial load. The data shows that the combined aqueous extract with anti-inflammatory and antioxidant properties has been able to protect the gastric mucosa and significantly reduce the wound resulting from infection.

References

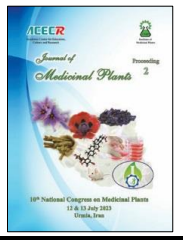
1. Baker DA. Plants against *Helicobacter pylori* to combat resistance: An ethnopharmacological review. *Biotechnol Rep (Amst)*. 2020 May 21; 26:e00470. Doi: 10.1016/j.btre.2020.e00470. PMID: 32477900; PMCID: PMC7248673.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 100

Studying the effect of Nozavit herbal solution on the prevention and treatment of Nosema disease in honey bees compared to Fomagillin-B

Afshin Karami[1, *], Tohid Roshancheshm[1], Saeed Naseri[2]

[1] *Center of Herbal Medicine, Iranian Academy Center for Education, Culture, and Research (ACECR), Ardabil, Iran*

[2] *Department of Pharmacology and Toxicology, Faculty of Pharmacy and Pharmaceutical Sciences, Tehran Medical Sciences, Islamic Azad University, Tehran, Iran*

E-mail: peykesalaamat@gmail.com

ARTICLE INFO

Keywords:
Herbal solution
Nosema
Bee
Medicinal plants
Fumagillin-B

ABSTRACT

Nosema is a serious disease of adult European honey bees, including queen bees. In some years, nosema may cause serious losses of adult bees and colonies in autumn and spring. The spore-forming microsporidian causes the disease – Nosema apis (1). Fomagilin was also used to conduct studies and compare effects as well as possible. Several 30 hives were selected from 5 beekeeping farms affected by nosemosis, and the hives were randomly divided into three treatment groups with Nozavit herbal solution and one group treated with fumagillin. One group was a control and was treated daily for 21 days. And every three days, the bees of each group were randomly studied under the loupe and microscope. The statistical comparison of the average treatment process in the studied groups on days 3 to 21 after treatment with the mentioned drugs showed a significant difference between the group treated with Nozavit herbal solution and the other groups ($P < 0.05$). At the same time, the best results are related to the treatment group with Nozavit herbal solution. According to the parasitological studies, in the Nozavit group, the speed of treatment and recovery of honey bees and cleaning of the bees' digestive system was very significant. There is a substantial considerable difference between the effects of Nozavit and the drug Fomagilin B, and the bees' appetite for nectar consumption increased, Whichy 30%—this herbal solution's positive effects on the bees' digestive system. Therefore, according to this study and interpretations, the Nozavit herbal solution, which is entirely natural and organic, can be used as a specific herbal medicine for treating bee stings without medicinal residues in honey.

References

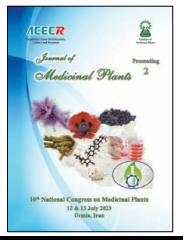
1. Botías, C., Martín-Hernández, R., Barrios, L. *et al*. *Nosema* spp. Infection and its negative effects on honey bees (*Apis mellifera iberiensis*) at the colony level. *Vet Res* **44**, 25 (2013). https://doi.org/10.1186/1297-9716-44-25

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 102

Effect of the commercial form of two medicinal plants, Neemarin® and Matrine® on adult, second and third instar larvae of the *Hypera postica* (Cole.: Curculionidae)

Elena Hosseini[1], Shahram Aramideh[1, *], Oruj Valizadegan[1]

[1] *Department of Plant Protection, Faculty of Agriculture, Urmia University*
E-mail: Elyh1365@gmail.com

ARTICLE INFO

Keywords:
Medicinal plants
Pest control
Lethality
Alfalfa weevil

ABSTRACT

The use of medicinal plants as alternative to use of pesticides in control pests and diseases is one of the important goals of researchers [1, 2]. Medicinal plants with different biological effects on pests play a very important role [3]. In this research, the effects of two commercial formulations of Neemarin® extracted from *Azadirachta indica* A. Juss and Matrine® from *Sophora flavescens* Ait. on adult, second and third instar larvae of the *Hypera postica* (Col.: Curculionidae) one important pest of alfalfa (*Medicago sativa*) in laboratory conditions were studied. The results of probit analysis showed that between the concentrations (50, 100, 200, 300 and 400 µl/liter) of Neemarin® and the concentrations of matrin (3.125, 6.25, 12.5, 25 and 50 µl/liter) with the mortality of adult, second and third instar larvae of *H. postica* correlation were observed. The calculated LC_{50} values of Neemarin® and Matrine® on adult, second and third instar larvae after 48 hours were obtained 544.65, 45.86, 18.05, 50.23, 3.76 and 6.63 µl/litr, respectively. This study showed that the commercial formulation of Matrine® in the above mentioned concentrations has 66.66, 72.33, 80.00, 88.00 and 98.33% mortality on second instar larvae after 48 hours, respectively. Also, no concentration caused phytotoxicity or appearance changes in alfalfa plants.

References

1. Alizadeh, E., O. Valizadegan, S. Aramideh, M. H. Safaralizadeh, and S. E. Sadeghi. 2019. Evaluation of the effect of some biopesticides on alfalfa weevil larvae, *Hypera postica* (Gyllenhal.) in laboratory and field conditions. *Agricultural Engineering International: CIGR Journal*, 21(4): 161–168.

2. Los, L. M. 1982. Evaluation of several natural control agents of the alfalfa weevil *Hypera postica* in Virginia alfalfa fields. M.S. thesis. Blacksburg, VA: Virginia Polytechnic Institute and State University.

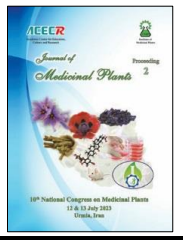
3. Oroumchi, S., and C. Lorra. 1993. Investigation on the effect of aqueous extracts of neem and chinaberryon development and mortality of the alfalfa weevil *Hypera postica* Gyllbnh (Col., Curculionidae). *Journal of Applied Entomology*, 116(1-5): 345-357.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 103

Effect of the commercial form of medicinal plant Matrine® on second and third instar larvae of the *Pieris brassicae* L. (Lepidoptera: Pieridae)

Elena Hosseini[1], Shahram Aramideh[1, *], Oruj Valizadegan[1]

[1]*Department of Plant Protection, Faculty of Agriculture, Urmia University. Urmia. Iran*
E-mail: Elyh1365@gmail.com

ARTICLE INFO

Keywords:
Medicinal plants
Pest control
Lethality
Cabbage

ABSTRACT

Pieris brassicae L. (Lepidoptera: Pieridae) is one of the important pests of cruciferous vegetables in the world [1]. The larvae of this pest feed on the leaves of the cabbage and causes weaken the plants or stop their growth [2]. In recent years, the use of extracts and essential oils of medicinal plants in order to reduce pesticides for pest control has received much attention. In this research, the effect of Matrine® commercial formula from *Sophora flavescens* Ait. on the second and third instar larvae *P. brassicae* was studied and investigated in laboratory conditions. The results of porbit analysis showed that after 24 and 48 hours, there is a correlation between the concentrations (100, 200, 300 and 400 µl/litr) of Matrine® with the mortality of the second instar and third instar larvae of *P. brassicae*. R^2 (0.96, 0.93, 0.96 and 0.88). Also, the calculated LC_{50} of Matrine® on second and third instar larvae was obtained respectively 213.62, 178.5, 261.46 and 199.80 µl/litr. This study showed that the commercial formulation of Matrine® in the 400 µl/litr concentrations had 90% mortality on second instar larvae after 48 hours, respectively.

References

1. Ali, A. & P. Q. Rizvi, 2007. Developmental response of cabbage butterfly, *Pieris brassicae* L. (Lepidoptera: Pieridae) on different crops under laboratory and field condition. *Asian Journal of Plant Sciences*, 6(8): 1241-1245.

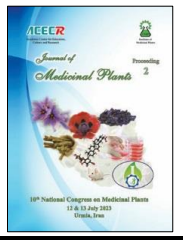
2. Grisakova, M., L. Metspalu, K. Jogar, K. Hiiesaar, A. Kuusik & P. Poldma, 2006. Effect of biopesticide neem EC on the large white butterfly, *Pieris brassicae* (L.) (Lepidoptera: Pieridae). *Agronomy Research*, 4: 181-186.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 104

Increasing profitability with optimal processing of medicinal plants and roses

Hossein Hosseini

[1]*Barij Medicinal Plants Research Center, Agriculture group, Kashan, I. R. Iran*
E-mail: mohosseini@yahoo.com

ARTICLE INFO

ABSTRACT

Getting to know the optimal processes of extracting and processing medicinal plants and roses, knowing the intentional and unintentional frauds of this industry and the consequences and risks arising from it, familiarizing with processing equipment and introducing new methods of extraction Getting to know the artisans and equipment manufacturers of this field, getting to know the process of producing organic products and creating added value in the field of export and managing the waste resulting from processing processes to create added value and help preserve the environment are among the things that can lead to optimal processing of plants. Medicinal and ultimately help create their added value. Optimum processing of roses by emphasizing the right time of harvesting and using modern processing equipment can also be considered to produce products with more added value and with a special position for export. Also, with a special look at the discussion of ecotourism in the field of medicinal plants, especially the rose flower, as well as the production of organic products, it plays a significant role in generating income and completing the value chain of medicinal plants. The use of standard breeding inputs and the use of scientific agricultural methods and the use of post-harvest processing equipment in order to produce export-oriented products can play an important role in creating product diversity in the export sector. Waste management resulting from the processing of medicinal plants, while helping to preserve the environment and reduce environmental risks, can double their added value by creating new products.

References

1. N. Kovatcheva, Productivity, Oil Content, Composition, and Bioactivity of Oil-bearing Rose. Accessions*Hort Science.* 2011, 46 (5) 710-714

2. Organic Agriculture way out of poverty for farmers, 2005, world bank.

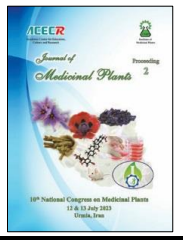
3. Willer, H, and M,Yussefi, 2006, The world of organic Agriculture, statistics and Emerging Trends, International Federation of organic Agriculture Movements, (I FOAM)

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 106

Effect of Different Dormancy Breaking Treatments on Germination of Sophora Seeds (*Sophora alopecuroides* L.)

Hadi Kalantari Khalilabad[1,2*], Ali Izadi Darbandi[1], Ardeshir Ghaderi[2], Seyed Ahmadosadat Nouri[1], Maryam Ahvazi[2], Mohammadreza Labbafi[2]

[1]*Department of Agronomy and Plant Breeding Science, College of Aburaihan, University of Tehran, Tehran, Iran*
[2]*Medicinal Plants Research Center, Institute of Medicinal Plants, ACECR, Karaj, Iran*
E-mail: hadi.kalantari@ut.ac.ir

ARTICLE INFO

Keywords:
Dormancy breaking
sophora
Sulfuric acid
Germination percentage

ABSTRACT

Seed dormancy is the cessation of the physiological and biological activities of seeds without disrupting their vital structure. It is an evolutionary mechanism that prevents seed germination under adverse ecological conditions, which generally ensures seedling survival. The effect of different mechanical (application of sulfuric acid or hot water), chemical treatments (application of gibsberellic acid), and cooling on breaking the dormancy of sophora seeds was investigated in a purely random design in 2022 (1). The treatments included gibberellic acid, sulfuric acid, water temperature, and 4 °C cold for different periods of time along with controls. The application of gibberellic acid did not significantly affect the germination and dormancy of sophora seeds. Variance analysis results of the FGP trait showed a significant difference between the germination percentages of dormancy breaking treatments for sophora seeds at the 5% confidence interval. Moreover, the highest CVT, MGR, GSP, GRI, GI, and UNC, and the lowest MGT, SDG, VGT, CVT, and UNC correspond to the sulfuric acid treatment (2). The dormancy breaking of sophora seeds with mechanical treatments and the effect of temperature suggest that the dormancy of sophora seeds is mixed

References

1. Cavallaro V., Maucieri C., Patanè C., Fascella G., Pellegrino A., and Barbera A. C. Polyphenols leaching and seed dormancy in carob (*Ceratonia siliqua* L.) in relation to hot water treatment. *Acta Physiologiae Plantarum.* 2021; 43(11), 1-10.

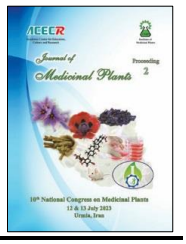
2. Balouchi H. R., Modares S. S. Aliz. B. Effective Factors on Seed Dormancy and Germination of Two Annual Medics. *Iranian Journal of Biology*. 2008; 261-270.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 107

Investigating the use of three medicinal species from the Asteraceae family in traditional medicine of Ramyan city, Golestan province

Mohammad Samiei[1, *], Mohammadrahim Forouzeh[1]

[1]*Department of Rangeland management, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Iran.*
E-mail: mohammadsamiei94@yahoo.com

ARTICLE INFO

Keywords:
Indigenous Knowledge
Sonchus oleraceus L
Anthemis altissima L
Artemisia absinthium L

ABSTRACT

Indigenous knowledge refers to the set of beliefs, values and experiences of each nation, which emerged as a result of the relationship between that nation and its surrounding environment. This knowledge is dynamic, time-tested and inexpensive and is transmitted verbally. Also, because it has evolved in the heart of the native environment, it is completely compatible with the conditions of each region [1]. In this study, the local knowledge related to three species *Sonchus oleraceus* L, *Anthemis altissima* L and *Artemisia absinthium* L is investigated. The studied area is located in Ramyan city of Golestan province and 70 km away from the center of the province, which is considered as one of the summer areas of the province. In order to collect and obtain information and achieve the goals of the research, survey research and face-to-face interviews with the natives of the region were used. Interviews were conducted with local experts. The results of this study show that the local people have great knowledge about where plants grow, how to use them as medicine and food, and they use them in their lives. This study also showed that they name plants according to morphological characteristics and ecological needs. According to the mentioned results, carrying out such research and paying attention to local knowledge, in addition to being able to play an important role in the direction of plant production in various sectors such as medicine, food, etc., will create employment and improve the livelihood of users and sustainable exploitation of pastures.

References

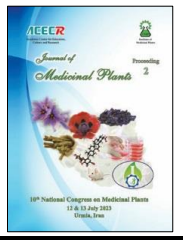
1. Farhadi K, Salemiqamsari M. Knowledge management of food preservation in Iran. 2013; 203-227.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 108

Effect of microwave drying on the phenolic compounds and antioxidant activity of Hollyhock (*Althea Rosea Cav. Var. Nigra*)

Abbas Ghorbani[1], Ghasem Eghlima[1, *], Mohammad Hossein Mirjalili[1]

[1]*Department of Agriculture, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*
E-mail: gh_eghlima@sbu.ac.ir

ARTICLE INFO

Keywords:
Drying
Total phenol
Antioxidant activity
Hollyhock

ABSTRACT

Althaea rosea L. is a popular garden plant, and its dark-violet flower variety (*Althaea rosea (*L.*) Cav. var. nigra*) belongs to the Malvaceae family [1]. Dried flowers is used in traditional medicine. Extract from the hollyhock flowers is a source of antocyanides and flavonoids. It also has many medicinal effects, including antimicrobial properties effective against cardiovascular diseases and strengthening the immune system [2]. Drying is one of the main processes postharvest and storing medicinal plants, which greatly affects their quantitative and qualitative characteristics [3]. In this study, the effect of different microwave powers (540, 720 and 900 W) on drying time, total phenol, flavonoids and antioxidant activity in hollyhock flowers was measured. The result showed that the highest amount of total phenol (99.7 mg GAE/g DW), total flavonoid (94.6 mg RUT/g DW) and antioxidant capacity (966.092 µmol Fe(II)/g DW) was obtained at 540 W. The shortest drying time was related to the power of 900 W, but it significantly reduced the content of total phenol, total flavonoid and antioxidant activity. Among the power, 540 W was the best method for the hollyhock plant to maintain its chemical composition.

References

1. Dudek M, Matławska I, Szkudlarek, M, Phenolic acid in the flowers of *Althaea rosea var. nigra, Acta Pol. Pharm.* 2006; 63(3): 207-11.

2. Papiez M, Gancarczyk M, Bilińska B., The compounds from the hollyhock extract (*Althaea rosea Cav. var. nigra*) affect the aromatization in rat testicular cells in vivo and in vitro. *Folia Histochem. Cytobiol*. 2002; 40(4): 353-359.

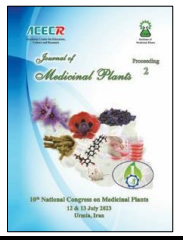
3. Ebadi M.T, Rahmati M, Azizi M, Khayyat M.H, Dadkhah A, The effects of different drying methods on drying time, essential oil content and composition of basil (*Ocimum basilicum* L.). *Iran. J. Med. Arom. Plant.* 2013; 29(2): 425-437.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 109

Phytochemical study of *Datura innoxia* from Iran

Zahra Morovati[1], Ghasem Karimzadeh[1, *], Mohammad Reza Naghavi[2], Sajad Rashidi Monfared[3]

[1]*Department of Plant Genetics and Breeding, College of Agriculture, Tarbiat Modares University, Tehran, Iran*
[2]*Department of Agronomy and Plant Breeding, College of Agriculture, University of Tehran, Karaj, Iran*
[3]*Department of Agricultural Biotechnology, College of Agriculture, Tarbiat Modares University, Tehran, Iran*
E-mail: karimzadeh_g@modares.ac.ir

ARTICLE INFO

Keywords:
Datura Innoxia
Antioxidant activity
Total phenol content
Flavonoids

ABSTRACT

Datura innoxia is an important species of *Datura* genus with several uses in traditional and modern medicine such as anti-inflammatory, larvicidal, pesticidal toxicity, antifungal, and anticonvulsant [1, 2]. *D. innoxia* contains saponins, tannins, alkaloids, flavonoids, and phenols [3]. In the current study, the dried plant material of *D. innoxia* of major regions of Iran, including Urmia, Hamedan, Kerman, Isfahan, and Mazandaran populations were used in three replications. The extracts of samples were prepared by sonication of 20 g of dried plant material for 30 min in 100 mL of methanol. DPPH method has been used to assess the antioxidant activity, and the IC_{50} was used to compare the antioxidant properties. Total phenolic content of samples were determined, using the Folin- Ciocalteu method. The content of flavonoids was measured by using aluminum chloride method. Comparison of antioxidant activity showed that the most antioxidant activity was related to Kerman population with IC50 60.01 ug/mg close the BHT (33 ug/mg) as a synthetic and industrial antioxidant. The least amount of this antioxidant activity was related to Isfahan population (IC_{50} 502.80 ug/mg). The extract of the Mazandaran population showed the highest total phenol content with 10.85 mg GAE/ g dry extract. The extract of Hamedan showed the highest total flavonoid content with 3.31 mg QE/g. The present study showed that the studied populations of *D. Innoxia* of Iran have a moderate antioxidant activity and phenolic compounds.

References

1. Al-Zharani M, Nasr F. A, Alqahtani A. S, Cordero M. A. W, Alotaibi A. A, Bepari A, Alarifi S, Daoud A, Barnawi I. O, Daradka H. M. *In vitro* cytotoxic evaluation and apoptotic effects of *Datura innoxia* grown in Saudi Arabia and phytochemical analysis. *Applied Sciences*. 2021; 11(6): 2864. https://doi.org/10.3390/app11062864.

2. Mohammed, F.S, Kına, E, Sevindik, M, Dogan, M, Pehlivan, M. *Datura stramonium* (Solanaceae): Antioxidant and antimicrobial potentials. *Turkish Journal of Agriculture-Food Science and Technology*. 2021; 9, 818-821. http://orcid.org/0000-0001-9083-1876.

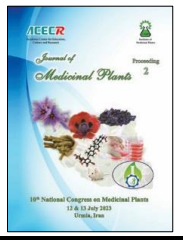
3. Avila M.D, Achimon F, Brito, V.D, Aguilar, R, Pizzolitto, R.P, Zunino, M.P, Peschiutta, M.L. Insecticidal activity of essential oils against mealybug pests (Hemiptera: Pseudococcidae): A systematic review and meta-analysis. *Plants*. 2023; 12, 109. https://doi.org/10.3390/plants12010109.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 110

Phytochemical study of *Datura stramonium* from Iran

Zahra Morovati[1], Ghasem Karimzadeh[1, *], Mohammad Reza Naghavi[2], Sajad Rashidi Monfared[3]

[1]*Department of Plant Genetics and Breeding, College of Agriculture, Tarbiat Modares University, Tehran, Iran*
[2]*Department of Agronomy and Plant Breeding, College of Agriculture, University of Tehran, Karaj, Iran*
[3]*Department of Agricultural Biotechnology, College of Agriculture, Tarbiat Modares University, Tehran, Iran*
E-mail: karimzadeh_g@modares.ac.ir

ARTICLE INFO

Keywords:
Datura stramonium
Antioxidant activity
Total phenol content
Flavonoids

ABSTRACT

Datura stramonium is an important species of *Datura* genus with several uses in traditional and modern medicine such as anti-inflammatory, larvicidal, pesticidal toxicity, antifungal, and anticonvulsant [1, 2]. *D. stramonium* contains saponins, tannins, alkaloids, flavonoids, and phenols [3]. In this study, the dried plant material of *D. stramonium* of major regions of Iran, including Urmia, Isfahan, Ardabil, Razavi Khorasan, and Gilan populations were used in three replications. The extracts of samples were prepared by sonication of 20 g of dried plant material for 30 min in 100 mL of methanol. DPPH method has been used to evaluate the antioxidant activity, and the IC_{50} was used to compare the antioxidant properties. Total phenolic content of samples was determined, using the Folin- Ciocalteu method. The content of flavonoids was measured by using aluminum chloride method. Comparison of antioxidant activity showed that the most antioxidant activity was related to Urmia population with IC_{50} 88 ug/mg close the BHT (33 ug/mg) as a synthetic and industrial antioxidant. The least amount of this antioxidant activity was related to Gilan population with IC_{50} 333 ug/mg. The extract of the Isfahan population showed the highest total phenol content with 8.5 mg GAE/ g dry extract. The extract of Razavi Khorasan showed the highest total flavonoid content (5.7 mg QE/g). As a whole, the present study showed that the populations of *D. stramonium* of Iran have a moderate antioxidant activity and phenolic compounds.

References

1. Al-Zharani M, Nasr F. A, Alqahtani A. S, Cordero M. A. W, Alotaibi A. A, Bepari A, Alarifi S, Daoud A, Barnawi I. O, Daradka H. M. *In vitro* cytotoxic evaluation and apoptotic effects of *Datura innoxia* grown in Saudi Arabia and phytochemical analysis. *Applied Sciences*. 2021; 11(6): 2864. https://doi.org/10.3390/app11062864.

2. Mohammed, F.S, Kına, E, Sevindik, M, Dogan, M, Pehlivan, M. *Datura stramonium* (Solanaceae): Antioxidant and antimicrobial potentials. *Turkish Journal of Agriculture-Food Science and Technology*. 2021; 9, 818-821. http://orcid.org/0000-0001-9083-1876.

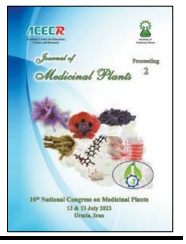
3. Avila M.D, Achimon F, Brito, V.D, Aguilar, R, Pizzolitto, R.P, Zunino, M.P, Peschiutta, M.L. Insecticidal activity of essential oils against mealybug pests (Hemiptera: Pseudococcidae): A systematic review and meta-analysis. *Plants*. 2023; 12, 109. https://doi.org/10.3390/plants12010109.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 111

Ameliorative effects of 24-epibrasinolide seed priming on some physiological traits of dragon's head plant (*Lallemantia iberica*) against alkali stress

Mahsa Allahverdian*, **Fatemeh Rahmani**

[1]*Department of Biology, Faculty of Sciences, Urmia University, Iran*
E-mail: mahsa.av74@gmail.com

ARTICLE INFO

Keywords:
Dragon
brassinosteroids
physiological indices
Alkali stress

ABSTRACT

Alkalinity strongly reduces crop production in arid and semi-arid regions (2). With 27 million hectares of saline and alkaline lands, Iran ranks first among Asian countries (1). Brassinosteroids are a new class of plant hormones that play various roles in plant growth and development. This hormone also plays an anti-stress role in plants and helps plants reduce the effects of salinity and alkalinity. (2). In order to investigate the effect of Brassinosteroids hormon (10 Molar) and alkali stress (sodium carbonate 15 mM) on some physiological traits of dragon plant (*Lallemantia iberica* L.), an experiment was conducted in the form of factorially based on a completely random design in the culture room of the biology department of Urmia University. Traits such as Chlorophyll A and B were measured. The results showed that the use Brassinosteroids hormone under alkali stress had a significant effect on chlorophyll a. Also, had positive effect on chlorophyll a under alkali stress. And it caused the adjustment of the alkali stress effect. The use of Brassinosteroids hormone under alkali stress has a positive effect on the improvement of the physiological characteristics of the dragon medicinal plant, and the optimal use of brassinosteroids can increase alkali resistance of the dragon plant in its vegetative growth stages.

References

1. Bagheri, A.R., and Hassanbaygi, M. (2009). Effect of different levels of salinity on germination and accumulation of sodium and potassium ions in bean seed. *Environmeantal Stress on Plant Science*. 1(2): 137-142.

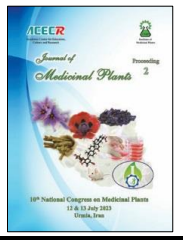
2. Jin, H., Kim, H.R., Plaha, P., Liu, S.K., Park, J.Y., Piao, Y.Z., Yang, Z.H., Jiang, G.B., Kwark,S.S., An, G., Son, M., Jin, Y.H., Sohn, J.H. and Lim, Y.P. (2008). Expression profiling of the genes induced by Na2CO3 and NaCl stresses in leaves and roots of Leymus chinensis. *Plant Science*. 175: 784-792.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 113

Effect of the commercial form of two medicinal plants, Neemarin® and Matrine® on adult, second and third instar larvae of the *Hypera postica* (Cole.: Curculionidae)

Elena Hosseini[1], Shahram Aramideh[1, *], Oruj Valizadegan[1]

[1]*Department of Plant Protection, Faculty of Agriculture, Urmia University*
E-mail: Elyh1365@gmail.com

ARTICLE INFO

Keywords:
Medicinal plants
Pest control
Lethality
Alfalfa weevil

ABSTRACT

The use of medicinal plants as alternative to use of pesticides in control pests and diseases is one of the important goals of researchers [1], [2]. Medicinal plants with different biological effects on pests play a very important role [3]. In this research, the effects of two commercial formulations of Neemarin® extracted from *Azadirachta indica* A. Juss and Matrine® from *Sophora flavescens* Ait. on adult, second and third instar larvae of the *Hypera postica* (Col.: Curculionidae) one important pest of alfalfa (*Medicago sativa*) in laboratory conditions were studied. The results of probit analysis showed that between the concentrations (50, 100, 200, 300 and 400 µl/liter) of Neemarin® and the concentrations of matrin (3.125, 6.25, 12.5, 25 and 50 µl/liter) with the mortality of adult, second and third instar larvae of *H. postica* correlation were observed. The calculated LC_{50} values of Neemarin® and Matrine® on adult, second and third instar larvae after 48 hours were obtained 544.65, 45.86, 18.05, 50.23, 3.76 and 6.63 µl/litr, respectively. This study showed that the commercial formulation of Matrine® in the above mentioned concentrations has 66.66, 72.33, 80.00, 88.00 and 98.33% mortality on second instar larvae after 48 hours, respectively. Also, no concentration caused phytotoxicity or appearance changes in alfalfa plants.

References

1. Alizadeh, E., O. Valizadegan, S. Aramideh, M. H. Safaralizadeh, and S. E. Sadeghi. 2019. Evaluation of the effect of some biopesticides on alfalfa weevil larvae, *Hypera postica* (Gyllenhal.) in laboratory and field conditions. *Agricultural Engineering International: CIGR Journal*, 21(4): 161–168.

2. Los, L. M. 1982. Evaluation of several natural control agents of the alfalfa weevil *Hypera postica* in Virginia alfalfa fields. M.S. thesis. Blacksburg, VA: Virginia Polytechnic Institute and State University.

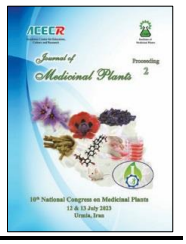
3. Oroumchi, S., and C. Lorra. 1993. Investigation on the effect of aqueous extracts of neem and chinaberryon development and mortality of the alfalfa weevil *Hypera postica* Gyllbnh (Col., Curculionidae). *Journal of Applied Entomology*, 116(1-5): 345-357.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 114

Use of herbal extracts in mammalian sperm storage

Ali Soleimanzadeh[1]

[1]*Department of Theriogenology, Faculty of Veterinary Medicine, Urmia University, Urmia, Iran*
E-mail: a.soleimanzadeh@urmia.ac.ir

ARTICLE INFO

Keywords:
Mammalian
Sperm
Herbal Extracts
Storage

ABSTRACT

Herbal extracts have recently emerged as an inexpensive, natural source of additives to help maintain and improve sperm function during semen storage. Several studies have reported positive effects of plant extracts on semen preservation. These studies reported 1.5 to 4.5 mg/L *Achillea millefolium* in rooster semen, 0.5–1.5 µg/mL of *Albizia harveyi* in bull semen, 20% *Aloe vera* concentration in peccary semen, *Argania spinosa* at concentrations of 1% to 5% in ram semen, 20 and 60 µg/mL of *Aspalathus linearis* in boar semen, *Camellia sinensis* at concentrations of 0.01% to 0.2% in dog semen, *Capparis spinosa* in human semen at concentrations of 30 and 45 ppm, *Ceratonia siliqua* in human semen at 10 and 20 µg/ml, *Cyclopia intermedia* in boar semen at 12.5, 25, 50 and 200 µg/ml, 2%, 4%, and 6% concentrations of *Diospyros kaki* in bull semen, 5 and 10 µg/mL *Sambucus nigra* in bull semen, 5–50 µg/mL of *Schisandra chinensis* in bull semen, 35-75 µg/mL *Syzygium aromaticum* in ram semen, *Syzygium cumini* at concentrations of 7 and 14 ppm in bull semen, 0.4 mg in boar semen /ml *Thymus capitatus*, *Urtica dioica* 200 µg/mL in bull semen, 2 -10 mg/mL of *Viscum album* in rabbit semen, 5 and 10 mg/L of *Zingiber officinale* in ram semen [1,2,3] may improve the quality of sperm parameters in long-term storage of semen. Therefore, due to its availability and antioxidant properties of the plant, it has been shown to be used during cold storage of semen of mammalian species.

References

1. Najafi D, Taheri RA, Najafi A, Rouhollahi AA, Alvarez-Rodriguez M. Effect of Achillea millefolium-loaded nanophytosome in the post-thawing sperm quality and oxidative status of rooster semen. *Cryobiology* 2018, 82, 37-42.

2. Sobeh M, Hassan SA, El Raey MA, Khalil WA, Hassan MA, Wink M. Polyphenolics from Albizia harveyi exhibit antioxidant activities and counteract oxidative damage and ultra-structural changes of cryopreserved bull semen. *Molecules*. 2017, 22(11), 1993.

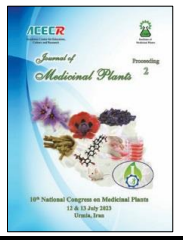
3. Souza AL, Lima GL, Peixoto GC, Silva AM, Oliveira MF, Silva AR. Use of Aloe vera–based extender for chilling and freezing collared peccary (Pecari tajacu) semen. *Theriogenology*. 2016, 85(8), 1432-8.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 115

Protective effects of herbal extracts against lead-induced oxidative stress in mice

Ali Soleimanzadeh[1]

[1]*Department of Theriogenology, Faculty of Veterinary Medicine, Urmia University, Urmia, Iran.*
E-mail: a.soleimanzadeh@urmia.ac.ir

ARTICLE INFO

Keywords:
mice
oxidative stress
Carob (*Ceratonia siliqua* L.)
Quercus brantii

ABSTRACT

Herbal medicine can be utilized as antioxidant agents against oxidative stress. Carob *(Ceratonia siliqua* L.*)* and *Quercus brantii* (QB) has shown antioxidants activity in previous studies [1]. Sixty-six male mice were randomly divided into 11 groups of 6 animals each. Group 1 was the control group that received no treatment. Group 2 was the sham group and received 0.2 ml distilled water per day. Group 3 received Pb acetate 1000 ppm/kg/day. Groups 4 and 5 received carob 500 and 1000 mg/kg/day, respectively. Groups 6 and 7 received both Pb 1000 ppm/kg/day and carob at doses of 500 and 1000 mg/kg/day, respectively at the same time. Groups 8 and 9 received QB extract 500 and 1000 mg/kg, respectively. Group 10 and 11 received Pb 1000 ppm/kg and QB extract 500 and 1000 mg/kg, respectively. All groups received treatment via oral gavage. After 35 days, sperm parameters were evaluated. Levels of sex hormones including LH, FSH, and testosterone, TAC, SOD and MDA were measured in animals' serum. Results showed that exposure to Pb negatively affected sperm parameters, decreased serum concentrations of sex hormones, TAC and SOD activity but increased MDA levels. However, co-administration of 500 and 1000 mg/kg *Quercus brantii* extract and Pb considerably and also co-administration of 1000 mg/kg Carob extract with Pb improved sperm parameters, increased sex hormones, TAC, and SOD activity while decreased MDA levels in animals' serum. Administration of carob and *Quercus brantii* extracts is able to protect the male reproductive system of mice against Pb-induced oxidative stress.

References

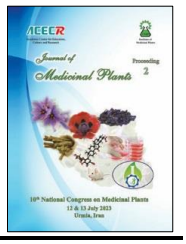
1. Naik, G. H., Priyadarsini, K. I., Satav, J. G., Banavalikar, M. M., Sohoni, D. P., Biyani, M. K., & Mohan, H. (2003). Comparative antioxidant activity of individual herbal components used in Ayurvedic medicine. *Phytochemistry*, *63*(1), 97-104.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 116

Anti-seizure activity of isolated compounds from *Tilia platyphyllos* Scop., as potent anti-epileptic Iranian medicinal plants

Mostafa Pirali Hamedani[1], Saied Goodarzi[2], Fateme Momeninasab[1], Ali Fazeli[1], Mohammad Sharifzadeh[3], Abbas hadjiakhoondi[1], Zahra Tofighi[1,*]

[1]*Department of Pharmacognosy, Faculty of Pharmacy, Tehran University of Medical Sciences, Tehran, Iran*
[2]*Medicinal Plants Research Center, Faculty of Pharmacy, Tehran University of Medical Sciences, Tehran, Iran*
[3]*Department of Pharmacology and Toxicology, Faculty of Pharmacy, Tehran University of Medical Sciences, Tehran, Iran*

ARTICLE INFO

Keywords:
Tilia platyphyllos
Seizure
PTZ
Quercetin
Methanol fraction

ABSTRACT

Tilia platyphyllos, Scrophularia striata and Salvia verticillata were used in Iranian traditional medicine for antianxiety and anticonvalsant effect. This study was conducted to evaluate the anticonvulsant activity of 80% methanol crude total extract and different fractions of *Tilia platyphyllos, Scrophularia striata and Salvia verticillata* in mice. The flowers of *T. platyphyllos* and aerial part of two other plants were extracted using maceration technique; hexane, chloroform and ethyl acetate were used for fraction and the residue was named methanol fraction. Anticonvulsant activity was evaluated by Pentylenetetrazol (PTZ) model. The parameters including latency, duration of seizure, number of seizures, survival time and mortality rate were examined. *T.platyphyllos* exhibited significant anticonvulsant effect in parameters compared with control. Among all fractions of *T. platyphyllos*, methanol fraction was demonstrated higher effect than others. Then, some compounds were isolated from this fraction with different chromatographic methods. Next, anti-seizure effects of isolated compounds were evaluated in several doses and the glycoside form of quercetin was shown the greatest ant seizure effect. Hoping to find more effective compounds with fewer side effects than current drugs in the treatment of epilepsy and considering the appropriate and significant effects of compounds extracted from *Tilia platyphyllos* in seizure control and the exact mechanism of anticonvulsant action of effective compounds extracted from the *Tilia* plant should be investigated.

References

1. Gorji A, Ghadiri MKJN, Reviews B. History of epilepsy in Medieval Iranian medicine. 2001; 25(5):455-61.
2. Tepe B, Eminagaoglu O, Akpulat HA, Aydin EJFC. Antioxidant potentials and rosmarinic acid levels of the methanolic extracts of *Salvia verticillata* (L.) subsp. *verticillata* and *S. verticillata* (L.) subsp. *amasiaca* (Freyn & Bornm.) Bornm. 2007;100(3):985-9.
3. Heidari MR. The effects of *Tilia platphyllos* scop. extract on seizure induced by picrotoxin and pentylentetrazole in mice. *Journal of Pharmaceutical & Health Sciences*. 2012; 1(1):17-24.
4. Alimohammadi B, Azhdari-Zarmehri H, Sofiabadi MJJoH, Development. Anticonvulsant effect of hydroalcoholic extract of *Scrophularia striata* boiss. On pentylenetetrazol-induced seizure in mice. 2014; 21(3).

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran

Poster Presentation ID: 117

Morfofisiological characteristics of Lemon balm (*Melissa officinalis* L.) under the influence of γ-amino butyric acid and phenylalanine in soilless culture.

Elmira Hashemi[1,*], Saeedeh Alizadeh salte[1], Abolfazl Alirezalu[2]

[1] *Department of Horticultural Sciences and engineering, Faculty of Agriculture, University of Tabriz, Tabriz, Iran*
[2] *Department of Horticultural Sciences and engineering, Faculty of Agriculture, Urmia University, Urmia, Iran*
E-mail: hashemie862@gmail.com

ARTICLE INFO

Keywords:
Melissa officinalis
γ-aminobutyric acid
Phenylalanine
Chlorophyll
Antioxidant activity

ABSTRACT

In order to evaluate the effect of gamma-aminobutyric acid (GABA) and phenylalanine amino acid on some of the morpho-physiological characteristics of the lemon balm (*Mellissa officinalis* L.) plant, a factorial experiment was conducted based on completely randomized design and in soilless culture condition. Experimental treatments included GABA (0, 10, 20 and 40 mg.li^{-1}) and phenylalanine (0, 10, 20 and 40 mg.li^{-1}). The treatments were started 2 weeks after the establishment of seedlings and continued until ten days before 50% flowering. The results showed that GABA and phenylalanine had no significant effect on the plant length, the number of flowering branches and the stem diameter in comparison with the control sample. Also, these treatments showed a significant effect on leaf greenness, leaf surface index, chlorophyll a and b, total carotenoid and antioxidant activity. The highest amount of total carotenoid and chlorophyll b was observed in the treatments of 20 mg.li^{-1}of phenylalanine and GABA, and the highest amount of chlorophyll a was observed in the treatment of 20 mg.li^{-1} of GABA. Also, the highest amount of antioxidant activity in the treatment of 40 mg.li^{-1} of GABA and 30 mg.li^{-1}of phenylalanine and the highest level of the leaf in the control treatment of GABA and 40 mg.li^{-1}of phenylalanine was measured. Based on the obtained results, the use of the biological combination of GABA and phenylalanine increased the quantitative and qualitative parameters of lemon balm, and the consumption of 20 mg.li^{-1}of each, to achieve better results in morphological and Physiological characteristics is recommended.

References

1. Amoee, A.M. (2009). Cultivation of Medicinal and Aromatic Plants. Publications of the Institute of Applied Higher Education of Agriculture Jahad.

2. Attoa, G. E., Wahba, H. E. and Farahat, A. A. (2000). Effect of some amino acids and azvin100 fertilization on growth and chemical composition of (*Iberis amara* L.) plant. Egyptian Journal of Horticulture, 29, 17-37.

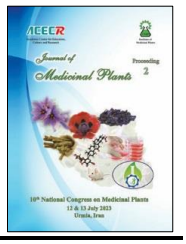
3. Belal, B. E. A., El-Kenawy, M. A. and Uwakiem, M. K. (2016). Foliar application of some amino acids and vitamins to improve growth, physical and chemical properties of flame seedless Grapevines. *Egyptian Journal of Horticulture*, 43, 123-136.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 118

Evaluation of the effect of oral administration of the Artacasia herbal solution on the incidence of subclinical ketosis in dairy cattle

Majid Fartashvand[1], Saeed Naseri[2,*], Mohammad Jafari Shiran[3]

[1]*Department of Clinical Sciences, Faculty of Veterinary Medicine, Tabriz Medical Sciences, Islamic Azad University, Tabriz, Iran*
[2]*Department of Pharmacology and Toxicology, Faculty of Pharmacy and Pharmaceutical Sciences, Tehran Medical Sciences, Islamic Azad University, Tehran, Iran*
[3]*Center of Herbal Medicine, Iranian Academy Center for Education, Culture, and Research (ACECR), Ardabil, Iran*
E-mail: herbalpharma07@gmail.com

ARTICLE INFO

Keywords:
Dairy cattle
Subclinical ketosis
Chicory
NEFA
BHBA

ABSTRACT

Subclinical ketosis is one of the essential metabolic diseases in high-breeding cows, which affects most dairy cows without obvious clinical signs. The damage caused by subclinical ketosis includes reduced milk production, weight loss, reproductive disorders, and increased risk of clinical diseases such as udder displacement. This study aimed to investigate the effect of Artacasia herbal extract administration on blood BHBA and NEFA levels and consequently reduce the incidence of subclinical ketosis in newborn cows. For this purpose, the number of 30 Holstein cows with similar weight and history of milk production in the form of three groups of 10 cows, including a control group and two treatment groups with different doses of Artacasia herbal medicine (1.5 and 3 liters per head per day) They were tested for six weeks. The mean serum BHBA in the low-dose group from the second week and the high-dose group from the third week onwards was significantly lower than in the control group. Also, the average serum NEFA was considerably lower in the treatment groups from the second week. By the end of the NEFA and BHBA period, serum levels in the treatment groups were lower than in the control group. The lowest amount of milk production was recorded in the control group and the highest amount in the high-dose treatment group based on the record of milk production one month after delivery, and this difference was statistically significant. The results of this study showed that the oral administration of Artacasia herbal solution to newborn cows prevents the increase of serum NEFA and BHBA levels and consequently prevents the occurrence of subclinical ketosis in dairy cows. Therefore, it can be considered a solution to preavoidmage caused by this disease in dairy cattle herds.

References

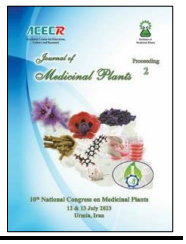
1. Van Arkel J, Vergauwen R, eventer R. S, et al., Sink filling, 2012. Inulin metabolizing enzymes and carbohydrate status in field grown chicory (*Cichorium intybus* L.),” *Journal of Plant Physiology*, vol. 169, no. 15, pp. 1520-1529.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 119

Investigating how to management stands of medicinal juniper trees (*Juniperus* Spp) in Dustak region of Urmia in Iran

Seyed Sajad mir yusefzadeh[1,*], Zahra bagheri[1], Seyed Hadi madani[2]

[1]*Department of Natural Resources, Urmia University, Urmia, Iran*
[2]*PhD of Medicinal plant*
E-mail: sajad.yusefzadeh@gmail.com

ARTICLE INFO

Keywords:
Juniperus Spp
Management
West Azerbaijan

ABSTRACT

Juniperus Spp, the common juniper, is a species of small tree or shrub in the cypress family Cupressaceae. It is one of the most important herbal plants in Iran and has many biological and pharmacological properties. They are used in traditional medicine as an anti-bloating, antibacterial and treatment for indigestion. Considering the importance and economic value of the use of by-products, the development of proper management methods for the exploitation of these resources will guarantee the production and continuity of these products. Therefore, with the aim of investigating how to manage juniper trees in the Dostak region of Urmia (371457.63N, 450436.88E), a statistical plan was evaluated in the form of 100% statistics, the habitat conditions, the amount of human intervention and the amount of harvesting of this medicinal plant were evaluated. The statistical results (at the level of 5%) showed that with the increase in people's awareness of the medicinal uses of this plant, the destruction has increased significantly and the need to carry out appropriate management measures to protect the area is needed.

References

1. Sadri H.A, Assadi M. Preliminary stadies on monoterpene composition of Juniperus polycarpos. *IRAN J. Bot*. 1994; 6 (2): 323 - 45

2. Salehi Shanjani P. Effect of secondry metabolism and peroxides and polyphenoloxidase in Juniperus. MSc Department of Biology of Tehran University. 1986.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran

Poster Presentation ID: 120

Treating Gastric Pain ache by preparing a potion of seven plants in the traditional medicine in Khosh Yeilagh Rangelands in Golestan Province

Yasaman Kiyasi*, Mohammad Rahim Forouzeh, Seyedeh Zohreh Mirdeilami, Hamid Niknahad-Gharmakher

[1]*Department of Range Management, Faculty of Range and Watershed Management, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan.*
E-mail: ykiassi@yahoo.com

ARTICLE INFO

Keywords:
Stomach Pain
Medicinal Plants
Traditional Medicine
Participatory Interview
KhoshYeilagh Rangeland

Figure 1: stomach potion

ABSTRACT

Stomach has a special place in the Iranian traditional medicine school. The stomach It is responsible for appetite and the first stage of food digestion. So the health of the body is dependent on the stomach function (Shirooye et al, 2015). Because when its function is good and normal, its benefit reaches the whole body, and on the contrary, in case of improper function, it causes damage to all body parts. Therefore, stomach diseases are of particular importance as one of the most important and effective members of the digestive system (Hajiheidari et al, 2012). Therefore, the purpose of this study is to introduce the herbal powder prepared by the local people of KhoshYeilagh region under the title of seven medicinal herbs potion for the immediate treatment of stomach pain. Information recording was done in the form of conversation in both interview methods in the natives' place of residence and participatory observation in the plant habitat. The interviewees were selected by snowball method. Plants used in this potion with scientific names: (*Achillea millefolium* L), (*Glycyrrhiza glabra* L), (*Teucrium polium* L), (*Thymus kotschyanus* Bioss. & Hohen), (*Bunium cylindricum* Boiss. & Hohen), (*Fumaria parvi flora* L) and (*Nepeta menthoides* Boiss. & Buhse) are. The uses of this potion can be used Confirmands systema digestivum, curationem immediatam cordis stomachi, anti-inflationis et gastritis, curationem heartache and Gripe Mixture Seven herbs are mixed with a little candy powder after being powdered, and a tablespoon of the powder is mixed in a glass of water and eaten. Preparation of this powder is an easy, cheap and accessible way to treat stomach pain and all body pain, so it is worth paying attention to it.

Table 1: Seven herbs used in stomach potion

Family	Scientific name	transliteration
Compositae	*Achillea millefolium* L	*Sāry:gul*
Legominaceae	*Glycyrrhiza glabra* L	*šyryn:boyān*
Lamiaceae	*Teucrium polium* L.	*kerpkasan*
Lamiaceae	*Thymus kotschyanus* Bioss. & Hohen	*kahlik:oty*
Apiaceae	*Bunium cylindricum* Boiss. & Hohen.	*zirah*
Fumariaceae	*Fumaria parvi flora* L	*šutarah*
Lamiaceae	*Nepeta menthoides* Boiss.& Buhse	*puneh*

References

1. Shirooye P, Sadeghpour O, Nazem E, Keshavarz M. Reasons for increasing appetite from the perspective of Iranian Traditional Medicine. *Jiitm* 2015; 5 (4): 304-309. URL: http://jiitm.ir/article-1-443-fa.html

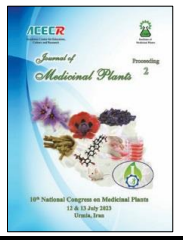
2. Hajiheidari M, Babaeian M, Mazaheri M, Elsagh M, Yavari M, Kamali M, et al . A Review on Causes of Gastric Pain in Traditional Iranian Medicine. *Jiitm* 2012; 2 (4) :337-344. URL: http://jiitm.ir/article-1-103-fa.html

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 121

The effect of (*Alpinia officinarum*) Hance on sex hormones and sperm quality indices in adult male dogs

Mohammad Esmaeilpour[1], Alaleh Rakhshanpour[2,*], Ali Soleimanzadeh[3]

[1]*D.V.M. Graduate, Faculty of Veterinary Medicine, Urmia University, Urmia, Iran*
[2]*Department of Clinical Pathology and Internal Medicine, Faculty of Veterinary Medicine, Urmia University, Urmia, Iran*
[3]*Department of Theriogenology, Faculty of Veterinary Medicine, Urmia University, Urmia, Iran*
E-mail: a.rakhshanpour@urmia.ac.ir

ARTICLE INFO

Keywords:
Alpinia officinarum
Sex hormones
Sperm quality indices
Dog

ABSTRACT

Fertility and the ability to control its efficiency are some of the main concerns of reproductive researchers. In this study, we investigated the direct effect of daily oral consumption of *Alpinia officinarum* extract on the spermatogenesis of adult male dogs. For this purpose, twenty adult male dogs were divided into four groups, including the control group (without consuming the plant extract), and the other three groups that ingested daily doses of 150 mg/kg, 250 mg/kg, and 500 mg/kg, respectively. At the beginning, venous blood samples and sperm samples were collected from each dog. The serum samples were used to measure Testosterone hormone, Malone-Di-Adelaide, Glutathione-peroxidase, total antioxidant capacity, Superoxide Dismutase, and Catalase enzyme. At the end of eight weeks of feeding plant extract, sperm count indices, morphological indices, plasma membrane damage index, sperm DNA damage and sperm motility indices were studied in all groups. According to the results, by increasing the dosage of extract between groups, at the third group (500 mg/kg), the most positive effect on spermatogenesis was seen. In the second and third groups with a dosage of 250 and 500 ml/kg respectively a significant increase in VCL (curvilinear velocity), VSL (straight-line velocity), VAP (average path velocity) and also total antioxidant capacity parameters was observed. Furthermore, it is noted that indicating high dosage of extract in adult male dogs showed a significant increase in testosterone level, Glutathione peroxidase and some parameters like STR/BCF in all treatments.

References

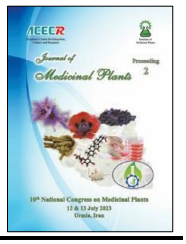
1. Hamid Heidari, Maasoume Abdollahi, Sima Khani, Fatemeh Nojavan & Samira Khani, Effect of Alpinia officinarum extract on reproductive damages in streptozotocin induced diabetic male Rats. *Journal of Diabetes & Metabolic Disorders*. 2021; 49(20):77–85.doi: 10.1007/s40200-020-00711-0.
2. Negm SH, Ragheb EM. Effect of (*Alpinia officinarum*) hance on sex hormones and certain biochemical parameters of adult male experimental rats. *Journal of Food and Dairy Sciences*. 2019; Sep 1; 10(9): 315-22. doi: 10.21608/JFDS.2019.55653.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 122

Interfering Effects of *Carum copticum* Essential Oil and Silver Nanoparticles on Gram-Negative Bacteria

Abdolghaffar Ownagh[1,*], Danial Hassani[2]

[1]*Department of Microbiology, Faculty of Veterinary Medicine, Urmia University, Umia, Iran*
[2]*Department of Food Science and Technology, Faculty of Agriculture, Urmia University, Urmia, Iran*
E-mail: hassani.danial2002@gmail.com

ARTICLE INFO

Keywords:
Ajowan
Essential oil
Silver nanoparticles
Gram-negative bacteria

ABSTRACT

Escherichia coli, *Salmonella typhimurium* and *Pseudomonas aeruginosa* as gram-negative bacteria are among important causes of bacterial infections. The aim of this study was to determine the interfering effects of Ajowan (*Carum copticum*) essential oil and silver nanoparticles on gram-negative bacteria in vitro situation in the presence of gentamicin as a positive control by using broth microdilution method. The results for minimum inhibitory concentration (MIC) of Ajowan essential oil on *Escherichia coli* and *Salmonella typhimurium* was 250 and 125µg/ml, respectively and these agents had no deterrent effect on *Pseudomonas aeruginosa*. The results of MIC for Ajowan essential oil with silver nanoparticles on *Escherichia coli* and *Salmonella typhimurium* was 125 and 25µg/ml and on *Pseudomonas aeruginosa* was 62.5 and 12.5 µg/ml, respectively. Due to synergistic anti-bacterial properties of Ajowan essential oil and silver nanoparticles, it can be concluded that *Carum copticum* oil and silver nanoparticle can be used as antimicrobial agents against gram negative bacteria and therefore, as an appropriate replacements for antibiotics.

References

1. Kazemi J, Ahmadi M, Dastmalchi H, Adibhesami M. Antibacterial effect of silver nanoparticles along with protein synthesis-inhibiting antibiotics on *Staphylococcus aureus* isolated from cattle mastitis. *Biol. J. Microorganism*. 2014; 2(8): 15-22.

2. Peter W. Alternative natural sources for a new generation of antibacterial agents. *Int. J. Antimicrob. Agents*. 2013; 52(3): 195-201.

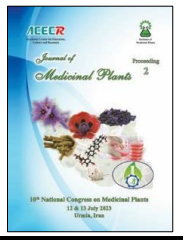
3. Kim JS, Kuk E, Yu KN, Kim JH, Park SJ, et al. Antimicrobial effects of silver nanoparticles. *Nanomedicine: Nanotechnol. Biol. Med.* 2007; 3(1): 95-101.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 123

Effect of Ajowan (*Carum copticum*) Essential Oil on Fungal Load of Poultry Feed

Abdolghaffar Ownagh[1,*], Danial Hassani[2]

[1]*Department of Microbiology, Faculty of Veterinary Medicine, Urmia University, Umia, Iran*
[2]*Department of Food Science and Technology, Faculty of Agriculture, Urmia University, Urmia, Iran*
E-mail: hassani.danial2002@gmail.com

ARTICLE INFO

Keywords:
Feed poultry
Fungal load
Essential oil
Carum copticum

ABSTRACT

The growth of fungal microorganisms in poultry feed can be transferred to their body and cause number of diseases. There are common methods for controlling microorganisms in the poultry feed but they are not always effective and have caused side effects in poultry and humans. Extensive studies have been done on the anti-fungal and antioxidant effects of plant essential oils. This study was conducted to evaluate the effect of Ajowan essential oil on fungal load in poultry feed. The essential oil of Ajowan seeds was extracted by hydrodistillation and different dilutions of it was prepared. The certain amounts of various dilutions (5 ml of 250 µl/ml, 125 µl/ml and 62/5 µl/ml) were added to poultry feed. The sampling were conducted from 2-hours, 24-hours, 48-hours, 1 week and 2 week after adding of treatments. The samples were cultured on SDA medium. Fungal load was calculated after 72 hours incubation in 30ºC. The results showed that the samples gathered in first 2 hours after adding of the oil had maximum effect on fungi. Fungal colonies counting showed that after two hours the fungal contamination decreased. The Ajowan essential oil has great influence in high dose (250 µl/ml) so the fungal count was 0 CFU/gram feed. The findings of this study showed that Ajowan essential oil may be suitable alternative for chemical materials in poultry industry. This treatment is perfectly natural, so it could be so safe but a broader investigation of the possible side effects on the poultry is essential.

References

1. Moazeni M, Saharkhiz MJ, Hosseini AA. In vitro lethal effect of ajowan (*Trachyspermu mammi* L.) essential oil on hydatid cyst protoscoleces. *Vet. Parasitol*. 2012; 187(1): 203-208.

2. Peter W. Alternative natural sources for a new generation of antibacterial agents. *Int. J. Antimicrob. Agents*. 2013; 52(3): 195-201.

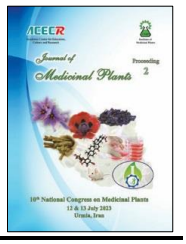
3. Khosravi H, Shokri N, Sohrabi M. Potential effects of *Trachyspermum copticum* essential oil and propolis alcoholic extract on Mep3 gene expression of *Microsporum canis* isolates. *J. Med. Mycology*. 2014; 24(3): 101-107.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 125

Cytotoxic activity of different extracts from aerial parts of *Artemisia deserti*

Saeed Mollaei[1,*], Ali Shamsuzan[1], Mostafa Ebadi[2]

[1]*Department of Chemistry, Faculty of Basic Sciences, Azarbaijan Shahid Madani University, Tabriz*
[2]*Department of Biology, Faculty of Basic Sciences, Azarbaijan Shahid Madani University, Tabriz*
E-mail: s.mollaei@azaruniv.ac.ir

ARTICLE INFO

Keywords:
Artemisia
Biolpgical activity
Chloroform extract

ABSTRACT

The genus *Artemisia* is one of the largest and varied genera of the Asteraceae family. The *Artemisia* species have many medicinal properties that are used to treat a variety of diseases, including: antihypertensive, invigorating bloodcirculation, antiallergy, antimalarial, antiviral, antitumor and antioxidant. *Artemisia deserti* Krasch is one of the *Artemisia* species that is a Chinese traditional medicinal herb [1, 2]. The purpose of the existent study was to investigate the cytotoxic activity of different extracts including n-hexane, chloroform, ethyl acetate, acetone, methanol, methanol/water extracts from aerial parts of *A. deserti* against in vitro ovarian cancer cell line (OVCAR-3). The cytotoxic activity of extracts was evaluated by MTT (3-[4,5-dimethylthiazol-2yl]-2,5-diphenyl tetrazolium bromide) assay on the ovarian cell membrane within 48 hours at different concentrations. The IC_{50} values of n-hexane, chloroform, ethyl acetate, acetone, methanol, and methanol/water extracts were calculated (11.01, 8.444, 58.29, 144.4, >1000, 31.35 µg/mL respectively). The chloroform and n-hexane extracts indicated the highest cytotoxic activity on the OVCAR-3 cell line among the other extracts. According to the calculated values, methanol extracts has the lowest cytotoxic activity against OVCAR-3. The present study revealed that *A. deserti* chloroform extract might have a high potential to use as an anti-cancer drug.

References

1. Bora KS, Sharma A. The genus Artemisia: a comprehensive review. *Pharm Biol*, 2011; 49: 101-109.

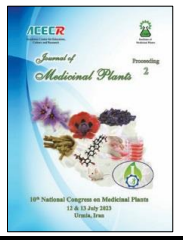
2. Pandey AK, Singh P. The genus Artemisia: A 2012–2017 literature review on chemical composition, antimicrobial, insecticidal and antioxidant activities of essential oils. *Medicines*, 2017; *4*(3): 68.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 126

The optimization of extracting oleoresin from coriander seeds and isolating its fatty acids by column chromatography

Nessa Gharehassanloo[1], Samad Nejad Ebrahimi[1,*], Ali Sonboli[1], Masoud Rahimi[1]

[1]*Department of Phytochemistry, Medicinal Plants and Drugs Research Institue, Shahid Beheshti University, Evin, Tehran, Iran*
E-mail: s_ebrahimi@sbu.ac.ir

ARTICLE INFO

Keywords:
Coriander
Oleoresin
Linoleic acid
Sonication
Maceration

ABSTRACT

Coriander (*Coriandrum sativum* L.) is primarily used as a flavor enhancer in food and various medicinal products. Coriander seed oleoresin contains many biologically active compounds, including fatty acids, polyphenols, volatile and essential oils, and etc. (1). Linoleic acid is one of the most common fatty acids of coriander oleoresin which is responsible for the major medicinal properties such as antioxidant, antimicrobial, anti-inflammatory and hypolipidemic activity (2). In this study, different extraction methods such as maceration, sonication, and combination of both methods, have been used to optimize the oleoresin extraction from coriander seeds at room temperature. In addition, the separation and isolation of fatty acids from the obtained oleoresin were carried out using silica gel column chromatography. After analyzing the outcomes, the hyphenated ultrasound-maceration method (sonication for 15 minutes at 50% power, followed by 24 hours of maceration) and the 24-hour maceration method were identified as the optimal extraction techniques, yielding the highest amounts (4.67% and 3.92%, respectively). Of the two methods mentioned above, maceration is more cost-effective, as its yield does not significantly differ from that of the sonic-maceration technique. For this purpose, overall extraction curve (OEC) was investigated for maceration technique to determine the optimum extraction time. Based on the OEC curve, the 12 h maceration with 3.78% yield was selected as the optimum maceration time. Furthermore, the gradient elution 96% hexane 4% ethyl acetate isolates fatty acids proved based on the ^{1}H NMR data.

References

1. Benyoussef EH, Beddek N, Zouaghi N, Belabbes R, Bessière JM. Isolation of Coriander Oils by Different Processes. *Journal of Essential Oil Bearing Plants*. 2004; 7(2): 129-35.

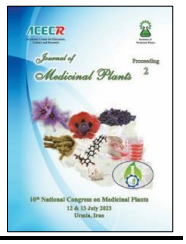
2. Uitterhaegen E, Sampaio KA, Delbeke EI, De Greyt W, Cerny M, Evon P, et al. Characterization of French Coriander Oil as Source of Petroselinic Acid. *Molecules*. 2016; 21(9).

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 127

Identification and quantification of phenolic acids in different extracts of *Artemisia deserti*

Saeed Mollaei[1,*], Ali Shamsuzan[1], Mostafa Ebadi[2]

[1]*Department of Chemistry, Faculty of Basic Sciences, Azarbaijan Shahid Madani University, Tabriz*
[2]*Department of Biology, Faculty of Basic Sciences, Azarbaijan Shahid Madani University, Tabriz*
E-mail: s.mollaei@azaruniv.ac.ir

ARTICLE INFO

Keywords:
Artemisia deserty
Extract
Rosmarinic acid

ABSTRACT

Artemisia species belong to Asteraceae family, and have many medicinal properties that are used to treat a variety of diseases, including: antioxidant, antitumor, antiviral, antimalarial, antihypertensive, invigorating bloodcirculation, and antiallergy. *Artemisia deserti* Krasch is one of the *Artemisia* species that is a Chinese traditional medicinal herb [1, 2]. The purpose of this study was to evaluate the phenolic acid compositions of different extract (n-hexane, chloroform, ethyl acetate, acetone, methanol, methanol/water, and water) from aerial parts of *A. deserti*. The extracts were analyzed by HPLC using C18 column. In this study, a total of 10 phenolic acid components were identified in the different solvent extracts. The results indicated that the amount of phenolic acids varied from 0.002 mg/g of plant to 0.778 mg/g of plant in different solvent extracts of *A. deserti* herb. Rosmarinic acid and salicylic acid were the dominant phenolic acid which was detected separately in methanol (0.778 mg/g of the plant) and methanol/water (0.760 mg/g of a plant) extracts. In different extract, *p*-hydroxybenzoic acid was the only phenolic acid identified in all extracts. Cinnamic acid was identified in all extracts in the amount of lower limit of detection (trace). According to results, methanol/water extract contain the highest amount of phenolic acids (1.292 mg/g of plant) followed by methanol extract (1.278 mg/g of plant), and the lowest amount of phenolic acids was related to n-hexane extract (0.078 mg/g of plant). The results of this study reveal that the methanol/water extract can be used as functional food ingredients and/or supplements.

References

1. Bora KS, Sharma A. The genus Artemisia: a comprehensive review. *Pharm Biol*, 2011; 49: 101-109.

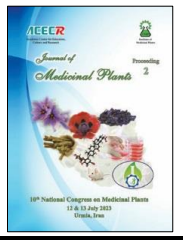
2. Pandey AK, Singh P. The genus Artemisia: A 2012–2017 literature review on chemical composition, antimicrobial, insecticidal and antioxidant activities of essential oils. *Medicines*, 2017; *4*(3): 68

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 128

Investigating the chemical composition of *Thymus daenensis* essential oil in the Baghmalek region (Khuzestan Province, Southwest of Iran)

Fatemeh Borna*, **Mokhtar Heidari**

[1]*Department of Horticultural Science, Agricultural Sciences and Natural Resources University of Khuzestan, Mollasani, Iran*
E-mail: borna@asnrukh.ac.ir

ARTICLE INFO

Keywords:
Needle thyme,
Thymol,
Carvacrol,
Lamiaceae

ABSTRACT

Denaii thyme [*Thymus daenensis* Celak.] belongs to the Lamiaceae family [1]. This plant is widely distributed in most regions of Iran, from the northwest to the central and southwest regions [2]. Studies show that different species of thyme have strong antibacterial, antifungal, antiparasitic, antispasmodic, and antioxidant effects [3]. Researches regarding the recognition of habitat areas, effective substances, etc. in the natural areas of Iran is being carried out. Khuzestan province is one of the important habitats of this plant, and it is important to collect information about the distribution of this plant in different parts of the province. In this research, the essential components of plants collected in the Baghmalek area were investigated for the first time. The collection of plant samples was done in April 2019 from the habitat of this plant in the Baghmalek mountains (Monghasht, northeast of Khuzestan). The essential oil of the collected samples was extracted by Hydro-distillation using a Clevenger apparatus, and the quality of essential oil compounds was checked by gas chromatography-mass spectrometry. Based on the results of the analysis, 73 chemical compounds were identified in the thyme essential oil, and the compounds of Cimen, Linalool, γ-Terpinene, and Thymol were the highest concentration and the major part constituted the essential oil, respectively with 31.43, 20.65, 20.01 and 4.52 percent., the amount of Carvacrol was 2.59%, which was different from the results reported about the essential oil compounds of Denaii thyme collected in other parts of the country. It is suggested to collect samples of this plant from different parts of the Baghmalek region and compare their biochemical compositions.

References

1. Jamzad, Z., 2010. Thymes and Savories of Iran, Institute of Research of Forests and Rangelands, 172 p.

2. Khorshidi, J., Shokrpour, M. and Nazeri, V. 2019. Phytochemical assessment and comparison of *Thymus daenensis* Celak. essential oil in natural habitats and field conditions, *Eco-phytochemical Journal of Medicinal Plants*, 7(1), pp. 1-11.

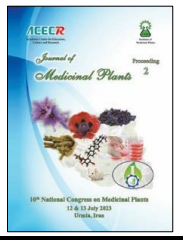
3. Stahl-Biskup, E. and Saez, F. 2002. Thyme. 1st Ed. Taylor & Francis. England. 346 p.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 130

Preparation and Evaluation of Peppermint Essential Oil Nanoemulsions for Delivery of Hydrophobic Drugs

Nafise Sepahdoost[1], Elnaz Tamjid[1,*], Maliheh Soodi[2]

[1] Department of Nanobiotechnology, Faculty of Biological Sciences, Tarbiat Modares University, Tehran, Iran
[2] Department of Toxicology, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran
E-mail: Tamjid@modares.ac.ir

ARTICLE INFO

ABSTRACT

Introduction Peppermint essential oil is a natural aromatic compound derived from the peppermint plant, a hybrid of spearmint and watermint. It has various applications in food, cosmetics, and medicine, as it possesses antibacterial, antifungal, antiviral, and antioxidant properties. The antimicrobial activities result from the combined effects of l-menthol, menthone, menthyl acetate, and limonene. However, peppermint essential oil has some drawbacks, such as low water solubility, high volatility, and strong odor, which limit its use and stability. To overcome these challenges, stabilizing the volatile components, and take full advantage of peppermint essential oil, nanoemulsion was used as a delivery system to encapsulate peppermint essential oil and enhance its performance [1, 2]. **Material and methods** The aim of this study was to prepare and evaluate nanoemulsions with different concentrations of surfactant (Tween 80), co-surfactant (PEG 400), oil (peppermint essential oil) and deionized water, and to identify the optimal formulation. The nanoemulsions were prepared by mixing oil with surfactant and co-surfactant and stirring at 900 rpm for 15 min. Then, deionized water was added drop by drop while stirring. Finally, the mixture was sonicated at 80% duty cycle for 10 min. The nanoemulsions were characterized by their particle size using a DLS instrument and visual stability. **Results** The optimal formulation was composed of 11.25% w/w surfactant, 1.25% w/w co-surfactant, 12.5% w/w oil, and 75% w/w deionized water. The negative zeta potential of this formulation contributed to its high stability. **Conclusion:** Therefore, this study developed an optimal nanoemulsion formulation for delivering hydrophobic drugs that are soluble in peppermint essential oil.

References

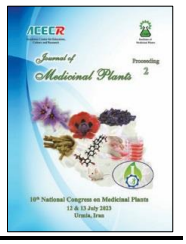
1. Liang R, Xu S, Shoemaker CF, Li Y, Zhong F, Huang Q. Physical and Antimicrobial Properties of Peppermint Oil Nanoemulsions. *J. Agric. Food Chem*. 2012; 60: 7796–7803. doi: 10.1021/jf301129k.
2. Liu Q, Li Y, Liang R, Zhang X, Xu S. Preparation of peppermint oil nanoemulsions: Investigation of stability, antibacterial mechanism and apoptosis effects. *Colloids and Surfaces B: Biointerfaces*. 2021; 202: 111626. doi: 10.1016/j.colsurfb.2021.111626.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 132

Sustainable Production of *Dracocephalum multicaule* under Different Levels of Nitrogen Fertilizer in Cold Region of East Azarbaijan

Saeid hazrati[1,*], Roya Valipour[1], Maryam Sarakhsi[1]

[1]*Department of Agronomy, Faculty of Agriculture, Azarbaijan Shahid Madani University, Tabriz, Iran*
E-mail: Saeid.hazrati@azaruniv.ac.ir

ARTICLE INFO

Keywords:
Nitrogen
Essentail oil
Fresh weight
Dracocephalum multicaule

ABSTRACT

Dracocephalum multicaule are mentioned in Iranian traditional medicine for enhancement of cognitive performance. The lack of appropriate nitrogen fertilizer dose recommendations is one of the limiting factors for its ex-situ conservation and large-scale cultivation, as plant nutrition is vital in determining crop growth and productivity [1]. Plant nutrition plays a vital role in determining crop growth and secondary metabolites productivity [2]. Thus, a study at the experimental field and unheated greenhouses. The research factors were nitrogen (N) dose (0, 30, 60, and 90 kg ha^{-1} in the field) with the random block method. It was found that *D. multicaule* could grow successfully outside their natural habitat with sufficient N fertilization when the fresh and essential oil yield per plantation area was also positively affected. N fertilizers enhanced plant, shoot fresh biomass, essential oil content and yield. The significant increase in shoot fresh weight (77.8 g per plant) and essential oil contents (0.545%) of *D. multicaule* confirms the efficient role of 60 and 90 kg ha^{-1} in the field, respectively. The results of this study indicate that utilizing nitrogen fertilizer at a moderate rate (60 and 90 kg ha^{-1} in the field) can increase the yield and essential oil content of *D. multicaule.*

References

1. Mojab F, Rustaiyan A, Khalighi Sigaroodi F. Essential oil of *Dracocephalum multicaule* Montbr. & Auch (Labiatae). *Journal* of *Medicinal Plants* and *By-products* 2002; 1(4): 68-71

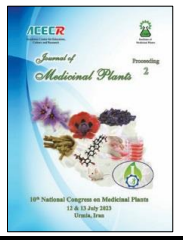
2. Radušienė J, Marksa M, Ivanauskas L, Jakštas V, Çalişkan Ö, Kurt D, Odabaş MS, Çirak C. Effect of nitrogen on herb production, secondary metabolites and antioxidant activities of *Hypericum pruinatum* under nitrogen application. *Industrial Crops and Products*. 2019 1; 139:111519.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 134

Study the effect of salinity stress and silver nanoparticles on growth indices in Basil plant (*Ocimum basilicum* L.)

Mohammad Sarberahneh*, **Rashid Jamei**

Department of Biology, Faculty of Sciences, Urmia University, Iran
E-mail: srbrhnhmhmd@gmail.com

ARTICLE INFO

Keywords:
Basil
Silver nanoparticles
Growth indices
Salinity stress

ABSTRACT

Salinity after drought is the most important and common drought stress in the world including Iran (1). Today, the use of nanotechnology in agriculture is expanding. Silver particles are also one of the factors that affect many morphological and physiological processes of plants (2). In order to investigate the effect of silver nanoparticles (75 ppm) and salt stress (75 mM and 150 mM) on some morphological traits of basil plant (*Ocimum basilicum L.*), an experiment was conducted in the form of a completely randomized design in the culture room of the biology department of Urmia University.Traits such as fresh weight, dry weight and weight in turgor state were measured. The results showed that the use of silver particles had a significant effect on the dry weight and increased it. Also, it had a positive effect on the fresh weight and the turgor weight, and it caused the adjustment of the salinity stress effect. The use of silver nanoparticles has a positive effect on the improvement of the morphological characteristics of the basil medicinal plant, and the optimal use of silver nanoparticles can increase salinity resistance of the basil plant in its vegetative growth stages.

References

1. Abd Mishani S, Bushehri A. supplementary plant breeding course and publications of the Department of Agriculture and Plant Breeding, 1372; Faculty of Agriculture University of Tehran.

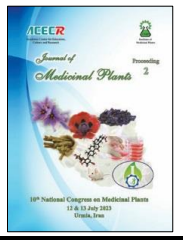
2. Yang F, Hong F. S, You W. J, Liu C, Gao F. Q, Wu C, and Yang P. Influences of nano-anatase TiO_2 on the nitrogen metabolism of growing spinach. *Biological Trace Element Research*. 2006, 110: 179 -190.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 135

Evaluation of antibacterial effects of hexane extract of *Hypericum coris* smoke against some pathogenic bacteria

Amirarsalan Kavyanifard[1], **Nasrollah Soori**[2]

[1]*Assistant Professor of Biology, Payame Noor University, Tehran, Iran*
[2]*Assistant Professor of Agriculture Sciences, Payame Noor University, Tehran, Iran*
E-mail: kavyanifarda@pnu.ac.ir

ARTICLE INFO

Keywords:
Antibacterial
Hypericum coris
Hexane extract
Medicinal plant

ABSTRACT

For decades, the medicinal plant *Hypericum coris* has been traditionally used as an ointment to treat infected wounds [1]. Considering the background, antibacterial properties of hexane extract of *H. coris* smoke (HEHS) was investigated against a number of pathogenic bacteria. For this purpose, the aerial parts of the plant were burned and the achieved smoke was precipitated using cold and then washed by hexane. After concentration of the hexane extract, disc diffusion method [2] was used to evaluate its antibacterial properties against *Bacillus subtilis, Staphylococcus aureus, Escherichia coli* and *Pseudomonas aeruginosa*. The hexane extract of wheat straw smoke was also used as a negative control. Comparing to control, our results indicated that HEHS prevents the growth of all of studied bacteria. It was the first research on the antibacterial effects of *H. coris* smoke which showed that its hexane extract has an inhibitory effect on gram positive and negative bacteria.

References

1. Grafakou ME, Diamanti A, Antaloudaki E, Kypriotakis Z, Ćirić A, Soković M, Skaltsa H. Chemical Composition and Antimicrobial Activity of the Essential Oils of Three Closely Related *Hypericum* Species Growing Wild on the Island of Crete, Greece. *Appl. Sci.* 2020; 10, 2823. https://doi.org/10.3390/app10082823.

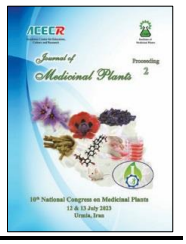
2. Salam MA, Al-Amin MY, Pawar JS, Akhter N, Lucy IB. Conventional methods and future trends in antimicrobial susceptibility testing. *Saudi Journal of Biological Sciences*, 2023; 30(3): 103582. doi.org/10.1016/j.sjbs.2023.103582.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 136

Improvement of photosynthetic parameters under treatment with gamma radiation in summer savory (*Satureja hortensis*)

Vahideh Mohammadi[1], Mahboobeh Zare Mehrjerdi[1,*], Sasan Aliniaeifard[1]

Department of Horticulture, College of Agricultural Technology, Tehran University, Tehran, Iran
E-mail: mzarem@ut.ac.ir

ARTICLE INFO

Keywords:
Photosynthesis
Gamma radiation
Summer savory

ABSTRACT

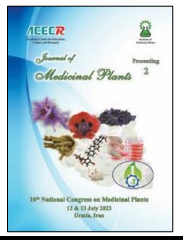
Summer savory (*Satureja hortensis*) is one of the most important medicinal plants from the Lamiaceae family. The essential oil of this plant is used in food and pharmaceutical industries. Gamma irradiation is used in breeding programs to create mutations. Induction of mutations have been used to improve plants and to help create genetic diversity. This research was conducted to investigate the effect of gamma radiation on photosynthetic parameters in the four-leaf stage. For this purpose, an experiment was designed in a completely randomized design with at least three replications in which savory seeds were treated with doses of 0، 50، 100، 200 and 300 Gray of gamma radiation. Then, the photosynthetic characteristics in the four-leaf stage of the control plants were evaluated by evaluating the fluorescence properties of chlorophyll and the electron transport chain using a Fluorpene device. The maximum efficiency of photosystem two (F_V/F_M) was increased under treatment with 100 and 300 Gray of gamma radiation. The highest F_V/F_M was observed in the 300 Gray, which increased by 3.32% compared to the control. Also, 50, 100, and 300 Gray have a positive effect on system efficiency index per absorbed light (PI_{ABS}), and the highest value was observed at 300 Gray, which increased by 47 percent compared to the control plants. Doses of 50, 100 and 300 Gray decreased the amount of Light absorbance flux for PSII antenna chlorophylls per reaction center (ABS / RC) and the amount of Trapped energy flux per reaction center (TR_0 / RC).

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 137

Long-term hairy roots culture of *Centella asiatica* in order to increase biomass accumulation for the production of centellosides

Zahra Karimi, Hassan Esmaeili, Mohammad Hossein Mirjalili*

[1]*Department of Agriculture, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*
E-mail: m-mirjalili@sbu.ac.ir

ARTICLE INFO

Keywords:
Bioreactor
Continuous culture
Extraction
Gotu kola
Triterpenoids

ABSTRACT

Centella asiatica (L.) Urban (Apiaceae) is well-known medicinal plant in the cosmetic and health industry, which is rich in pentacyclic triterpenoids named centellosides. These compounds include triterpene saponins such as madecassoside and asiaticoside as well as their sapogenins *i.e.* Asitic acid and madecassic acid. Biological activities and medicinal properties centellosides such as memory enhancement, anti-inflammatory, anticancer and antidiabetic have been widely reported [1]. In the present study, long-term hairy root culture of the plant to increase the biomass accumulation of two types of the plant induced hairy roots including wild type (A4) and transformed squalene synthase (SQS) roots for further use in the production of centellosides were investigated for eight weeks and was compared with batch culture. The results showed that in batch culture, A4 and SQS hairy root lines reached their maximum growth rates as 12.15 g and 11.22g in the fourth and fifth weeks, respectively. After that, they entered the decline phase and death by going through the downward process, while in long-term culture, the hairy roots showed a positive response and their growth trend was increasing until the last week. Therefore, A4 and SQS hairy root lines showed their highest growth rate with 33.61 g and 18.64 g after eight weeks, respectively. These findings can be interestingly considered for mass production of *C.asiatica* hairy roots as a fast and stable source of medicinally important centellosides.

References

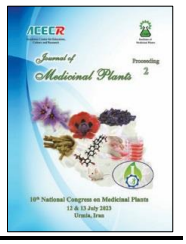
1. Luthra R, Satija G, Roy A. Centellosides: pharmaceutical applications and production enhancement strategies. *PCTOC.* 2022; 149, 25–39. doi: 10.1007/s11240-021-02187-z

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 138

The effect of growth regulators on callus formation of *Catharanthus roseus*

Shabnam miryousefzadeh[1], bahman hosseini[2,*] , syavash hemmati[3]

[1]*M.Sc. student, Department of Horticulture, Faculty of Agriculture, Urmia University, Urmia, Iran*
[2]*Department of Horticulture, Faculty of Agriculture, Urmia University, Urmia, Iran.*
[3]*Research Department of Secondary Metabolites Production in Bioreactor,Academic Center for Education, Culture and Research (ACECR), West Azarbayjan Branch, Urmia, Iran*
E-mail: b.hosseini@urmia.ac.ir

ARTICLE INFO

Keywords:
Alkaloid
Catharanthus roseus
Callus culture
Plant growth regulators

ABSTRACT

Catharanthus roseus, is a perennial medicinal plant belonging to the Apocynaceae. Vinblastine and vincristine are commercial indole terpenoid alkaloids that are used in anticancer chemotherapy [1]. Considering the medicinal and economic importance of the cultivation of Periwinkle plant, progress on *In vitro* plant tissue culture methods of this plant is important in order to facilitate the methods of cell suspension culture to produce valuable compounds [2]. Therefore, in this research, the cultivation conditions optimization was investigated in order to produce callus of *C. roseus* plant. To callus induction, seeds of four varieties of *C. roseus* (Apricot, Red Really, Orange, Little Mix) surface sterilized and transferred to MS culture medium for seed germination, and after 20 days of cultivation, in order to produce callus, the leaves of the seedling were separated and after wounding transferred to MS media fortified with various concentrations of 2, 4-D (0.5, 1, 1.5, 2 mg/l) and BAP (0, 0.5, 1, 1.5 mg/l). Explants were subculture every 3 weeks. A completely randomized design with three replications was used to check the percentage of the callus formation obtained from the explants and the quality of the produced callus. The analysis of variance results showed that the highest percentage of callus obtained in media contained with 2,4-D (0.5mg/) and (1mg/l) respectively in Red Really genotype And then it was observed in Orange variety , Little Mix and Apricot varieties had low levels of callus formation ($p<0.01$).

References

1. Ahmed Y. M. Effect of Growth Regulators on Callus Formation and Alkaloids Production on Vinca Rosea Plant (*Catharanthus roseus* L.). *Journal of Biotechnology & Bioinformatics Research. SRC/JBBR*, 2022, 155. (4), 153.

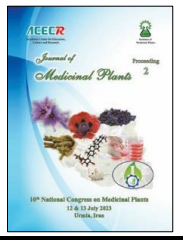
2. Das A, Sarkar S, Bhattacharyya S, Gantait, S. Biotechnological advancements in *Catharanthus roseus* (L.) G. Don. *Applied Microbiology and Biotechnology*, 2020, 104, 4811-4835.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 139

Essential oil composition, total flavonoid content and antioxidant activity of *Trachyspermum copticum* (L.)

Alireza Alvani[1], Babak Mokhtari[1], Zeinab Mazarei[1,*]

[1]*Department of Chemistry, Faculty of Science, Shahid Chamran University of Ahvaz, Ahvaz, Iran*
E-mail: z.mazarei@scu.ac.ir

ARTICLE INFO

Keywords:
Trachyspermum copticum (L.)
Essential oil
Total flavonoid content
Antioxidant activity

ABSTRACT

Trachyspermum copticum (L.), with the Persian name of Zenian, is an annual herb with small brown fruits that grows in eastern India and Iran. In Iranian traditional medicine, the fruits of *T. copticum* are used as diuretics, antiemetic, antiflatulent, and anthelmintics [1–2]. In this study, the essential oil of *T. copticum* fruits was extracted by hydrodistillation method using a Clevenger-type apparatus, and the obtained essential oil was analyzed by GC-MS. The major components of the essential oil include Thymol (56.20%), o-Cymene (21.17%), δ-Terpineane (16.63%), and β-Pinene (1.59%). Four extracts of *T. copticum*, including ethanolic, 80% ethanolic, methanolic, and acetone extracts, were prepared by maceration and were assessed for total flavonoid content and antioxidant capacity. The 80% ethanolic extract showed the highest total flavonoid content based on quercetin equivalent (12.68 ± 0.43 mg/g). The antioxidant capacity of prepared extracts was evaluated by the DPPH free radical scavenging method. The obtained results revealed that the ethanolic extract possesses the highest antioxidant activity, with an IC_{50} value calculated at 0.344 mg/mL.

References

1. Iranmanesh, Safora, et al. Preparation and Characterization of Zein Electrospun Fibers for Nano Encapsulation of Ajowan (*Trachyspermum copticum* L.) Essential Oil. *Journal of Essential Oil Bearing Plants* 2022; 25.2: 219-233.

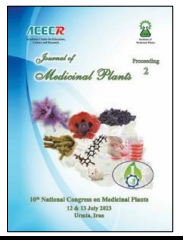
2. Ladan Moghadam, A. R. Chemical Composition and Antimicrobial Activity of *Trachyspermum copticum* L. Essential Oil in Iran. *Journal of Essential Oil Bearing Plants* 2016; 19.6: 1532-1536.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 140

Effect of light intensity on *Ziziphora clinopodioides* Lam growth

Saeid hazrati[1,*], **Iraj Ezzatmand**[1]

[1]*Department of Agronomy, Faculty of Agriculture, Azarbaijan Shahid Madani University, Tabriz, Iran*
E-mail: Saeid.hazrati@azaruniv.ac.ir

ARTICLE INFO

Keywords:
Light intensity
Fresh weight
Growth
Ziziphora clinopodioides

ABSTRACT

Light intensity is most strongly related to plant growth attributes and is a significant limiter for plant growth, development, and certain physiological and phytochemical processes [1]**.** *Ziziphora clinopodioides* is one of the most commonly consumed medicinal edible plants, belonging to the Lamiaceae family, that widely distributed in Asia and Europe especially Turkey and west of Iran, aerial of the plant is frequently used as wild vegetable or additive in foods to offer aroma and flavor in Iran [2]. Field experiments were conducted to measure the growth and fresh yield of *Z. clinopodioides* seedlings at three light intensities (full sunlight, 50% sunlight, and 75% of full sunlight) and evaluated the adaptability of seedlings. We found that low light regime led to a decrease in the number of lateral branches in *Z. clinopodioides*, and the number of lateral branches was maximum (15.83 plant^{-1}) under full sunlight is more favorable for the normal growth and development of *Z. clinopodioides.* According to the results, the maximum amount of fresh weight (8274.7 kg ha^{-1}) was obtained under 75% of full sunlight, compared to 50% of full intensity was 34% more. Therefore, proper shading conditions should be handled wisely for optimum fresh weight of *Z. clinopodioides* seedlings.

References

1. Hazrati S, Tahmasebi-Sarvestani Z, Nicola S, Beyraghdar Kashkooli A, Habibzadeh F, Mohammadi H, Mokhtassi-Bidgoli A. 2020. Effect of light and water deficiency on growth and concentration of various primary and secondary metabolites of *Aloe vera* L. *Journal of Agricultural Science and Technology* 22(5): 1343-1358.

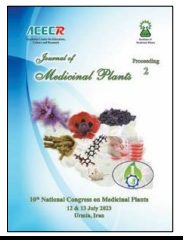
2. Hazrati S, Govahi M, Sedaghat M, Kashkooli AB. A comparative study of essential oil profile, antibacterial and antioxidant activities of two cultivated Ziziphora species (*Z. clinopodioides* and Z. *tenuior*). *Industrial Crops and Products*. 2020, 1; 157: 112942.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 141

Effect of biochar enriched with biofertilizer and trichoderma on some morphological traits of *Hibiscus esculentus* L. in the stress condition of the heavy metal chromium

Aysan Hasemzadeh*, **Latifeh Poorakbar, Sina Siavash Moghaddam**

Department of Biology, Faculty of Sciences, Urmia University, Iran
E-mail: st_a.hasemzadeh@urmia.ac.ir

ARTICLE INFO

Keywords:
Okra plant
Heavy metal
Biochar Trichoderma

ABSTRACT

Due to the industrialization of cities and the increase of human and industrial activities, the soil is contaminated by some heavy metals such as chromium, which is toxic and carcinogenic to organisms (1). Biochar is charcoal prepared from plant biomass and agricultural waste, which is considered a widely used method for soil bioremediation, the purpose of which is to reduce the risk of transferring pollutants to water and the food cycle of living organisms(2). In this regard, an experiment was carried out on okra plant(*Hibiscus esculentus* L.) with three levels of chromium (0, 20 and 40) and seed inoculation with biofertilizer and Tricoderma fungus with three replications of factorially based on a completely randomized design in the culture room of the biology department of Urmia University. The results showed that the use of chromium heavy metal reduces the length of the plant's roots and shoots. Also, the use of heavy metal chromium has increased the relative content of leaf water compared to the control. But the use of biochar, biofertilizer and Trichoderma fungus has moderated the toxic effects of the heavy metal chromium on the okra plant.

References

1. He, L., Zhong, H., Liu, G., Dai, Z., Brookes, P. C. and Xu, J. (2019). Remediation of heavy metal contaminated soils by biochar: Mechanisms, potential risks and applications in China. *Environmental pollution*, 252, 846-855.

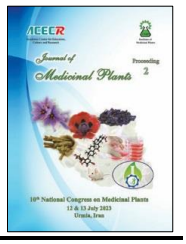
2. Kim, H.S., Kim, K. R., Kim, H.J., Yoon, J.H., Yang, J.E., Ok, Y.S and Kim, K.H. (2015). Effect of biochar on heavy metal immobilization and uptake by lettuce (*Lactuca sativa* L.) in agricultural soil. *Environmental Earth Sciences*, 74(2), 1249-1259.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 142

Potential target protein prediction for Naringenin; an *in-silico* study

Zeinab Mazarei

Department of Chemistry, Faculty of Sciences, Shahid Chamran University of Ahvaz, Ahvaz, Iran
E-mail: z.mazarei@scu.ac.ir

ARTICLE INFO

Keywords:
Naringenin
Flavonoid
Target protein
Anti-cancer

ABSTRACT

One of the most prevalent challenges in the field of natural products biology is the target protein identification. In many cases, the quantity of extracted and purified natural compounds is so low that it is not feasible to perform multiple biological evaluations. In these situations, a preliminary strategy is utilizing *in silico* investigations to obtain some information about possible 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 Naringenin as a model natural flavonoid [1, 2]. Recent studies revealed that Naringenin could efficiently control various inflammation-related diseases such as sepsis and cancer through interacting with correlated proteins in inflammatory pathways [3]. However, screening the results from the two mentioned servers showed that Naringenin is also able to interact with other proteins that play a prominent role in the cancer pathway, such as DNA polymerase. In addition, another potentially important target was identified as a drug efflux pump that causes multidrug resistance in cancer. It seems that due to the fact that the proposed proteins of these two servers do not have much in common, it is necessary to perform a complete assessment on all proteins to obtain the most reliable results.

References

1. Wang X, Shen Y, Wang S, Li S, Zhang W, Liu X, Lai L, Pei J, Li H. PharmMapper 2017 update: a web server for potential drug target identification with a comprehensive target pharmacophore database. *Nucleic Acids Research*. 2017; 45:W356-60.

2. Gfeller D, Grosdidier A, Wirth M, Daina A, Michielin O, Zoete V. SwissTargetPrediction: a web server for target prediction of bioactive small molecules. *Nucleic Acids Research*. 2014; 42:W32-8.

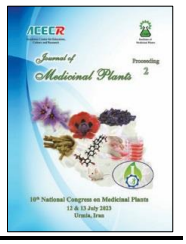
3. Zeng W, Jin L, Zhang F, Zhang C, Liang W. Naringenin as a potential immunomodulator in therapeutics. *Pharmacological Research*. 2018; 135:122-6.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 143

Study of lead on Germination Indices of *Mentha piperita* and *Thymus daenensis*

Soheila afkar

[1]*Department of Agriculture, Payame Noor University, Tehran, Iran*
E-mail: Dr.afkar@pnu.ac.ir

ARTICLE INFO

Keywords:
Medicinal plants
Heavy metal
Germination
Thymus daenensis
Mentha piperita

ABSTRACT

The accumulation of heavy metals in the soil reduces the quality of the soil and the risk of food security [3]. Also heavy metals prevents the germination of the seeds. Other studies showed that among the heavy metals, lead is durable and stable in the environment [1, 2]. In this experiment, the effect of three concentration of lead nitrates (0, 50 µM, 100 µM) on the germination properties of two medicinal plants, Thymus e and *Mentha piperita* was investigated. The ANOVA results indicated no significant difference between different concentrations of lead nitrate on germination characteristics in peppermint plant, but a significant difference was observed between different concentrations of lead on the characteristics of germination speed, germination percentage and germination index of thymus. The highest value for germination speed, germination percentage and germination index of the thymus plant was observed in the control, while the concentration of 50 µM lead nitrate decreased the germination percentage, germination rate and germination index of this plant compared to the control. In general, it is clear that the germination of the thyme medicinal plant was sensitive to the heavy metal stress of lead, but the germination of the peppermint was not affected by the concentrations used in this research.

References

1. Kranner I, Colville L. Metals and seeds: biochemical and molecular implications and their significance for seed germination. *Environmental and Experimental Botany*. 2011; 72(1): 93-105.

2. Pandey S, Gupta K, Mukherjee AK. Impact of cadmium and lead on *Catharanthus roseus*: a phytoremediation study. *Journal of Environmental Biology*. 2007; 28: 655-662.

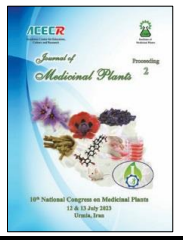
3. Rubio C, Lucas JRD, Gutiérrez AJ, Glez-Weller D, Pérez Marrero B, Caballero JM, Revert C, Hardisson A. Evaluation of metal concentrations in *Mentha* herbal teas (*Mentha piperita* L. *Mentha pulegium* L and *Mentha* species) by inductively coupled plasma spectrometry. *Journal of Pharmaceutical and Biomedical Analysis*. 2012: 71: 11-17.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 144

Investigating the biodiversity of *Crataegus* species in West Azarbaijan province

Seyed Sajad mir yusefzadeh[1,*], Zahra bagheri[1*], Seyed Hadi madani[2]

[1]*Department of Natural Resources, Urmia University, Urmia, Iran*
[2]*PhD of Medicinal plant*
E-mail: sajad.yusefzadeh@gmail.com

ARTICLE INFO

Keywords:
Crataegus Spp
Biodiversity
West Azerbaijan

ABSTRACT

Crataegus species are shrubs or small trees. Is a genus of several hundred species of shrubs and trees in the family Rosaceae. Hawthorn is used to help protect against heart disease and help control high blood pressure and high cholesterol. an increase in the exploitation of natural habitats and a gradual decrease in the population of medicinal plants, which can ultimately cause the extinction of these species and cause irreparable damage to the ecosystem and plant diversity. Considering this importance, it is necessary to identify the genetic diversity of plant populations in different regions of the country and adopt appropriate policies to preserve and maintain these genetic reserves. Diversity, species richness and evenness indicators were performed with TWINSPAN software and necessary tests were reported using one-way analysis (ANOVA). The results showed that there is no significant difference in the Shannon-Wiener and Simpson indices.

References

1. Sadri H.A, Assadi M. Preliminary stadies on monoterpene composition of Juniperus polycarpos. *IRAN J. Bot*. 1994; 6 (2): 323 - 45

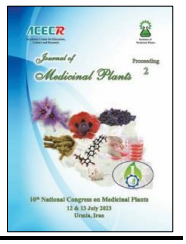
2. Salehi Shanjani P. Effect of secondry metabolism and peroxides and polyphenoloxidase in Juniperus. MSc Department of Biology of Tehran University. 1986.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 146

Evaluation of nitrogen and phosphorus fertilizer on Fennel (*Foeniculum vulgare*) landrace populations

Amir Houshang Hosseinzadeh Moghbeli[1,*], Fatemeh Hashemzadeh[1]

Departemant of Agronomy and Plant Breeding, Faculty of Agriculture, Islamic Azad University, Tabriz Branch, Iran
E-mail: ahmogbeli@yahoo.com

ARTICLE INFO

ABSTRACT

In order to evaluate the effect of chemical fertilizers on the yield, yield components and some agronomical traits of four landrace populations of fennel (*Foeniculum vulgare*), an experiment was conducted in 1401 in Khoy region. This research was conducted as a factorial experiment based on a randomized complete block design with three replications. The studied factors included four landrace populations of fennel named Bonab, Ahar, Moghan and Hamadan and nitrogen and phosphorus chemical fertilizers at three levels including zero, 50% and 100% of the recommended amount of each after soil analysis. Fennel (*Foeniculum vulgare* Mill.) is one of the most important and widely used as a medicinal plant of the Umbellifers family [1]. Fennel which is known as Razianeh in Persian and Bitter fennel, sweet fennel in English [2]. The studied traits were plant height, number of claws, number of umbels, number of seeds per umbel, seed yield, 1000 seed weight, essential oil yield and harvest index. The results showed that the Bonab landrace population at 100% of the recommended amount of nitrogen and phosphorus fertilizers had the highest harvest index with a significant difference compared to other landrace populations. In terms of essential oil yield, the Ahar landrace populations at 50% of the recommended amount of nitrogen and Phosphorus had the highest essential oil yield with a significant difference compared to other landrace populations.

References

1. Mohammadi M, Pouryousef M, Farhang N. Study on germination and seedling growth of various ecotypes of fennel (*Foeniculum vulgare* Mill.) under salinity stress. *Journal of applied research on medicinal and aromatic plants*. 2023 April; 34(100481).

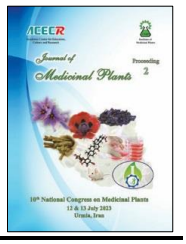
2. Abdossi V, Ghahremani A, Hadipanah A, Ardalani H, Aghaee K. Quantitative and qualitative responses in chemical composition of three ecotypes of fennel (Foeniculum vulgare Mill.) cultivated in Iran climatic conditions. *Journal of Biodiversity and Environmental Sciences (JBES)*. 2015; 6(3): 401-407.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 147

The Effect of Average Annual Rainfall and Average Annual Temperature of Habitats on the Content of Essential Oil of Different Populations *Stachys* lavandulifolia

Kazem Lotfi[1], Saeid hazrati[1,*], Mehdi Oraei[1]

[1]Department of Horticultural Science, Faculty of Agriculture, Islamic Azad University, Miyaneh Branch, Miyaneh, Iran

[2]*Department of Agronomy, Faculty of Agriculture, Azarbaijan Shahid Madani University, Tabriz, Iran*

E-mail: Saeid.hazrati@azaruniv.ac.ir

ARTICLE INFO

Keywords:
Essential oil
Population
Stachys lavandulifolia

ABSTRACT

Stachys lavandulifolia Vahl. is a native plant that is widely distributed in different regions of Iran and known as “Chaye-e-Kohi”[۱]. This plant is used as herbal tea and a medicinal plant in Iranian folk medicine [2]. We evaluated the relationship between the essential oil content (EO) of *S. lavandulifolia* populations from the northwest of Iran with average annual rainfall and average annual temperature. Samplings were done at flowering from early June to early July 2020. Results show that Azarshahr and Zanjan Soltanieh populations have the highest and lowest contents of EO, respectively, with 0.565 and 0.096%. Moreover, Heris, Sarab, Mianeh, Mahabad, Hamadan Razan, Oskou, and Meshkinshahr populations showed higher EO content than the average of the total population. This study found that the low average annual rainfall and high average annual maximum temperatures in Azarshahr and Sarab were responsible for the high content of EO in these populations. It was observed that the content of EO had a positive and high correlation with the average maximum temperature, and a negative correlation with the average annual rainfall variable. Therefore, selection based on the high temperatures and decreases in rainfall, resulting in an improvement in the EO of S lavandulifolia.

References

1. Modarresi M, Hosseinzadeh L, Nematy N, Siavash-Haghighi ZM, Ghanbari K. Acute and subchronic toxicological evaluation of *Stachys lavandulifolia* aqueous extract in Wistar rats. *Res. Pharm. Sci*. 2014, 9(3):165-72. PMID: 25657785; PMCID: PMC4311280.

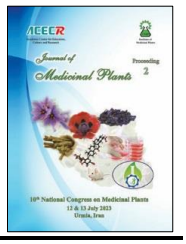
2. Hazrati S, Lotfi K, Govahi M, Ebadi MT. A comparative study: Influence of various drying methods on essential oil components and biological properties of *Stachys lavandulifolia*. *Food Science & Nutrition*. 2021 May; 9(5):2612-9.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 148

Effect of Gamma-Amino Butyric Acid Foliar Application on Some Morphological and Phytochemical Characteristics of Basil (*Ocimum basilicum*) under Drought Stress Conditions

Hanieh Doostmohammadi[1], Abbas Hassani[1,*], Ramin Maleki[2]

[1]*Department of Horticultural Science, Faculty of Agriculture, Urmia University, Umia, Iran*
[2]*Research Department of Chromatography, Iranian Academic Center for Education, Culture and Research (ACECR), Urmia, Iran*
E-mail: a.hassani@urmia.ac.ir

ARTICLE INFO

Keywords:
Water deficit stress
Basil
Chlorophyll
Total phenol
GABA

ABSTRACT

Drought stress is a major global challenge limiting plant growth and productivity in many areas of the world. Γ-aminobutyric acid (GABA) is a non-protein amino acid involved in various physiological processes and it have a protective effect against drought stress in plants. To study the effects of foliar application of GABA (0, 10 and 20 mM) and different drought stress levels (50, 75 and 100% of field capacity) on some morpho-physiological and phytochemical characteristics of basil (*Ocimum basilicum*), a pot experiment was conducted as factorial based on completely randomized design with three replications. As the soil water content decreased, growth parameters (plant height, leaf number, fresh and dry weight of leaves and stems) and chlorophyll content (SPAD value) decreased. Foliar application of GABA improved plant growth and chlorophyll content. The results of this research also showed that total phenol and flavonoid content and antioxidant activity (by DPPH method) increased in response to drought stress and foliar application of GABA. Overall, the findings of this study showed that the adverse effects of drought stress on growth and chlorophyll content of basil can be alleviated by foliar application of GABA.

References

1. Hassan MM, Alabdallah NM, Alharbi BM, Waseem M, Yao G, Liu XD, Abd El-Gawad HG, Abou El-Yazied A, Ibrahim MFM, Jahan MS, Fang XW. GABA: A key player in drought stress resistance in plants. *Int. J. Mol. Sci.* 2021; 22: 10136.

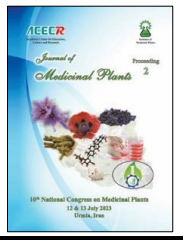
2. Krishnan S, Laskowski K, Shukla V, Merewitz EB. Mitigation of drought stress damage by exogenous application of a non-protein amino acid γ-aminobutyric acid on perennial ryegrass. *J. Amer. Soc. Hort. Sci.* 2013; 138(5): 358-366.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 149

The Symbiotic Relationship with *Piriformospora indica* and *Pseudomonas* sp. Alleviates the Negative Effects of Salt Stress on Basil Plants

Kosar Taheri Boukani[1], Abbas Hassani[1,*], MirHassan Rasouli-Sadaghiani[2], Mohsen Barin[2], Ramin Maleki[3]

[1]*Department of Horticultural Science, Faculty of Agriculture, Urmia University, Umia, Iran*
[2]*Department of Soil Science, Faculty of Agriculture, Urmia University, Urmia, Iran*
[3]*Research Department of Chromatography, Iranian Academic Center for Education, Culture and Research (ACECR), Urmia, Iran*
E-mail: a.hassani@urmia.ac.ir

ARTICLE INFO

Keywords:
Salinity stress
Basil
Growth
Essential oil
Plant growth promoting microorganisms

ABSTRACT

Salinity stress is a global crisis limiting plant growth and productivity especially in arid and semi-arid regions. In sustainable agricultural systems, different beneficial soil microorganisms are explored to improve crop production and tolerance of plants to different environmental stresses such as salinity. To study the effect of plant growth-promoting microorganisms inoculation (control without inoculation, inoculation with *Piriformospora indica* and inoculation with a mixture of *Pseudomonas areuginosa*, *P. putida* and *P. fluorescens*) and different salinity levels (0, 40, 80 and 120 mM of NaCl) on growth, essential oil and nutrients content of basil (*Ocimum basilicum*), a pot experiment was conducted as a factorial experiment in completely randomized design with three replications. Growth parameters (plant height, fresh and dry weight of leaves and stems), chlorophyll content (SPAD), leaf K concentration and essential oil yield exhibited a reduction in response to salinity. In contrast, salinity increased essential oil content and leaf Na and Cl concentration. Inoculation with microorganisms increased growth parameters, chlorophyll content, leaf K concentration, essential oil content and yield and decreased leaf Na and Cl concentration. Overall, the findings of this study showed that the use of plant growth-promoting microorganisms can ameliorate the adverse effects of salinity stress on the growth and essential oil production of basil plant by increasing water and nutrients uptake, preserving photosynthetic pigments and decreasing toxic ions accumulation.

References

1. Aslani Z, Hassani A, Abdollahi Mandoulakani B, Barin M, Maleki R. Effect of plant growth-promoting microorganism's inoculation on some growth and physiological parameters and nutrients content of sage (*Salvia officinalis*) under salinity stress conditions. *App. Soil Res*. 2021; 9(3): 104-122.

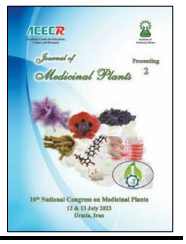
2. Khademian R, Asghari B, Sedaghati B, Yaghoubian Y. Plant beneficial rhizospheric microorganisms (PBRMs) mitigate deleterious effects of salinity in sesame (*Sesamum indicum* L.): Physio-biochemical properties, fatty acids composition and secondary metabolites content. *Ind. Crops Prod*. 2019; 136: 129-139.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 151

Investigation of Essential Oil of *Mentha longifolia* on Bacterial Canker Disease

Soheila afkar[1*], **Fatemeh Shahryari**[2]

[1] *Department of Agriculture, Payame Noor University, Tehran, Iran*
[2] *Plant Protection Department, Faculty of Agriculture, University of Zanjan, Zanjan, Iran*
E-mail: Dr.afkar@pnu.ac.ir

ARTICLE INFO

Keywords:
Medicinal plants
Mentha longifolia
Pseudomonas syringae
Plant disease

ABSTRACT

Bacterial canker disease caused by *Pseudomonas syringae* pv. syringae is one of the most important diseases of stone fruit trees, and its damage rate in newly established orchards is estimated at 16-75%. [1]. Recently, the use of medicinal plants has been increasing due to the presence of antimicrobial metabolites. *Mentha longifolia* as a medicinal plant belongs to the mint family and the essential oil of this plant has antioxidant properties along with antibacterial and antifungal properties [2, 3]. The aim of this study was to investigate antibacterial activities of essential oil extracted from *Mentha longifolia* that collected from different regions of Lorestan province (Khorramabad, Aleshtar, Delfan) against bacterial plant pathogen (*Pseudomonas syringae* pv. syringae). 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 indicated the essential oil of *Mentha longifolia* in three region of lorestan province had strong antibacterial activities against studied bacterial strain in vitro.

References

1. Hamzeh Neghad P, Ghasemi Gh, Tahimian H, Goharkhani Sh. Evaluation of resistance of cherry cultivars to *Pseudomonas syringae*. *Journal of Agricultural Sciences*. 2003; 37 (3): 457-562.

2. Diaz-Maroto C, Castillo N, Castro-Vazquez L, Gonzalez-Vinas M, PerezCoello S. Volatile composition and olfactory profile of pennyroyal (*Mentha pulegium* L.) plants. *Flavour and Fragrance Journal*. 2007; 22: 114-18

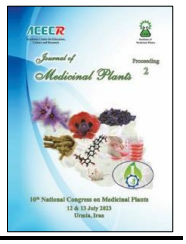
3. Khan RA, Khan F, Mushtaq A, Shah AS, Khan NA, Khan MR, Shah MS. Phytotoxic and antibacterial assays of crude methanolic extract of *Mentha longifolia* (Linn.). *African Journal of Pharmacy and Pharmacology*. 2011; 5: 1530-1533.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 152

Improvement of antioxidant capacity of Denak (*Oliveria decumbens*) by salicylic acid hormone under salinity stress

Anahita Boveiri Dehsheikh[1], Mohammad Mahmoodi Sourestani[1*], Naeimeh Enayatizamir[2] Mehdi Safdarian[3]

[1]*Department of Horticultural Science, Shahid Chamran University of Ahvaz, Ahvaz, Iran*
[2]*Department of Soil Science, Shahid Chamran University of Ahvaz, Ahvaz, Iran*
[3]*Persian Gulf Nanotechnology Research Center, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran*
E-mail: m.mahmoodi@scu.ac.ir

ARTICLE INFO

Keywords:
Total Phenolic content
Antioxidant activity
Flavonoid

ABSTRACT

Denak (*Oliveria decumbens*) is one of the endemic medicinal plants of Iran [1]. It is an annual plant belonged to the Apiaceae family that is found in the south and southwest of Iran [2]. To investigate the effect of salinity stress and salicylic acid hormone (SA) on the antioxidant capacity of Denak extract, a factorial pot experiment was conducted as a randomized complete block design with three replications in the research farm of Shahid Chamran University of Ahvaz in 2019-2020. The experiment factors included irrigation water salinity at four levels (1.1, 2.5, 5, 7.5 dS/m) and foliar application of SA at four levels (0, 100, 200, 500 mg/L^{-1}). The traits included total phenolic (TPC), flavonoid (TFC), flavone and flavanol contents (TFFC), and antioxidant activity (AA). According to the results, increasing the level of salinity stress up to 5 dS/m led to an increase in TPC, TFC and AA of Denak, and the application of SA improved the above traits. The maximum amount of TPC, TFC and AA was detected in 5 dS/m salinity stress by 200 mg/L^{-1} SA. Salinity stress and application of SA significantly reduced the amount of TFFC. The highest TFFC value was obtained in the normal salinity and no foliar spraying of SA, and the lowest level observed in 7.5 dS/m salinity and 200 mg/L^{-1} application SA. Therefore, it seems that the cultivation of Denak in saline lands up to 5 dS/m and the use of SA can help to increase the therapeutic properties of its extract.

References

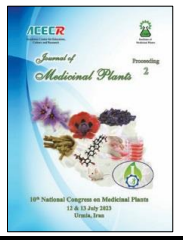
1. Amin G, Sourmaghi MS, Zahedi M, Samadi N. Essential oil composition and antimicrobial activity of *Oliveria decumbens. Fitoterapia.* 2005; 76(7-8), 704-707. doi: 10.1016/j.fitote.2005.06.009.
2. Mozaffarian V. A dictionary of Iranian plant names. Tehran: Farhang Moaser. 2022, 371-372.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 153

Compositions and biological efficacy of the different populations of *Cupressus* against adult wheat weevil (*Tribolium castaneum* Herbst)

Shahla Amini[1], Hamideh Khalaj[2], Maryam Ahvazi[1], Mohammadreza Labbafi[1]*

[1]*Medicinal Plants Research Center, Institute of Medicinal Plants, ACECR, Karaj, Iran*
[2]*Department of Agriculture, Payame Noor University, Tehran, Iran*
E-mail: mlabbafy@gmail.com

ARTICLE INFO

Keywords:
Cupressus
Essential oils
Fumigant toxicity
Pest control
Repellent

ABSTRACT

The harmful consequences of the chemical insecticides in agriculture caused to find a safe method to control storage pests. The effects of insecticides, repellents and nutritional indices of *Cupressus* species essential oils on wheat weevil (*Tribolium castaneum* Herbst) are more environmentally friendly than synthetic chemicals [1]. This study was performed to investigate the pesticide effects of *Cupressus* species including, *C. sempervirens* L. var. *horizontalis* (France), *C. sempervirens* L. var. *horizontalis* (Tehran), *C. sempervirens* L. var. *horizontalis* (Chalus), *C. sempervirens* L. var. *stricta* (Chalus) and C. *arizonica* Greene on adult *Tribolium castaneum* Herbst. These experiments were done by factorial based on a completely randomized design with four replications and the biological effects of essential oils against adult *T. castaneum* at a temperature of 27 ± 1 ° C and relative humidity of 65 ± 5% were investigated [2]. The results of the Fumigant toxicity test of essential oils showed with increasing the concentration and duration of exposure to essential oil, the mortality of flour weevil increases significantly. Among the studied species, *C. sempervirense* (France) with LC50 = 256.93 µL / L air had the highest Fumigant toxicity (87.5%) on *T. castaneum*. Comparison of relative growth rate (RGR), relative consumption rate, feed conversion efficiency and nutritional inhibition index of essential oil had not significantly different from the control. Based on the insecticides, repellents and nutritional indices effect of *Cupressus* essential oils on *T. castaneum*, can be used as a biological pest management.

References

1. Mozaffarian V A. Dictionary of Iranian Plant Names: Latin, English, Persian. Seventh ed. 169 pp., Tehran: Farhang Moaser Publishers; 2013: 169.

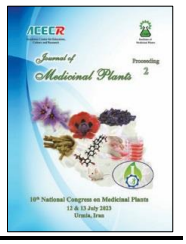
2. LeOra S. "Poloplus, A User's Guide to Probit or Logit Analysis." Li JF, Wu Y. 2003.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 155

Molecular docking studies of selective phytochemicals of Asteraceae genera as potential inhibitors against α-Glucosidase

Atefeh Babaei[1], Fatemeh Saremi[2], Mohammadreza Labbafi [3,*], Shahla Amini [3]

[1]*Department of Plant Biology, Faculty of Biological Sciences, Tarbiat Modares University, Tehran, Iran*
[2]*Department of microbiology, Faculty of Basic Sciences and Advanced Technologies in Biology, Science and Culture University, Tehran, Iran*
[3]*Medicinal Plants Research Center, Institute of Medicinal Plants, ACECR, Karaj, Iran*
E-mail: mlabbafy@gmail.com

ARTICLE INFO

Keywords:
Molecular Docking
Diabetes Mellitus
Medicinal plants
Asteraceae
α-Glucosidase

ABSTRACT

Diabetes Mellitus (DM) is a chronic metabolic disorder that affects millions of people around the world, including Iran and novel therapies are needed to treat this disease. The purpose of this study was to explore the potential of selective phytochemicals of Asteraceae genera as potential inhibitors against α-glucosidase, a key enzyme involved in the pathogenesis of diabetes mellitus, using in silico molecular docking techniques. Natural products derived from plants have shown promise as potential therapeutic agents for DM [1], and according to Iranian ethnobotanical studies, the Asteraceae genera have been identified as a rich source of bioactive compounds [2]. In this study, we applied in silico molecular docking using Autodock4 to identify selective phytochemicals of *Cirsium palustre* (L.) Scop., *Crepis foetida* L., and *Carthamus tinctorius* L. could inhibit α-glucosidase activity. The results revealed Luteolin as a promising compound among the 6 compounds studied, with the most negative energy level of connection and the highest affinity for binding to the active site of α-glucosidase. This compound was found to inhibit the activity of the enzyme and potentially reduce blood glucose levels. Our findings suggest that in silico molecular docking studies can be an effective tool for identifying a potential inhibitor of α-glucosidase from natural sources, such as *Cirsium palustre*, *Crepis foetida*, and *Carthamus tinctorius*, and may lead to the development of novel treatments for DM. Further in vitro and in vivo studies are needed to validate these findings and explore the therapeutic potential of this compound.

References

1. Sadeghi M, Zarei MA. Molecular docking studies of some flavone analogues as α-Glucosidase inhibitors. *Journal of Medicinal Plants*. 2020 Sep 10; 19(75):55-64.

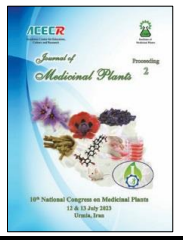
2. Labbafi, M.R., Babaei, A., Amini, Sh., Khalaj, H. and N. Qavami. Iranian Ethnobotany Database. Published on Internet. https://www.netplant.ir/ebotany/. Retrieved 2023-05-07 18:40:57

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 156

Effect of plant growth promoting rhizobacteria and phosphorus concentration on growth and biochemical characteristics of basil (*Ocimum basilicum* L.) in hydroponic culture

Fereshte Moharrami[1], Sahebali Bolandnazar[1,*], Saeide Alizade Salte[1], Mohamadreza Sarikhani[2]

[1]*Department of Horticultural Sciences, Faculty of Agriculture, University of Tabriz, Tabriz, Iran*
[2]*Department of Soil Sciences, Faculty of Agriculture, University of Tabriz, Tabriz, Iran*
E-mail: Fereshte.moharrami@yahoo.com

ARTICLE INFO

Keywords:
Growth
Hydroponic
PGPR
Phosphorus Uptake

ABSTRACT

Phosphorus (P) has a crucial role in crop production. Due to its strong chemical fixation in the soil, P deficiency has become an important factor that limits agricultural productivity. Thus, using of sustainable technologies to increase the availability of soil phosphorus is an issue that should be considered. Plant Growth Promoting Rhizobacterias (PGPRs) are well-known to induce plant growth, yield, nutrient uptake, plant stress tolerance and secondary metabolites accumulation of medicinally important plants [1] through various mechanisms. Although PGPRs are often used in traditional agriculture to stimulate crop productivity, their use in soilless agriculture has been limited. Hydroponics is a soilless plant cultivation technique with many advantages and it is expected to become even more successful in combination with beneficial PGPR application. Hence, this experiment was conducted in order to investigate the effects of two PGPR (*Bacillus subtilis* and *Pantoea agglomerans*) and different concentrations of phosphorus (10, 20 and 40 mg/l) on the growth and some biochemical properties of *Ocimum basilicum* L. in hydroponic culture. It was found that phosphorus level reduction led to a decrease in plant growth while inoculation with PGPRs increased growth of the plants compared to the control. The highest shoot fresh and dry weights, leaf area and root volume were observed in the plants treated by *B. subtilis* and 40 mg/l of phosphorus. Also, total antioxidant activity, total phenolic, flavonoid and anthocyanin content were significantly increased in inducted plants compared to control. The highest total antioxidant activity (about 2.5 fold increase over the control) was related to the plants treated by *P. agglomerans* and 20 mg/l of phosphorus. The highest content of total phenolic and flavonoid were observed in the plants treated by *P. agglomerans* and *B. subtilis* at 10 mg/L of phosphorus, respectively.

References

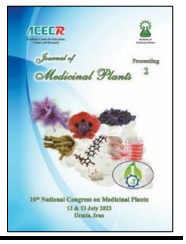
1. Egamberdieva D, Teixeira da Silva J A. Medicinal plants and PGPR: A new frontier for phytochemicals, in Plant-Growth-Promoting Rhizobacteria (PGPR) and Medicinal Plants, ed D. Egamberdieva, S. Shrivastava, and A. *Varma*. 2015, 287-303. doi: 10.1007/978-3-319-13401-7_14.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 157

EFFECT OF *IN VITRO* OSMOTIC STRESS ON MORPHOLOGICAL AND PHYTOCHEMICAL TRAITS OF GOTU KOLA (*CENTELLA ASIATICA*)

Masoud Alizadeh[1], Mohammad Hossein Mirjalili[1,*]

[1]*Department of Agriculture, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*
E-mail: m-mirjalili@sbu.ac.ir (M.H. Mirjalili)

ARTICLE INFO

Keywords:
Gotu kola
Osmotic stress
Centelloside
In vitro
Anti-cancer

ABSTRACT

Centella asiatica (L.) Urban, commonly known as Gotu kola, is a valuable medicinal plant from the Apiaceae family native to the tropical regions. Gotu kola is also growing in limited areas of northern Iran, particularly around the Anzali wetland at Gilan province [1]. The plant contains triterpenoid saponins named centellosides that are widely used in the cosmetic, healthcare, and pharmaceutical industries. Anti-inflammatory, anti-cancer, antioxidant, and wound-healing properties of the plant have been reported [2]. Environmental conditions and various types of abiotic stresses can lead to a change in the potential production and also variations in the quantity and quality of the plants bioactive compounds. In the present study, the effect of *in vitro* induced osmotic stress on the morphological (plant height, leaf number, leaf area index, root length, fresh weight, and dry weight) and phytochemical traits (content of total phenol, total flavonoid, asiaticoside, madecassoside, asiatic acid, and madecassic acid) of the plant was investigated. Polyethylene glycol 4000 (1, 2 and 4%), sucrose (45, 60, and 80 g/l), and sorbitol (20, 30 and 40 g/l) were used as osmotic agents. The experiment was conducted in a completely randomized design with six replications. The results showed that treatment with 60 g/L sucrose had the greatest effect on growth traits. And the phytochemical traits of the plant were also significantly different when faced with osmotic stress compared to the control, so that the plants treated with sorbitol 40 g/L contained the highest total centelloside content (70 mg/g dry weight) compared to other treatments.

References

1. Nouri S, Nejad S, Sonboli A, Hossein M. South African Journal of Botany Variability , association and path analysis of centellosides and agro- morphological characteristics in Iranian *Centella asiatica* (L.) Urban ecotypes. *South African J. Bot.* [Internet]. 2021;139:254–66. Available from: https://doi.org/10.1016/j.sajb.2021.03.006

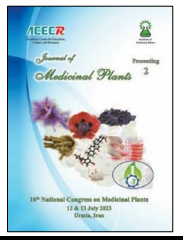
2. Belwal T, Andola HC, Atanassova MS, Joshi B, Suyal R, Thakur S, et al. Gotu Kola (*Centella asiatica*). *Nonvitamin Nonmineral Nutr*. Suppl. 2019 Jan 1; 265-75.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 158

Evaluation of antimicrobial, antioxidant, cytotoxic effect and chemical composition of coriander essential oil (*Bifora testiculata* (L.) Spreng)

Ali Huti Ajirloo[1], Tooraj Mehdizadeh[1,*], Hossein Tajik[1]

[1]*Department of Food Hygiene and Quality Control, Faculty of Veterinary Medicine, Urmia University, Urmia, Iran*

E-mail: t.mehdizadeh@urmia.ac.ir

ARTICLE INFO

Keywords:
(*Bifora testiculata* (L.) Spreng)
Antimicrobial activity
Antioxidant activity
Chemical compounds
Cytotoxic effect
Essential oil

ABSTRACT

Recently, there has been an increased tendency to use natural preservatives, especially essential oils from plants and spices, which has led researchers to identify their compounds [1]. This study aims to determine the antimicrobial, antioxidant, cytotoxic effects and constituents of coriander (*Bifora testiculata (*L.*)* Spreng) plant essential oil in vitro. The essential oil of the coriander plant was extracted using the water distillation method, and the chemical composition of the essential oil was analyzed using a GC-MS device. The amount of total phenol was determined using the Folin Ciocaltio method, and the antioxidant properties of the essential oil were investigated using three methods: DPPH, FRAP, and ABTS. The antimicrobial effect of the essential oil was determined using the agar well diffusion, minimum growth inhibitory concentration (MIC), and minimum bactericidal concentration (MBC) methods. Finally, the cytotoxic effect of the essential oil was determined using the MTT test. Results showed that the main components of the essential oil are trans-2-dodecen-1-ol (12.29%), 2-dodecenoic acid (11.52%), hexadecanoic acid (10.03%), lauric acid (7.89%), phytol (7.28%), pheophytadine (1.85-6.83%), E-2-tetradecen-1-ol (4.68%), decanal (4.52%), Nonaldehyde (3.8%), dodecanal (3.45%), 2-pentadecanone trimethylhexa (3.36%). The amount of total phenol in the essential oil was 74.72 ± 6.02 mg of gallic acid/g, and for DPPH, the IC50 value of the essential oil was calculated as 17.9 mg/ml. The comparison of ABTS radical inhibitory power between different concentrations of essential oil showed a statistically significant difference ($p \leq 0.05$). In the antimicrobial test, the largest diameter of the zone of inhibition was related to *L. monocytogenes* (22 mm) and *E. coli* (13.4 mm). On the other hand, L.monocytogenes was the most sensitive among bacteria in MIC and MBC. These results showed that coriander essential oil has strong antimicrobial activity against gram-positive bacteria. The results of the MTT test showed that the essential oil had the least toxicity on mesenchymal cells, and the breast cancer cell (4T1) had the highest decrease in cell survival. In general, the results of this study showed that coriander essential oil has significant biological effects such as antioxidant, antibacterial, and anticancer. Therefore, it is suggested to conduct more studies on the biological properties of the identified compounds in order to clarify the importance of this plant and to suggest it as a useful and promising compound for the food and pharmaceutical industries.

References

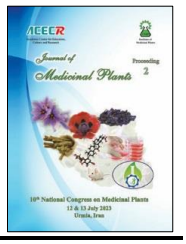
1. Li Y. X. Erhunmwunsee F. Liu M. Yang K. Zheng W. Tian J. Antimicrobial mechanisms of spice essential oils and application in food industry. *Food Chemistry*, 2022., 132312. https://doi.org/10.1016/j.foodchem.2022.132312.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 159

Evaluation and comparison of antioxidant effects of different extracts of *Vitis vinifera* L. var. Ghizil Uzum skin and seeds extracted by ultrasonic and deep eutectic solvents (DESs) methods

Ehsan Shekarchi[1], Tooraj Mehdizadeh[1,*], Hossein Tajik[1], Ali Huti Ajirloo[1]

[1]*Department of Food Hygiene and Quality Control, Faculty of Veterinary Medicine, Urmia University, Urmia, Iran*
E-mail: t.mehdizadeh@urmia.ac.ir

ARTICLE INFO

Keywords:
Antioxidant
Extract
Ultrasonic
Ghizil Uzum
Deep eutectic solvents

ABSTRACT

Extraction of antioxidants from plant tissues can be done using traditional extraction processes, such as solid-liquid extraction, solvents, and steam distillation [1]. One of the simplest techniques for extraction is ultrasonic extraction (USE), which is easy to perform using common laboratory equipment, like an ultrasonic bath. In recent years, a new generation of green solvents called DES (Deep Eutectic Solvents) has been introduced. These solvents are compatible, easily synthesized, and cost-effective [2]. The purpose of this research is to combine DES and ultrasound methods to extract the seed and skin extract of grapes. For this study, samples of *Vitis vinifera* L. var. Ghizil grapes were collected from vineyards in Urmia city. Grape seed and skin extracts were extracted using ultrasonic and deep eutectic solvents (DESs) methods. Antioxidant activity of different extracts was evaluated using total phenol, DPPH, and reducing power tests. The results of this study showed that the extraction method plays an important role in determining the antioxidant properties of the extract. There was a significant difference in the antioxidant capacity of skin and seed extracts that were extracted using each of the ultrasonic and deep eutectic solvents (DESs) methods compared to the control group (BHT) ($p < 0.05$). The highest antioxidant capacity per mg of grape skin and seed extract was observed in the extract prepared by the combined method of ultrasonic and deep eutectic solvents, which had a significant difference with other extraction methods and the control group (BHT) ($p < 0.05$). In addition, the study found that the highest amount of total phenol and antioxidant capacity was observed in the seed extract compared to the skin extract. Therefore, it can be concluded that grape skin and seed extracts extracted using the combined ultrasonic method and deep eutectic solvents have higher antioxidant effects compared to other conventional methods of extract preparation.

References

1. Cavero S. García-Risco MR. Marín FR. Jaime L. Santoyo S. Señoráns FJ. Reglero G. Ibanez E. Supercritical fluid extraction of antioxidant compounds from oregano: chemical and functional characterization via LC–MS and in vitro assays. *The Journal of Supercritical Fluids*, 2006; 38(1):62-9. doi:10.1016/j.supflu.2005.01.003.

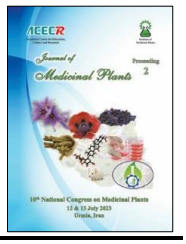
2. Ali M.C. Chen J. Zhang H. Li Z. Zhao L. Qiu H. Effective extraction of flavonoids from *Lycium barbarum* L. fruits by deep eutectic solvents-based ultrasound-assisted extraction. *Talanta*, 2019; 203:16-22. doi:10.1016/j.talanta.2019.05.012.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 160

Improvement of antioxidant capacity of Denak (*Oliveria decumbens*) by salicylic acid hormone under salinity stress

Anahita Boveiri Dehsheikh[1], Mohammad Mahmoodi Sourestani[1,*], Naeimeh Enayatizamir[2] Mehdi Safdarian[3]

[1]*Department of Horticultural Science, Shahid Chamran University of Ahvaz, Ahvaz, Iran*
[2]*Department of Soil Science, Shahid Chamran University of Ahvaz, Ahvaz, Iran*
[3]*Persian Gulf Nanotechnology Research Center, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran*
E-mail: m.mahmoodi@scu.ac.ir

ARTICLE INFO

Keywords:
Total Phenolic content
Antioxidant activity
Flavonoid

ABSTRACT

Denak (*Oliveria decumbens*) is one of the endemic medicinal plants of Iran [1]. It is an annual plant belonged to the Apiaceae family that is found in the south and southwest of Iran [2]. To investigate the effect of salinity stress and salicylic acid hormone (SA) on the antioxidant capacity of Denak extract, a factorial pot experiment was conducted as a randomized complete block design with three replications in the research farm of Shahid Chamran University of Ahvaz in 2019-2020. The experiment factors included irrigation water salinity at four levels (1.1, 2.5, 5, 7.5 dS/m) and foliar application of SA at four levels (0, 100, 200, 500 mg/L^{-1}). The traits included total phenolic (TPC), flavonoid (TFC), flavone and flavanol contents (TFFC), and antioxidant activity (AA). According to the results, increasing the level of salinity stress up to 5 dS/m led to an increase in TPC, TFC and AA of Denak, and the application of SA improved the above traits. The maximum amount of TPC, TFC and AA was detected in 5 dS/m salinity stress by 200 mg/L^{-1} SA. Salinity stress and application of SA significantly reduced the amount of TFFC. The highest TFFC value was obtained in the normal salinity and no foliar spraying of SA, and the lowest level observed in 7.5 dS/m salinity and 200 mg/L^{-1} application SA. Therefore, it seems that the cultivation of Denak in saline lands up to 5 dS/m and the use of SA can help to increase the therapeutic properties of its extract.

References

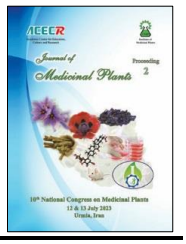
1. Amin G, Sourmaghi MS, Zahedi M, Samadi N. Essential oil composition and antimicrobial activity of *Oliveria decumbens. Fitoterapia.* 2005; 76(7-8), 704-707. doi: 10.1016/j.fitote.2005.06.009.
2. Mozaffarian V. A dictionary of Iranian plant names. Tehran: Farhang Moaser. 2022, 371-372.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 161

Impact of NaHS seed priming on ferric reducing antioxidant power (FRAP) in black gram (*Vigna mungo* L.) exposed to high pH

Shabnam Yeghanehfar[1], Fatemeh Rahmani[1, *], Amir Rahimi[2]

[1]*Biology Department, Urmia University, Urmia, Iran*
[2]*Department of Plant Production and Genetics, Faculty of Agriculture, Urmia University, Urmia, Iran*
E-mail: f.rahmani@urmia.ac.ir

ARTICLE INFO

Keywords:
Vigna mungo
Antioxidant power
Legumes

ABSTRACT

Alkaline stress as a result of increasing soil pH is due to environmental and human factors [3]. The high PH leads to ionic and osmotic imbalance, peroxidation of membrane lipids, degradation of proteins and DNA. The hydrogen sulfide (H_2S) has been proved to stimulate the expression of genes involved in synthesis of metabolites and defense compounds [2]. Black gram (*Vigna mungo*.L) is one of the legumes with high protein value as every 100 grams of seeds contains 25-38 grams of protein [1]. In this investigation, the role of sodium hydrogen sulfide (NaHS), as an ameliorant, was investigated on the ferric reducing antioxidant power (FRAP) assay. The results showed that NaHs (1 mM) reduced FRAP in the leaves of seed primed black gram plants exposed alkaline stress (PH=9) indicating better antioxidative status of stressed plants and elevation of the defense mechanism in *Vigna mungo* L. against high pH.

References

1. Preethi R, Moses JA, Anandharamakrishnan C. Effect of conductive hydro-drying on physicochemical and functional properties of two pulse protein extracts: Green gram (Vigna radiata) and black gram (*Vigna mungo*). *Food Chem*. [Internet]. 2020; 128551. Available

2. Sharma, P., Meyyazhagan, A., Easwaran, M., Sharma, M. M.M., Mehta, S., Pandey, V., Liu, W-Ch., Kamyab, H., Balasubramanian, B., Baskaran, R., Klemeš, J.J., Mesbah, M., Chelliapan, Sh. Hydrogen Sulfide: A new warrior in assisting seed germination during adverse environmental conditions. 2022; *Plant Growth Regulation*. 98:401-420.

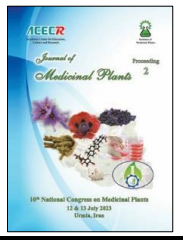
3. Zhang, C., Zhou, X., Wang, X., Ge, J., Cai, B. Elaeagnus angustifolia can improve salt alkali soil and the health level of soil: emphasizing the driving role of core microbial communities. 2022; *Journal Environmental Management*. 305, 114401.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 163

The effect of seed priming with NaHS on growth and chlorophyll content in Black gram (*Vigna mungo* L.) plants under imposition of alkaline stress

Shabnam Yeghanehfar[1], Fatemeh Rahmani[1,*], Amir Rahimi[2]

[1]*Biology Department, Urmia University, Urmia, Iran*
[2]*Department of Plant Production and Genetics, Faculty of Agriculture, Urmia University, Urmia, Iran*
E-mail: f.rahmani@urmia.ac.ir

ARTICLE INFO

Keywords:
Black mung bean
Priming
$NaHCO_3$

ABSTRACT

The high concentration of $NaHCO_3$ in alkaline soils affects a wide range of metabolic activities in plants, which leads to growth stunting, leaf chlorosis and destruction of anatomical structures [2]. Black mung bean (*Vigna mungo* L) belongs to the Leguminoseae family and the Papilionaceae subfamily [1]. In this study, it has been tried to increase the resistance of Black gram (*Vigna mungo* L) to alkaline stress using seed priming. The *Vigna mungo* seeds were seed primed under different concentrations of NaHS (0, 0.25, 0.5, 1, 1.5, 2 and 3 mM) for 24 hours, and then planted in pots containing perlite. The three weeks' old plants were subjected to alkaline stress of pH=9 for twenty days. As seen, alkaline stress affected the growth of the Blackgram plant and caused a decrease in the longitudinal growth of the plant and an increase in chlorophyll content in plants without seed priming. However, NaHS seed priming resulted the best plant performance against alkaline stress under concentration of 1mM with increase in longitudinal growth and reduction of photosynthetic pigments.

References

1. Bhareti P, Singh DP and Khulbe RK. Genetic variability and association n analysis of advanced lines and cultivars following intervarietal and interspecific crosses in blackgram. *Crop Improv*. 2011; 38:67-70.

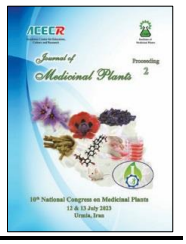
2. Singh D, Singh CK, Singh YP, Singh, V, Singh, R, Tomar RSS, Sanwal SK, Karwa S, Mishra VK, Sarkar SK,Pal M. Evaluation of cultivated and wild genotypes of Lens species under alkalinity stress and their molecular collocation using microsatellite markers. 2018; *PloS One*. 13: pe0199933

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 166

Phytochemical investigation of methanolic extract of Sophora (*sophora alopecuroides* L.)

Hadi Kalantari Khalilabad[1,2,*], **Ali Izadi Darbandi**[1], **Ardeshir Ghaderi**[2], **Seyed Ahmadosadat Nouri**[1], **Maryam Ahvazi**[2]

[1] *Department of Agronomy and Plant Breeding Science, College of Aburaihan, University of Tehran, Tehran, Iran*
[2] *Medicinal Plants Research Center, Institute of Medicinal Plants, ACECR, Karaj, Iran*
E-mail: hadi.kalantari@ut.ac.ir

ARTICLE INFO

Keywords:
Anticancer
Chemical compound
Gas chromatography
Mass Spectrometry
Sophora

ABSTRACT

The genus Sophora, (Family Fabaceae) is a perennial plant that has been reported to have 187 species worldwide. *Sophora alopecuroides* which is existed in Iran contains active ingredients that have anti-cancer, anti-viral, anti-inflammatory, anti-microbial, analgesic, and neuroprotective activities, as well as protective properties against pulmonary fibrosis and proliferation of cardiac fibroblasts. So, this plant can be considered a prospect for the development of novel medicines used for the treatment of cancer and some chronic diseases (1). The subject of this study is performing phytochemical constituents of methanolic extract of *sophora alopecuroides* L. The application of Mass Spectrometry Gas chromatography (GC-MS) technique let to isolation, purification and identification of several alkaloids in a one genotype. In this investigation, the fractionation of methanol extract of the seeds of *sophora alopecuroides* L. led to the isolation and purification of six known The main alkaloids Sophocarpine (15/33%), Quilonine (14/30%), Matrine (11/65%), Sophoridine (10.65%), Isosophoridine (9/65%), Sophoramine (1.24%) (2). The results show a methanolic extract of *sophora alopecuroides* L is a rich source of alkaloids.

References

1. Muosavi SH, Motaez M, Zamiri-Akhlaghi A, Emami SA,Tayarani-Najaran Z. In-Vitro Evaluation of Cytotoxic and Apoptogenic Properties of Sophora Pachycarpa. *Iranian Journal of Pharmaceutical Research: IJPR*, 2014; 13(2):665.

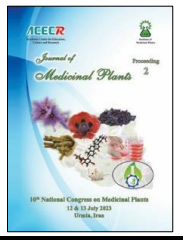
2. Kianbakht S, Hashem Dabaghian F. *Sophora alopecuroides* L. var. alopecuroides alleviates morphine withdrawal syndrome in mice: involvement of alkaloid fraction and matrine. *Iranian Journal of Basic Medical Sciences.* 2016.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 167

Anticancer activity of *Aizoon canariense* L. against acute lymphocytic leukemia cell line

Hamidreza Golian[1,*], Mehrshad Mirdar Soltani[1], Shilan Nasri[3]

[1]*Department of Biotechnology, Faculty of New Sciences and Technologies, University of Science and Culture, Tehran, Iran*
[2]*Department of Life Science Engineering, Faculty of New Sciences and Technologies, University of Tehran, Tehran, Iran*
E-mail: Hamidreza.Golian@stu.usc.ac.ir

ARTICLE INFO

Keywords:
Aizoon Canariense
Lymphocytic leukemia
Phosphatidylserine
Cytotoxic activities
Lactate dehydrogenase

ABSTRACT

Natural products are known to be a continuous source of potential anti-cancer agents due to their chemical and biological diversity. This study planned to evaluate the in vitro cytotoxic properties of the medicinal plant Aizoon canariense (Aizoaceae family) and their mechanisms of action in acute lymphocytic leukemia (ALL) cells. The study investigated the effect of the cytotoxic extracts on cell cycle, caspase-3/7, apoptosis induction using Annexin V-FITC/PI staining, morphological changes and lactate dehydrogenase activity and 2D cell migration studies. There were some extracts considered promising Aizoon Canariense (15 µg/mL). Most of the cytotoxic effects were accompanied by externalization of phosphatidylserine and morphological abnormalities like cell shrinkage and chromatin condensation. This plant is used traditionally for jaundice, hepatitis, wound healing and cancer [1]. Various properties have been documented, such as anti-microbial, antioxidant, and anticholinesterase activity, and it is cytotoxic against breast and colon cancer cells [2, 3]. The cytotoxic activity has been attributed to its adenine-based alkaloid content, which exists in addition to other chemical classes such as coumarins, saponins, tannins, flavonoids, steroids, adenosine derivatives, triterpenes and fatty acids like protocatechuic acid. The bio-guided studies of plant extract led to the identification of anti-acute lymphocytic leukemia constituents belonging to different classes including lignans, lignan glycosides, triterpenes and flavonoids. Plasma membrane damage is one of the signs of cellular death, we assessed its integrity by evaluating the leakage of one of the cytosolic enzymes, lactate dehydrogenase (LDH) using pierce LDH cytotoxicity assay kit (Thermo Fisher Scientific Inc., Waltham, MA, USA).

$$\% \text{ Cytotoxicity} = \frac{\text{Extract} - \text{treated LDH activity} - \text{Spontaneous LDH activity}}{\text{Maximum LDH activity} - \text{Spontaneous LDH activity}} \times 100$$

References

1. A. Hassan-Abdallah, A. Merito, S. Hassan, D. Aboubaker, M. Djama, Z. Asfaw, E. Kelbessa, Medicinal plants and their uses by the people in the Region of Randa, Djibouti, *J. Ethnopharmacol*. 148 (2) (2013) 701–713.

2. R.O. Bakr, M.F. El-Behairy, A.M. Elissawy, H. Elimam, M.A.A. Fayed, New Adenosine Derivatives from Aizoon canariense L.: In Vitro Anticholinesterase, Antimicrobial, and Cytotoxic Evaluation of Its Extracts, *Molecules* 26 (5) (2021)1198.

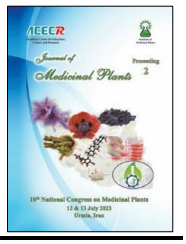
3. Y. El-Amier, S. Haroun, O. El-Shehaby, O. Al-Hadithy, Antioxidant and Antimicrobial Properties of Some Wild Aizoaceae Species Growing in Egyptian Desert, *J. Environ. Sci*. 45 (2016) 1–10.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 168

The most important medicinal plants used by Qashqai nomads in the Kakan region for COVID-19

Abbas Hosseinimanesh[1,*], Mohammad-Rahim Forouzeh[1], Abolfazl Sharifian[1,2]

[1]*Department of Rangeland Management, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Iran*
[2]*Centre for Ecological Research, Institute of Ecology and Botany, Vácrátót, Hungary*
E-mail: Abbas6300@gmail.com

ARTICLE INFO

Keywords:
Ethnobotany
Ethnopharmacology
Local knowledge
Iran

ABSTRACT

Qashqai nomads in Iran have an extensive body of knowledge regarding using medicinal and industrial plants as one of the methods to overcome health problems and food supply. Erosion of Indigenous and Local Knowledge reported by recent studies obliges researchers to speed documentation of this heritage. The aim of this study was identification of medicinal plants used by Qashqai nomads in the summer pasturelands of Kakan region in Kohgiluyeh and Boyer-Ahmad province to treat COVID-19. Moreover, the method of exploitation and usage was studied to extract the traditional practices involved in using medicinal plants. After conducting semi-structured interviews and participatory observation, three plants used to treat COVID-19 were introduced including *Ziziphora clinopodioides* lam., *Nasturtiu officinalis* (L.) R. Br., and *Nepeta persica* boiss.. Qashqai nomads considered the infusion of these plants leaf to be effective against COVID-19. The result of this study along with other studies on traditional knowledge of local communities associated with treating COVID-19 can be used to develop organic health solutions.

References

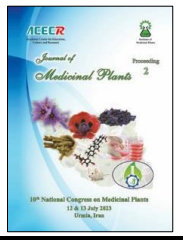
1. Mozaffarian V. A dictionary of Iranian plant names. Tehran: Farhang Moaser. 2022, 361-363.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 170

The effect of foliar spray with selenium nanoparticles on physiology attributes of *Cannabis sativa* L.

Maryam Rezagholi[1], Javad rezapourfard[1,*]

[1]*Faculty of Agriculture, Department of Horticultural Sciences, Urmia University, Urmia, Iran*
E-mail: j.rezapourfard@urmia.ac.ir

ARTICLE INFO

Keywords:
Cannabis
Nano particle
Medicinal effects

ABSTRACT

Cannabis (*Cannabis sativa* L.) is a dioecious and annual plant that has a variety of uses, including fiber, vegetable oil, medicinals, and narcotics. Despite the fact that this plant is native to central Asia, the capacity of this plant to adapt to different climates has spread throughout the world (McPartland *et al*., 2019). Chemical diversity has been seen in the cannabis plant (Mansouri and Rohani, 2014). The most notable compound of cannabis is cannabinoids (Giupponi *et al*., 2020; Pollastro *et al*., 2018). Nanoparticles (with a size of 1 to 100 nm) are made from a collection of artificial molecules in different sizes and shapes (Zahedi *et al*., 2020). The effect of nanoparticles depends on their characteristics, including size, shape, concentration, and physical or chemical composition of the particle (Kumar *et al*., 2018). Considering the importance of the effective substances in cannabis and the possibility of the favorable effect of nanoselenium on the chemical characteristics of the plant, we decided to investigate this effect. This experiment was carried out in pots in the research greenhouse of Urmia University with three levels (concentrations of 5, 10 and 20 ml/liter of nano selenium and control) in three replications in 1401. The results of this study showed that the total chlorophyll had the highest average at 5 ml/liter of nanoselenium and had a significant difference compared to all the treatments and the control. The highest average in chlorophyll a and b also belongs to this treatment. No significant difference between the data was observed in the phenol attribute. The concentration of 10 showed the highest flavonoid content (38 mgQuercetin/g). The concentration of 20 showed the best results (89% inhibition) in dpph. The three treatments have no significant difference, but they have a significant difference with the control.According to the presented results, spraying with nanoselenium has been able to have favorable effects on some chemical characteristics of the Cannabis.

References

1. Hanafy M, Aly U, Mohamed A. Regeneration and transformation via Agrobacterium tumefaciens of *Echinacea purpurea* L. *Plant Tissue Culture and Biotechnology*. 2010, 20(2):101-111.

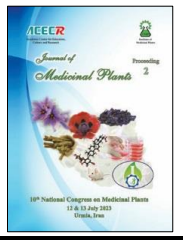
2. GiupponiL, Leoni V, Carrer M, Ceciliani G, Sala S, Panseri S, Pavlovic R, Giorgi, A. Overview on Italianhempproduction chain, related productive and commercial activities and legislative framework. *Ital. J. Agron*. 2020, 15, 194-205.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 171

In vitro Cell Culture Establishment of *Linum album* as a Potential Source of Anticancer Lignans: The Effect of Explant Type and Plant Growth Regulators

Sajad Razmi[1], Mohammad Hossein Mirjalili[1,*]

[1]*Department of Agriculture, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*
E-mail: m-mirjalili@sbu.ac.ir (M.H. Mirjalili)

ARTICLE INFO

Keywords:
Specialized metabolites
Anticancer activity
Podophyllotoxin
Callus induction
Linaceae

ABSTRACT

Linum album Kotschy ex Boiss, is an endemic herbaceous plant distributed in Iran. The plant contains valuable lignans *i.e.* podophyllotoxin (PTOX), 6-methoxy PTOX, and secoisolariciresinol which possess anticancer activity. To overcome the complexity and difficulties associated with their chemical synthesis in addition to limited natural sources, cell suspension culture of the plant sources especially *L. album* is proposed. In the present study, the effect of explant type and the level of plant growth regulators (NAA, 2-4-D, KIN, BAP, IBA) on *in vitro* callus induction was studied. The highest callus induction rate (91%) was obtained from shoot segments cultured on MS medium supplemented with 2 mg l^{-1} NAA and 0.4 mg l^{-1} KIN. Induced calli (1 g) were inoculated and maintained on the same solid medium fortified with 2 mg l^{-1} 2,4-D, 1 mg l^{-1} NAA, and 0.1 mg l^{-1} IBA. The fresh weight (8.84 g) and dry weight (0.3 g) were recorded at the end of 6th week. The plant cell culture was subsequently established from friable calli (1.5 g) in the liquid MS medium fortified with 2 mg l^{-1} 2, 4-D, 1 mg l^{-1} BAP, and 1 mg l^{-1} NAA. The growth pattern was sigmoid during five weeks in which maximum FW and DW were 12.57 g and 0.36 g, respectively on the 28th day; furthermore, the doubling time was recorded on the 5th day. Cell viability had a gradual decrease from 88% in the first week to 47% in the last week. Our findings can be considered for lignans production through biotechnological methods such as cell suspension culture.

References

1. Bahabadi, S. E., Sharifi, M., Safaie, N., Murata, J., Yamagaki, T., & Satake, H. (2011). Increased lignan biosynthesis in the suspension cultures of *Linum album* by fungal extracts. *Plant Biotechnology Reports*, *5*(4), 367-373. https://doi.org/10.1007/s11816-011-0190-3

2. Bakhtiar, Z., & Mirjalili, M. H. (2022). Long-term cell suspension culture of *Thymus persicus* (Lamiaceae): A novel approach for the production of anti-cancer triterpenic acids. *Industrial Crops and Products*, *181*, 114818.

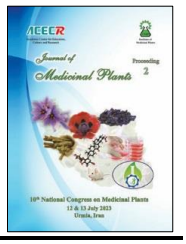
3. Lalaleo, L., Alcazar, R., Palazon, J., Moyano, E., Cusido, R. M., & Bonfill, M. (2018). Comparing aryl tetralin lignan accumulation patterns in four biotechnological systems of *Linum album*. *Journal of plant physiology*, *228*, 197-207.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 172

Phytochemical and bioactivity evaluation of *Eryngium billardieri* growing in Iran

Abbas Delazar[1], Parina Asgharian[1, *], Keyvan Sardari[1]

[1]*Department of pharmacognosy, faculty of pharmacy, Tabriz University of Medical Sciences, Tabriz, Iran*
E-mail: sardaari.k@gmail.com

ARTICLE INFO

Keywords:
Eryngium billardieri
HPLC
DPPH

ABSTRACT

Eryngium genus are widely used in folk and alternative medicine for treatment of various diseases. *Eryngium billardieri* was investigated because of the lack of phytochemical studies and bioactivity evaluations and its potential bioactivities. The aerial parts of mentioned plant were extracted respectively using n-hexane, dichloromethane, and methanol (MeOH) by soxhlet method. The MeOH extract was fractioned with using C18 Sep-Pak fractionation method by a step gradient of MeOH-H2O. Reversed-phase HPLC was used to further purification of fractions and two compounds were isolated and characterized by H-NMR and C-NMR results. Free-radical scavenging activity of the extracts, fractions, as well as their total flavonoid and phenolic contents, were assessed using the DPPH method, AlCl3, and Folin-Ciocalteu reagents. Phytochemical study of 20% and 40% solid phase extraction fractions of MeOH extract resulted one coumarin (decursin) and one phenolic compound (chlorogenic acid). The methanolic extract showed relatively high activity in terms of antioxidant activity, total phenolics content along with total flavonoids content (0.14 ± 0.01 mg/mL, 786.64 ± 7.39 mg/100g and 30.81 ± 0.02 mg/100g) as well as 40% SPE fraction (0.08 ± 0.00 mg/mL, 347.08 ± 11. and 19.7 ± 0.37 mg/100g), respectively. The presence of phenolic compounds appears to be an important antioxidant potency in *Eryngium billardieri.*

References

1. Küpeli, E., Kartal, M., Aslan, S., Yesilada, E., 2006. Comparative evaluation of the anti-inflammatory and antinociceptive activity of Turkish Eryngium species. *J. Ethnopharmacol*. 107, 32–37

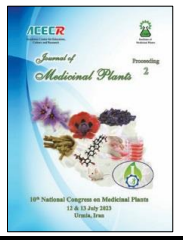
2. Milena D. Vukic, Nenad L. Vukovic, Gorica T. Djelic, Ana Obradovic, Miroslava M. Kacaniova, Snezana Markovic, Suzana Popović, Dejan Baskić, 2018. Phytochemical analysis, antioxidant, antibacterial and cytotoxic activity of different plant organs of *Eryngium serbicum* L., *Industrial Crops and Products*, 115, 88-97

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 173

Cytotoxic and anti-oxidant potential of *Eryngium thyrsoideum* aerial parts and its chemical composition

Abbas Delazar[1], Parina Asgharian[1,*], Keyvan Sardari[1]

[1]*Department of Pharmacognosy, Faculty of Pharmacy, Tabriz University of Medical Sciences, Tabriz, Iran*
E-mail: sardaari.k@gmail.com

ARTICLE INFO

Keywords:
Eryngium thyrsoideum
P-TLC
MTT-ASSAY

ABSTRACT

The genus *Eryngium* (Apiaceae) is widely distributed in the world and used in traditional medicine for different therapeutic purposes. *Eryngium thyrsoideum* investigated due to lack of phytochemical studies and its probable compounds and bioactivities. The aerial parts of plant were extracted successively using n-hexane, dichloromethane, and methanol (MeOH) by soxhlet method, respectively. The MeOH extract was exposed to C18 Sep-Pak fractionation by a step gradient of MeOH-H2O. Further purification of the fractions by TLC and preparative TLC methods, yielded one compound. The chemical ingredients of essential oil were determined by GC-MS. Free-radical scavenging activity of the extracts and fractions, were assessed using the DPPH method. Cytotoxic activity of essential oils was determined by MTT assay method on MCF-7 (human breast cancer cell line). Phytochemical study of 20% solid phase extraction fraction of MeOH extract yielded one flavonoid (rutin) and characterized by H-NMR, C-NMR and 2D-NMR. 2,4,5-Trimethylbenzaldehyde (37.49 %), germacrene D (7.75 %) and + spathulenol (6.39 %), were the main compounds of essentials oil. The MeOH extract and 20% solid phase extraction fraction demonstrated respectively high potency antioxidant activity (0.19 ± 0.01 mg/mL and 0.13 ± 0.01). Cytotoxic activity for the essential oils is indicated by the following numbers, which represent RC50 in 24 and 48 hours and numbers are 2.51 mcg/ml and 1.07 mcg/ml. The presence of phenolic compounds appears to be an important antioxidant compound in *Eryngium thrsoideum* and this plant presented noticeable effects on human breast cancer cell line.

References

1. Küpeli, E., Kartal, M., Aslan, S., Yesilada, E., 2006. Comparative evaluation of the anti-inflammatory and antinociceptive activity of Turkish Eryngium species. *J. Ethnopharmacol*. 107, 32–37.

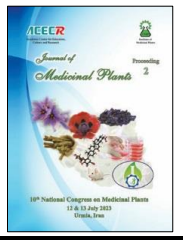
2. Milena D. Vukic, Nenad L. Vukovic, Gorica T. Djelic, Ana Obradovic, Miroslava M. Kacaniova, Snezana Markovic, Suzana Popović, Dejan Baskić, 2018. Phytochemical analysis, antioxidant, antibacterial and cytotoxic activity of different plant organs of *Eryngium serbicum* L., *Industrial Crops and Products*, 115, 88-97.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 174

Improvement of antioxidant capacity of Denak (*Oliveria decumbens*) by salicylic acid hormone under salinity stress

Anahita Boveiri Dehsheikh[1], Mohammad Mahmoodi Sourestani[1,*], Naeimeh Enayatizamir[2] Mehdi Safdarian[3]

[1]*Department of Horticultural Science, Shahid Chamran University of Ahvaz, Ahvaz, Iran*
[2]*Department of Soil Science, Shahid Chamran University of Ahvaz, Ahvaz, Iran*
[3]*Persian Gulf Nanotechnology Research Center, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran*
E-mail: m.mahmoodi@scu.ac.ir

ARTICLE INFO

Keywords:
Total Phenolic content
Antioxidant activity
Flavonoid

ABSTRACT

Denak (*Oliveria decumbens*) is one of the endemic medicinal plants of Iran [1]. It is an annual plant belonged to the Apiaceae family that is found in the south and southwest of Iran [2]. To investigate the effect of salinity stress and salicylic acid hormone (SA) on the antioxidant capacity of Denak extract, a factorial pot experiment was conducted as a randomized complete block design with three replications in the research farm of Shahid Chamran University of Ahvaz in 2019-2020. The experiment factors included irrigation water salinity at four levels (1.1, 2.5, 5, 7.5 dS/m) and foliar application of SA at four levels (0, 100, 200, 500 mg/L^{-1}). The traits included total phenolic (TPC), flavonoid (TFC), flavone and flavanol contents (TFFC), and antioxidant activity (AA). According to the results, increasing the level of salinity stress up to 5 dS/m led to an increase in TPC, TFC and AA of Denak, and the application of SA improved the above traits. The maximum amount of TPC, TFC and AA was detected in 5 dS/m salinity stress by 200 mg/L^{-1} SA. Salinity stress and application of SA significantly reduced the amount of TFFC. The highest TFFC value was obtained in the normal salinity and no foliar spraying of SA, and the lowest level observed in 7.5 dS/m salinity and 200 mg/L^{-1} application SA. Therefore, it seems that the cultivation of Denak in saline lands up to 5 dS/m and the use of SA can help to increase the therapeutic properties of its extract.

References

1. Amin G, Sourmaghi MS, Zahedi M, Samadi N. Essential oil composition and antimicrobial activity of *Oliveria decumbens*. *Fitoterapia*. 2005; 76(7-8), 704-707. doi: 10.1016/j.fitote.2005.06.009.

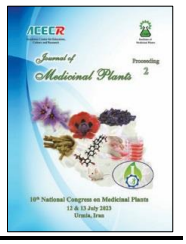
2. Mozaffarian V. A dictionary of Iranian plant names. Tehran: Farhang Moaser. 2022, 371-372.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 175

The study of Behbahanian Knapweed plant, native to Khuzestan province with emphasis on taxonomic and phytochemical aspects

Fatemeh Borna*, **Kazem Negaresh**

[1]*Department of Horticultural Science, Agricultural Sciences and Natural Resources University of Khuzestan, Mollasani, Iran*
E-mail: borna@asnrukh.ac.ir

ARTICLE INFO

Keywords:
Centaurea pabotii
Total phenol
Flavonoid
Antioxidant activity

ABSTRACT

Identifying and introducing the plants of a region is of particular importance, which includes the possibility of easy and quick access to specific plant species in a certain place and time, the possibility of increasing the number of resistant species and endangered species and helping to preserve them, identifying plants Medicinal and their basic use and help to determine the cover plants of the country. Behbahanian knapweed (*Centaurea pabotii*) from the Asteraceae family is an endemic plant of Iran and is mainly distributed in the wheat fields of the southwest of the country. Behbahanian knapweed species found in the south and southwest of Iran is known as a Zagrosian element that can be seen in wheat fields and roadsides. In this research, the amount of total phenolic compounds, total flavonoid and antioxidant activity in the leaves and inflorescences of Behbahanian knapweed were investigated in a factorial design with 6 replications. The results showed that there is a significant difference between the compounds in leaves and capitol at the level of 1%. The highest amount of total phenol, flavonoid and percentage of free radical inhibition was observed in the leaves of Behbahanian knapweed. Therefore, it can be concluded that the leaves of the plant have more medicinal value than the flowers.

References

1. Khodayari, H. and Amani, Sh. 2013 ethnobotanical survey of medicinal plants of Izeh city (Khuzestan province). *The first national conference of medicinal plants, traditional medicine and organic agriculture.* Hamedan. p. 3716.

2. Negaresh K, Rahiminejad MR, 2015. A taxonomic revision of Centaurea sect. Microlophus (Asteraceae, Cardueae–Centaureinae) and three new records for the flora of Iran. *Nordic Journal of Botany* 33: 335–353.

3. Negaresh, K. and Rahiminejad, M.R. 2015. The identity and revised circumscription of *Centaurea iranshahrii* (Asteraceae, Cardueae–Centaureinae) in Iran. *Feddes Repertorium*, 126(3–4), 55–66.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran

Poster Presentation ID: 176

The role of nanocellulose coating and carvacrol in improving the antioxidant activity of Physalis fruit with and without calyx

Leila Fereidoni[1], Abdollah Ehteshamnia[2,*], Hassan Mumivand[2], Mohammad Reza Raji[3]

[1]M.Sc. Student (Department of Horticulture, Faculty of Agriculture, Lorestan University, Khorramabad, Iran)
[2]Associate Professor (Department of Horticulture, Faculty of Agriculture, Lorestan University, Khoramabad, Iran)
[3]Assistant Professor (Department of Horticulture, Faculty of Agriculture, Lorestan University, Khoramabad, Iran)
E-mail: ab.ehteshamnia@gmail.com

ARTICLE INFO

Keywords:
Antioxidant activity
Physalis
Phenol

ABSTRACT

Today, one of the important fields of organic agriculture is the use of natural compounds compatible with plants. In the most recent studies, nanocellulose (CNF) has been recommended as a cheap, available, non-toxic, natural, renewable, biodegradable material obtained from natural materials extracted from plants, for the post-harvest stage of various fruits. In recent years, the use of natural compounds such as essential oils as a new idea in controlling bacterial and fungal infections and reducing losses after harvesting garden products and as edible coating materials in food, films and edible coatings based on biological materials such as proteins, lipids and Polysaccharides, alone or often in combination (3). Therefore, this research was conducted in order to investigate the effect of post-harvest application of CNF coated with pure carvacrol (Car) obtained from *Satureja khuzistanica* plant on the quality and storage time of *Physalis peruviana* fruit. The results showed that storage time × treatment had a significant effect at the probability level of 1% on total phenol content (TPC), total flavonoid content (TFC) and antioxidant activity in both types of Physalis fruit with and without calyx. Increasing the storage time caused a decrease in the antioxidant activity, however, a smaller decrease in these characteristics was recorded in the treated fruits compared to the control. In fruits with calyx, the highest TPC belonged to Car 0.3% treatment (34.99 mg/g FW), the highest TFC (0.539 mg/g FW) was in Car 0.6+ CNF 1.5% treatment and the highest antioxidant activity (88.01%) was observed in Car 0.6+ CNF 1.5% treatment. In the samples without calyx, the highest TPC (33.64 mg/g FW), TFC (0.52 mg/g FW) and the highest level of antioxidant activity (86.56 %) were related to Car 0.3%, Car 0.3+ CNF 1.5% and Car 0.6+ CNF 1.5% treatments, respectively. The low amounts of phenolic compounds in control samples can be due to the participation of polyphenols in the oxidation process by PPO and POD enzymes during storage. Probably, the used coatings, by spreading in the closed environment and interacting with the surface of the food material, reduce the activity of enzymes responsible for the decomposition of phenolic compounds such as PPO and as a result delay their oxidation (1). It is possible that carvacrol plays a positive role in the production of secondary metabolites and the biosynthesis of antioxidant compounds by increasing the activity of the PAL enzyme (2).

References

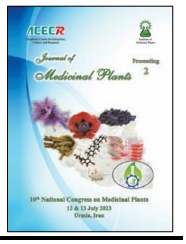
1. Gao M, Feng L. and Jiang T, Browning inhibition and quality preservation of button mushroom (*Agaricus bisporus*) by essential oils fumigation treatment. *Food Chem*. 2014; (149): 107 –113.
2. Lvov Y, Wang W, Zhang L, and Fakhrullin R. Halloysite clay nanotubes for loading and sustained release of functional compounds. 2015; Adv. Mater. n/a -n/a.
3. Xiao J, Gu C, Zhu D, Huang Y, Luo Y, and Zhou Q. Development and characterization of an edible chitosan/zein-cinnamaldehyde nano-cellulose composite film and its effects on mango quality during storage. LWT. 2021; 140: 110809.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 178

Investigating the local communities' knowledge about the use of forest edge plants

Yasna Khaksar Baghan[1,*], Mohammad Rahim Forouzeh[1], Morteza Mofidi[2]

[1]*Department of Range Management, Faculty of Range and Watershed Management, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Iran.*
[2]*Department of Range Management, Faculty of Range and Watershed Management, Urmia University, Urmia, Iran*
E-mail: yasnakhaksar2000@gmail.com

ARTICLE INFO

Keywords:
Traditional medicine
medicinal plants
Golestan province
forest edge plants

ABSTRACT

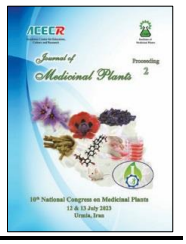
Traditional medicine is an ancient and precious heritage our predecessors have left for us. Today's man is trying to not only revive the skill of his predecessors in the field, but also take effective steps for evolution. The global approach of herbal medicine in the last century demands us more perseverance and effort, especially with the leaders of this science as Avicenna. Local communities in villages and nomadic areas are those that have a rich knowledge of medicinal plants due to their relations with nature. For this purpose, in the suburbs of Gorgan city, some of the forest edge plants were studied. *Allium ursinum, Mentha pulegium, Glycyrrhiza glabra, Rumex acetosa* and *Origanum majorana* were investigated in this study. Information was collected through observations and interviews with local communities, and data was collected through the snowball method in the form of a direct sampling of experts. The results showed that the mentioned plants, in addition to having many and varied uses in cooking local foods, are effective and useful in treating digestive disorders such as indigestion, stomach ulcers, and improving appetite, and have been used by local communities over the years. The results of this survey showed that local communities have a rich knowledge in identifying the methods of harvesting and consuming medicinal plants in their surrounding areas, which can be used as a useful and effective platform for the improvement and development of official knowledge.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 179

Evaluation of the Sedative Effect of the Phytochemicals from *Hyoscyamus* Genus Using the Molecular Docking and QSAR Analyses

Peyman Piran[1, *], Mahdi Abbas-Mohammadi[2], Zeinab Toluei[3]

[1]*Essential Oil Research Institute, University of Kashan, Kashan, Iran*
[2]*Department of Organic Chemistry, Faculty of Chemistry, University of Kashan, Kashan, Iran*
3Biotechnology Division, Department of Cell and Molecular Biology, Faculty of Chemistry, University of Kashan, Kashan, Iran
E-mail: peymanpk1995@gmail.com

ARTICLE INFO

Keywords:
Hyoscyamus Genus
Sedative
Molecular Docking
Qsar Modeling
Natural Products

ABSTRACT

Medicinal plants as a rich source of different bioactive constituents, have been traditionally used for treatment of different disease, since a long time. *Hyoscyamus* genus has also been regarded as an important medical plant due to its anti-cancer, antioxidant, anti-diabetic, anti-parkinson, anti-spasmodic, pain relief and sedative activities [1, 2]. Molecular docking and QSAR analyses, as the most widely used strategies in computer-assisted drug design, play a major role for the identification of suitable molecular scaffold and distinguishing selectivity for the target proteins [3]. Herein, the over-mentioned *in silico* assays were applied to evaluate the sedative effect of the plants of *Hyoscyamus* genus through the inhibition of the activity of GABAa receptors. For this, reported chemical constituents of the *Hyoscyamus* genus was collected from the literature and then their sedative effect was determined against two sub-unites of GABAa with the PDB codes of 6D6T and 4COF. Results of molecular docking analysis revealed a good affinity, activity and binding orientation of some ligands to the target proteins. Based on the obtained results, compound 7ß-hydroxyhyoscyamine had the best affinity to the target proteins of 6D6T and 4COF with docking score values of -6.291 and -5.513 kcal/mol respectively. In continue, pharmacophore modelling and 3D-QSAR studies were performed on a dataset of 30 sedative drugs with the intention of exploring entry inhibitors with better therapeutic potential. The common pharmacophore hypothesis of AARRR was used for 3D-QSAR model development, which indicated the predicted activity of 0.622 nM for compound 7ß-hydroxy hyoscyamine, confirming the results of molecular docking analysis.

References

1. Yuan H, Ma Q, Ye L, Piao G. The traditional medicine and modern medicine from natural products. *Molecules*. 2016; 21(5): 559. doi: 10.3390/molecules21050559.

2. Ak G, Uysal S, Sinan KI, Ceylan R, Zengin G. Hyoscyamus niger L. InNovel Drug Targets With Traditional Herbal Medicines: *Scientific and Clinical Evidence* 2022; 337-345. doi: 10.1007/978-3-031-07753-1_22.

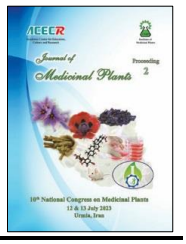
3. Pagadala NS, Syed K, Tuszynski J. Software for molecular docking: a review. *Biophysical reviews*. 2017; 9:91-102. doi: 10.1007/s12551-016-0247-1.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 180

Phytochemical Analysis on the Ethyl Acetate Extract of the Leaves of *Hyoscyamus Senecionis*

Peyman Piran[1,*], Zeinab Toluei[2], Mahdi Abbas-Mohammadi[3]

[1]*Essential Oil Research Institute, University of Kashan, Kashan, I.R. Iran*
[2]*Biotechnology Division, Department of Cell and Molecular Biology, Faculty of Chemistry, University of Kashan, Kashan, Iran*
[3]*Department of Organic Chemistry, Faculty of Chemistry, University of Kashan, Kashan, Iran*
E-mail: peymanpk1995@gmail.com

ARTICLE INFO

Keywords:
Hyoscyamus senecionis
Chromatography
Natural Products

ABSTRACT

Hyoscyamus, known as the henbanes, is one of the most important genera of Solanaceae family. This genus has been used in traditional Chinese and Indian medicines for stomach cramps, manic psychosis and heavy coughs since many years ago [1]. Tropane alkaloids such as hyoscyamine and scopolamine are important secondary metabolites of all species of this genus, which are widely used in pharmaceutical industry [2]. They also contain other various compounds such as tyramine derivatives and steroidal glycosides. *Hyoscyamus senecionis* is a native Iranian herb which its antispasmodic, analgesic, antipyretic and anticholinergic effects have been confirmed [3]. In our efforts to discover new and potentially bioactive secondary metabolites from Iranian plants, a phytochemical analysis was performed on the ethyl acetate extract of the leaves of *H. senecionis*. This attempt led to the isolation of two glycosylated steroids. Their structures were elucidated using modern NMR spectroscopic technique.

References

1. Shah D, Kamili AN, Wani AA, Majeed U, Wani ZA, Sajjad N, Ahmad P. Promoting the accumulation of scopolamine and hyoscyamine in *Hyoscyamus niger* L. through EMS based mutagenesis. *Plos one*. 2020; 15(5): e0231355. doi: 10.1371/journal.pone.0231355.

2. Sajeli Begum A. Bioactive Non-alkaloidal Secondary Metabolites of *Hyoscyamus niger* Linn. Seeds: A Review. *Res J Seed Sci*. 2010; 3(4): 210-7. doi: 10.3923/rjss.2010.210.217.

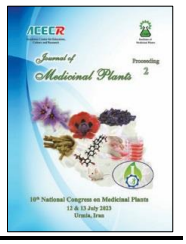
3. Dehghan E, Ahmadi FS, Ravandi EG, Reed DW, Covello PS, Bahrami AR. An atypical pattern of accumulation of scopolamine and other tropane alkaloids and expression of alkaloid pathway genes in Hyoscyamus senecionis. *Plant physiology and biochemistry*. 2013; 1;70: 188-94. doi: 10.1016/j.plaphy.2013.05.007.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 181

Ethnobotany of Medicinal Plants in Qaen, Southern Khorasan

Sholeh Ghollasimod[1,*], Mehdi Yaghobi[1]

[1]*Faculty of Natural Sciences and Environment, University of Birjand, Iran*
E-mail: sgholasimod@birjand.ac.ir

ARTICLE INFO

Keywords:
Birjand
Rural area
Asteraceae
Lamiaceae

ABSTRACT

Preservation, and revival of information on how to use the medicinal plants, which are the fruit of the ancestors' experience, are among the leading research priorities in Khorasan with its long history [1, 2]. The present study aimed to identify the medicinal plants and recognize their use in rural pastures around Birjand villages. The herbal plants cultivated in the rural pastures were identified, and data gathering was conducted based on the interviews with the villagers and the elders, who numbered about 80. The study results showed that there are 42 species of medicinal, edible, and industrial plants. The Lamiaceae, Asteraceae and Apiaceae with four species had the highest frequencies. These herbal plants have long been used for various diseases, including gastrointestinal (15 species), hematological (6 species), and rheumatological diseases (2 species), cold (7 species), depression (5 species), and skin diseases (5 species). The most consumption is in the form of brew and after that in raw and edible form. Due to the historical antiquity of the area and its long history in the use of medicinal plants as a result of remoteness from health centers, the present study helps introduce the valuable plant species, guide on how to use them, and preserve the local medical knowledge.

References

1. Pardode-Santayana M, Pieroni A and Puri RK. Ethnobotany in the New Europe: people, Health and Wild Plant Resources. New York, NY, Berghahn Books, 2010.

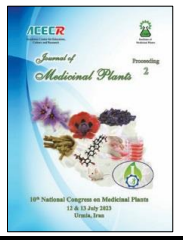
2. Silva N and Fernandes Júnior A. Biological properties of medicinal plants: a review of their antimicrobial activity. *The Journal of Venomous Animals and Toxins including Tropical Diseases* 2010; 16(3): 402-41.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 183

Effect of *Serendipita indica* Inoculation on Some Morphological Traits of Marjoram (*Origanum majorana* L.)

Zahra Soleiman pour, Zahra Movahedi*, Mehdi Ghabooli, Majid Rostami

[1]*Department of Plant Production and Genetics, Faculty of Agriculture, Malayer University, Malayer, Iran*
E-mail: zahra_movahedi_312@yahoo.com

ARTICLE INFO

Keywords:
Endophytic fungus
Marjoram
Vegetative traits

ABSTRACT

Marjoram (*Origanum majorana* L.) belongs to the Lamiaceae family of plants is common in most parts of the world as a medicinal plant used [1]. *Serendipita indica* (previously known as *Piriformospora indica*) is an endophytic fungus that forms symbiotic associations with a broad range of plant species similar to mycorrhizal symbiosis[2]. In recent decade, much investigations have been performed to study the positive effects of the application of root endophytic fungus (*Serendipita indica*) on improving growth properties and yield performances under non-stress conditions as well as increase resistance or tolerance under biotic and abiotic stress conditions in different plants (Liu *et al*., 2020). To evaluate the effects of *S. indica* inoculation on some morphological traits of *Origanum majorana* L., a pot experiment was conducted in a completely randomized design with three replications. Treatments included control (without inoculation) and inoculation with *S. indica*. The results showed that inoculation with *S. indica* increased plant height, root length, leaf number, fresh weight of shoot, dry weight of shoot, fresh weight of root, dry weight of root and root volume. Overall, the findings of this study showed that inoculation with *S. indica* can improve the morphological traits of Marjoram.

References

1. Zahedi E. Classification dicotyledonous and gymnosperms plants. Tehran University Press. 1956, pp: 152.

2. Verma S, Varma A, Rexer K.H, Hassel A, Kost G, Sarbhoy A, Bisen P, Bütehorn B Franken P. *Piriformospora indica*, gen. et sp. nov., a new root-colonizing fungus. *Mycologia (the official journal of the Mycological Society of America)*. 1998, 90: 896- 903.

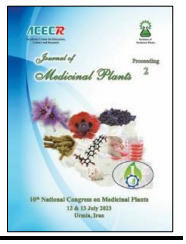
3. Liu Y.A.N.G, Jin-Li C.A.O, Zou Y.N, Qiang-Sheng W.U, Kamil K.U.Č.A. 2020. Piriformospora indica: a root endophytic fungus and its roles in plants. *Not. Bot. Horti. Agrobot. Cluj Napoca*, 2020, 48(1): 1-13.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 184

Antibacterial study of the medicinal plant *Salicornia persica* under the treatment of iron oxide nanoparticles and salt stress

Maedeh Khorrami[1], Hadis Tavafi[1,*], Masoume Maleki[1], Zahra Movahedi[2]

[1]*Department of Biology, Faculty of science, Malayer University, Malayer, Iran*
[2]*Department of plant production and genetics, Faculty of agriculture, Malayer University, Malayer, Iran*
E-mail: hadistavafi@yahoo.com

ARTICLE INFO

Keywords:
Salicornia persica
Antibacterial activity
Iron oxide nanoparticles

ABSTRACT

Salicornia persica is a halophyte plant. This plant has antibacterial properties. The present research is in the design of completely random levels with salinity treatment at four levels (0, 100, 200 and 400 ppm of NaCl) and iron oxide nanoparticles (0, 2 and 15 mg/ml) with three repetitions. The antibacterial investigation of the plant under treatment was done by determining the MIC and MBC against pathogenic bacteria using broth microdilution method. The results showed that the interaction effects of salinity and nanoparticles on the amount of malondialdehyde was significant, and the highest amount was related to the salinity of 400 ppm and the nanoparticle of 15 mg/ml, and the lowest value was related to the control plant under the treatment of 2 mg/ml nanoparticle, the antibacterial effect of control plant extract under the treatment of nanoparticle of 2 mg/ml showed the highest antibacterial activity compared to other treatments. The MIC results of the mentioned plant extract on *E. coli*, *S. aureus*, *P. aeruginosa* and *S. pyogenes* were reported as 0.78, 0.19, 0.78 and 0.39 mg/ml, respectively. Also, the result of MBC of plant extract on mentioned bacteria is 1.56, 0.38, 0.78 and 1.56 mg/ml, respectively. Based on the obtained results, it can be concluded that salt stress and iron nanoparticles increased the antibacterial activity of the plant. Also salinity stress and iron nanoparticles increased malondyaldehye, total phenol and anthocyanins.

References

1. Ventura Y, Sagi M. 2013. Halophyte crop cultivation: the case for salicor- nia and sarcocornia. *Environ. Exp. Bot.* 92:144–153.

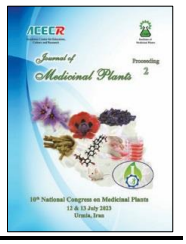
2. Akcin, A., and E. Yalcin. 2016. Effect of salinity stress on chlorophyll, carotenoid content, and proline in *Salicornia prostrata* Pall. and *Suaeda prostrata* Pall. Subsp. prostrata (Amaranthaceae). *Brazilian Journal of Botany*. 39(1): 101-106.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 185

Investigation of antimicrobial activity of the medicinal plant *Salicornia persica* under the treatment of titanium dioxide nanoparticles and salinity stress

Faezeh Khorrami[1], Hadis Tavafi[1,*], Masoume Maleki[1], Zahra Movahedi[2]

[1]*Department of Biology, Faculty of science, Malayer University, Malayer, Iran*
[2]*Department of plant production and genetics, Faculty of agriculture, Malayer University, Malayer, Iran*
E-mail: hadistavafi@yahoo.com. tavafi.hadis@gmail.com

ARTICLE INFO

Keywords:
Salicornia persica
Antimicrobial activity
Titanium dioxide nanoparticles

ABSTRACT

Salicornia persica is a salt-loving plant [1]. This plant has antimicrobial properties [2]. This study performed in the design of completely random with salinity treatment at 4 levels of 0, 100, 200 and 400 ppm of NaCl and Titanium dioxide nanoparticles at concentrations of 0, 5 and 50 mg/ml, with 3 repetitions. The antibacterial investigation of the plant under stress and treatment was done by determining its MIC and MBC against bacteria using broth Microdilution method. The results showed that the interaction effects of salinity and nanoparticle on the amount of anthocyanin was significant, and the highest amount of anthocyanin was related to salinity of 400 ppm and nanoparticle of 50 mg/ml, and the lowest amount was related to salinity of 200 and nanoparticle of 5 mg/ml, the antibacterial effect of the plant extract under salinity of 200 and nanoparticle of 5 mg/ml showed the highest antibacterial activity compared to other treatments. The MIC results of the plant extract on *E. coli*, *S. aureus*, *P. aeruginosa* and *S. pyogenes* was reported as 0.78, 0.78, 0.39, 0.78 mg/ml respectively. Also, the results of MBCs of plant extract on mentioned bacteria were reported as 1.56, 0.78, 0.78 and 1.56 mg/ml respectively. Based on the obtained results, it can be concluded that salt stress and titanium dioxide nanoparticles increased the antibacterial activity of the plant. Also salinity stress and titanium dioxide nanoparticles increased malondyaldehye, total phenol and flavonoids.

References

1. Narasimha Rao GM, PrayagaMurty P, Murali Krishna Kumar M. Seeds of *Salicornia brachiata* as a source of edible oil. *Indian Journal of Applied Research*, 2015; 5(8): 532-533.

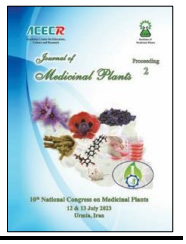
2. .Narasimha Rao GM, PrayagaMurty P. Distribution of *Salicornia brachiata* in Relation to Physico-Chemical and Soil Characteristics in Godavari Estuary, AP, India. *IOSR Journal of Pharmacy and Biological Sciences*, 2015; 10(4): 13-16.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 186

Comparison of Density and Length of Stomata in two Accessions in *Thymus transcaucasicus*

Farahza Kazemi Saeed[1,*], Ebrahim Sharifi Ashourabadi[1], Ziba Jamzad[1]

[1]*Research Institute of Forests and Rangelands, Tehran, Iran*
E-mail: farahzakazemisaeed@gmail.com

ARTICLE INFO

Keywords:
Stomatal density
Stomatal length and *Thymus transcaucasicus*

ABSTRACT

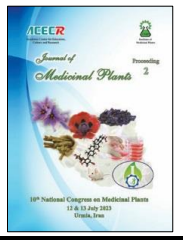
Stomata exist in the epidermis of all aerial organs of plants, especially in leaves and stems and their number determines the efficiency of plant performance. Due to the special importance of stomata in the structure of plants, their density and length were investigated in 3 replicates in the leaves of 2 *Thymus transcaucasicus* accessions, both of which were planted in the collection of the Iranian National Botanical Garden, but their seed origin was different (Zanjan and Gilan). To prepare leaf epidermis, the collected sample was placed in 70% alcohol for at least 4 days. After preparation, the epidermis sample was examined under a microscope for the presence or absence of stomata, its length and density per unit area. The results showed that habitats were significantly different in terms of density in both abaxial and adaxial levels. But in terms of the length of the aperture, their difference was not significant. The Gilan habitat sample had 202 stomata and the Zanjan habitat had 123 stomata per surface unit (square mm) in the abaxial surface. Also, in the adaxial level, Gilan and Zanjan habitats had 178 stomata, respectively. Conversely, regarding stomatal length, the Zanjan habitat sample had a longer stomatal length. So, on the abaxial and adaxial surface, they had stomata with a length of 25 and 26 micrometers, respectively. The length of the stomata of the Gilan habitat was 22 micrometers on the abaxial surface and 23 micrometers on the adaxial surface.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 187

The Effect of Different Concentrations of Nitrogen on Licorice (*Glycyrrhiza glabra* L.) Performance in Hydroponic Culture

Salehe Khosravi[1], Leila Tabrizi[1,*], Majid Shokrpour[1], Mesbah Babalar[1]

[1]*Department of Horticultural Science and Landscape Engineering, Faculty of Agricultural Science and Engineering, College of Agriculture and Natural Resources, University of Tehran, Karaj, Iran*
E-mail: L.tabrizi@ut.ac.ir

ARTICLE INFO

Keywords:
Amunium nitrate
Licorice
Nutrient solution
Potassium nitrate

ABSTRACT

Since the productivity and quality of hydroponically grown crops markedly depends on the target values of plant nutrients in growing medium, therefore, nutrient solution management has a vital role in crop production under hydroponic systems [1]. In order to investigate the effect of two different nitrogen sources of nutrient solution on licorice (*Glycyrrhiza glabra* L.) morpho-physiological criteria was investigated in a randomized complete block design experiment with three replicates in the Research Greenhouse of Department of Horticultural Science, University of Tehran in 2022. Treatments were included five different levels of nitrogen sources (nitrate and amunium) in nutrient solution (2.8, 3.9, 5, 6.1, 7.2 meq L^{-1}). Criteria such as plant height and diameter, leaf number, root length and volume, herbal fresh and dry weight, root and rhizome fresh and dry weight, total phenol and nitrogen concentration in above and below-ground tissues were measured. The effect of nutrient solution on most measured criteria was significant. Increasing the nitrogen concentration in nutrient solution led to increase of N concentration in the root tissue, while root length and root fresh and dry weight decreased. Leaf number, root volume and total phenol in root and rhizome showed an accelerating trend by slight increasing of N concentration in the nutrient solution, although there were no significant differences with control plants. Results revealed the potential ability of licorice for growing in low input hydroponic culture systems. Although, more research is needed to optimize the target value and composition of nitrogen in nutrient solution of hydroponically grown licorice.

References

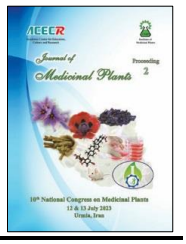
1. Atherton HR, Li P. Hydroponic cultivation of medicinal plants—plant organs and hydroponic systems: Techniques and Trends. *Horticulturae*. 2023; 9(3): 349. doi.org/10.3390/horticulturae903034.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 188

Effect of Biostimulants on the Biological Characteristics of Lead-Contaminated Soil in Licorice (*Glycyrrhiza glabra* L.) Cultivation

Maryam Naghavi[1], Leila Tabrizi[1,*], Vahideh Nazeri[1], Mohammad Bagher Farhangi Rasti[2]

[1]*Department of Horticultural Science and Landscape Engineering, Faculty of Agricultural Science and Engineering, College of Agriculture and Natural Resources, University of Tehran, Karaj, Iran*
[2]*Department of Soil Science, Faculty of Agriculture, University of Guilan, Rasht, Iran*
E-mail: L.tabrizi@ut.ac.ir

ARTICLE INFO

Keywords:
Bacterial inoculation
Licorice
Lead contamination
Translocation factor

ABSTRACT

Heavy metals contamination in farmlands cause risks to ecological systems and human health. Pb is one of the most environmentally important metallic pollutants and could affect the plant metabolism [1, 2]. A factorial experiment based on completely randomized design with four replications was conducted to investigate the biostimulation effect of bacterial inoculants in alleviation of the adverse effects of Pb stress in licorice (*Glycyrrhiza glabra* L.) during 2020-2021. Treatments included Pb concentrations (0, 150, 350 and 550 mg/kg soil) and bacterial inoculation (no inoculation, *Pseudomonas fluorescens* and *Bacillus subtilis*). After six months of the plant growth cycle, Pb accumulation in plant tissues and translocation factor, as well as soil biological criteria including organic carbon (OC), microbial basal respiration (MBR) and microbial biomass carbon (MBC) were measured. Results indicated that the interaction effect of Pb and bacterial inoculants on Pb accumulation in plant tissues, translocation factor, OC, MBR and MBC were significant. Plants exposed to 550 mg/kg of Pb along with *B. sabtilis* inoculation caused the highest Pb concentration in belowground tissues, while the highest Pb concentration in aboveground tissues was in contamination by 150 mg/kg Pb under *B. sabtilis* inoculation. The Pb translocation factor increased in plants inoculated with both bacteria at 150 mg/kg of Pb. Contamination with 150 mg/kg Pb in both uninoculated and inoculated with *B. sabtilis* led to the highest OC. In addition, MBR increased in *B. sabtilis* inoculation in non-contaminated plants. Application of 350 mg/kg Pb combined with *P. fluorescens* inoculation resulted in the highest MBC.

References

1. Doyi I, Essumang D, Gbeddy G, Dampare S, Kumassah E, Saka D. Spatial distribution, accumulation and human health risk assessment of heavy metals in soil and groundwater of the Tano Basin, Ghana. *Ecotoxicol. Environ. Saf.* 2023; 165: 540-6.

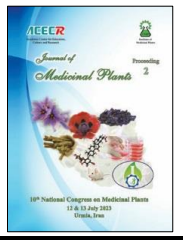
2. Dinu C, Gheorghe S, Tenea AG, Stoica C, Vasile GG, Popescu RL, Serban EA, Pascu LF. Toxic metals (As, Cd, Ni, Pb) impact in the most common medicinal plant (*Mentha piperita*). *Int. J. Environ. Res. Public Health*. 2021; 18(8):3904.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 189

Effect of biochar on the growth and pigment of Zea Mays L. (PL538) under heavy metal nickel

Leila Cheraghvareh[1,*], Latifeh Pourakbar[2], Sina Siavash moghaddam[3]

[1,2] Department of Biology, Urmia University, Urmia, Iran
[3] Department of Agriculture, Urmia University, Urmia, Iran
E-mail: L.ch1987@yahoo.com

ARTICLE INFO

Keywords:
Zea mays
Biochar
Nickel
Growth factor
Pigment

ABSTRACT

Soil contamination with heavy metals is a major environmental concern that has emerged with the rapid development of industrial activities in the world over the last century. Heavy metals that are subsequently taken up by plants enter into the food chain and accumulate in animals and humans where they can cause toxicity (1). Many factors affect the uptake process of metals by plants, Among the amendments that are used to adsorb heavy metals and decrease their potential bioavailability, biochar has been shown to be particularly effective (2). Biochar is a carbon rich material produced by pyrolysis of straw, manure, wood, and other agricultural wastes under oxygen-limited conditions (1). Accumulation of Ni in plants, leaves, and fruits also deteriorates their quality and causes cancer in humans when such a Ni-contaminated diet is used regularly. Plants that suffer from Ni toxicity mostly show chlorosis and necrosis symptoms (3). The most common symptoms of its toxic effects on plants, are chlorosis, and inhibited photosynthesis and respiration.The current research was carried out to study the effect of Ni on maize (Zea mays L.) growth and with biochar assistance. Zea mays seeds were germinated and cultured on nutrient solution in three leafs period with nickel concentrations of (0, 75 and 150 µmol) and biochar (3%w/w) and their combination (biochar+Ni) were grown in a pot experiment for a period of two weeks. The fresh weight of leaves and roots and leaf area increased in 75µM nickel but decreased in 150µM. Application of biochar alone or in combination with nickel increase maize root and shoot length and leaf area, compared with control. By increasing nickel concentrations, the content of photosynthetic pigments (chl-a, chl-b) decreased but increase with biochar. In conclusion, application of biochar suitable concentrations may decrease Ni uptake by maize providing an effective and economic method of Ni-contaminated places.

References

1. El-Naggar, A., Ahmed, N., Mosa, A., Niazi, N. K., Yousaf, B., Sharma, A., ... & Chang, S. X. (2021). Nickel in soil and water: Sources, biogeochemistry, and remediation using biochar. *Journal of hazardous materials*, *419*, 126421.

2. Alam, M. S., Gorman-Lewis, D., Chen, N., Flynn, S. L., Ok, Y. S., Konhauser, K. O., & Alessi, D. S. (2018). Thermodynamic analysis of nickel (II) and zinc (II) adsorption to biochar. *Environmental science & technology*, *52*(11), 6246-6255.

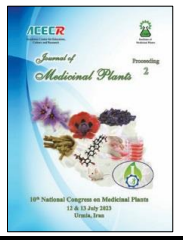
3. Younis, U., Athar, M., Malik, S. A., Raza Shah, M. H., & Mahmood, S. (2015). Biochar impact on physiological and biochemical attributes of Spinach (*Spinacia oleracea* L.) in nickel contaminated soil. *Global Journal of Environmental Science and Management*, *1*(3), 245-254.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 190

Investigation of Interaction between Medicinal Plants and Cholesterol by Spectrophotometric Methods

Aysan Ghanbarnezhad[1], Khalil Farhadi[2,*], Biuck Habibi[1], Sima Najafi Ghamat[3], Mohsen Farhadpour[4], Davod Ahmadian[3]

[1]*Department of Chemistry, Faculty of Science, Azarbijan Shahid Madani University, Tabriz, Iran*
[2]*Department of Analytical Chemistry, Faculty of Chemistry, Urmia University, Urmia, Iran*
[3]*Department of Research and Development of Nooshin Shahd Urmia Company, Urmia, Iran*
[4]*Department of Phytochemistry, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*
E-mail: khalil.farhadi@yahoo.com; kh.farhadi@urmia.ac.ir

ARTICLE INFO

Keywords:
Cholesterol
Medicinal plants
Artichoke

ABSTRACT

Cholesterol is a sterol lipid that plays important roles in human body. Most of cholesterol is produced in liver, adrenal glands, intestines, and in gonads. One of the major functions of cholesterol is to participate in the biosynthesis of bile acids in the liver. Bile can break down dietary fats into smaller droplets and helps the subsequent digestion. Abnormal levels of cholesterol or its precursors have been observed in various human diseases, such as heart diseases, stroke, type II diabetes, brain diseases and many others. In recent years, the use of compounds found in plants in the treatment and control of many diseases has attracted public attention. Medicinal plants are full of natural antioxidants and flavonoids, which significantly reduce serum cholesterol in people with high cholesterol. Changes in the level of serum lipids and lipoproteins, especially high cholesterol, lead to various chronic diseases. Therefore, in recent years, many studies have been conducted on effective plant compounds to reduce cholesterol levels. In this research, the interaction between effective plant extracts and cholesterol was investigated in simulated body conditions during an enzymatic reaction and the intensity of absorption was analyzed using the spectrophotometric method. The obtained results showed that the artichoke plant has the greatest effect in reducing cholesterol and reduces the amount of absorption at 505 nm more than other investigated plants. Additional results were obtained after clinical tests on people with hypercholesterolemia, before and after taking artichoke plant extract, and were analyzed by LC/MS method.

References

1. Li-Hua Li, Ewelina P. Dutkiewicz, et al. Analytical methods for cholesterol quantification. *Journal of Food and Drug Analysis.* 2018; 19(4): 39-42. doi: 10.1016/j.jfda.2018.09.01

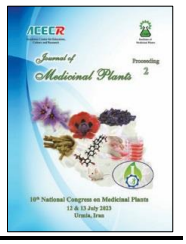
2. Canan Kucukgergin, et al. Effect Of Artichoke Leaf Extract on Hepatic and Cardiac Oxidative Stress in Rats Fed on High Cholesterol Diet. *Bio Trace Elem Res.* (2010); 135 : 264-274. doi: 10.1007/s12011-009-8484-9

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 191

Investigating the protective effect of quercetin on the combined toxicity of acetamiprid and chlorpyrifos in the zebrafish larval model

Zeinab Samanghani[1], Maliheh Soodi[1,*], Mohammad Reza Khorramizadeh[2], Hassan mohamadi[2]

[1]*Department of Toxicology, Faculty of medical sciences, Tarbiat Modares University, Tehran, Iran*
[2] *Biosensor Research Center, Endocrinology and Metabolism Research Institute (EMRI), Tehran University of Medical Sciences, Tehran, Iran*
E-mail: soodi @modares.ac.ir

ARTICLE INFO

Keywords:
Quercetin Chlorpyrifos
Acetamiprid
Zebrafish larvae model

ABSTRACT

The flavonoid quercetin has multiple biological functions, including anti-oxidation, anti-inflammatory, and anti-aging(1). As pesticides are widely used to increase the quality and quantity of crops, humans are exposed to a mixture of pesticides. This study aims to study the potential protective properties of quercetin against the combined toxicity of acetamiprid and chlorpyrifos, a commonly used pesticide in Iran, using a zebrafish larval model. This model is extensively used as a toxicology model to study mixture toxicity and investigate the underlying molecular mechanisms (2). Larval toxicity tests were performed on larvae that had been hatched 72 hours after fertilization. In the experiment, the following five groups were included: control, acetamiprid (10 µg/mL), chlorpyrifos (1 µg/mL), quercetin (5 µg/mL), acetamiprid+chlorpyrifos and acetamiprid+chlorpyrifos+quercetin. The larvae of zebrafish were treated for 48 hours. Following treatment, mortality was measured. In addition, Real-time PCR was used to measure the expression of genes related to oxidative stress, including superoxide dismutase and catalase, as well as Bcl2, Bax, and Caspase 3 genes as markers of apoptosis. Acetamiprid+chlorpyrifos-treated larvae experienced a significant mortality rate increase, which was diminished by quercetin. Combined pesticide treatment resulted in changes in oxidative stress and apoptosis-related gene expression attenuated by quercetin. As a result of these findings, quercetin significantly reduced the toxicity of acetamiprid and chlorpyrifos when used together and could be used as a nutraceutical formulation to avoid the side effects associated with pesticide mixture exposure.

References

1. Zou H, Ye H, Kamaraj R, Zhang T, Zhang J, Pavek P. A review on pharmacological activities and synergistic effect of quercetin with small molecule agents. *Phytomedicine*. 2021; 92: 153736.

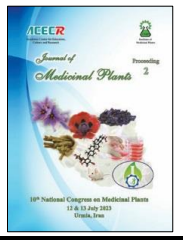
2. Min EK, Lee AN, Lee J-Y, Shim I, Kim P, Kim T-Y, et al. Advantages of omics technology for evaluating cadmium toxicity in zebrafish. *Toxicological Research*. 2021:1-9.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 193

Variations in morphological and phytochemical traits of Danshen (*Salvia miltiorrhiza* Bunge) cultivated at different areas

Fahimeh Rastegarnejad[1], Mohammad Hossein Mirjalili[1,*], Zahra Danaiepour[2]

[1]*Department of Agriculture, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*

[2]*Department of Biotechnology, Faculty of Agriculture and Natural Resources, Imam Khomeini International University, Qazvin, Iran*

E-mail: m-mirjalili@sbu.ac.ir (M.H. Mirjalili)

ARTICLE INFO

Keywords:
Tanshinone
medicinal plants
phenolic acid
red sage
HPLC

ABSTRACT

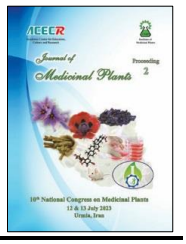
Red sage (*Salvia miltiorrhiza* Bunge), belonging to the Lamiaceae family, is one of the well-known medicinal plants in traditional Chinese medicines. Red sage is used in the pharmaceutical and food industries throughout the world. This plant is rich in tanshinone diterpenoids and phenolic acids and has anticancer, antimicrobial, antivirus, and anti-Alzheimer properties. The biologically active compounds in this plant and their commercial value increases the effort to improve the cultivation and synthesis of these compounds in different regions of the world. The present work was conducted to introduce red sage for cultivation and to investigate the climatic factors of Iran on the quantity and quality of its active compounds. Experiments were separately conducted for two years in two places under farm conditions. Morphological characteristics were measured, including plant height, inflorescence length, leaf length, leaf width, stem diameter, shoot and root fresh weight, internode distance, root diameter, root length, number of branches per plant, and the shoot and root dry weight. Also, the content of tanshinone and phenolic acids was analyzed using HPLC in the shoots and roots. The results showed that there was a significant difference between some morphological characteristics in two years and two different places. This plant showed more root yield in the second year, while there was no significant difference between the two studied locations. Also, the content of tanshinone and rosmarinic acid were significantly different in different organs, and the tanshinones were specifically accumulated in the roots, which showed an inverse correlation with the rosmarinic acid content. Therefore, this plant has a suitable adaptation to the climatic conditions of Iran, and these data can be used in further research on the cultivated samples of this plant in different regions of Iran, as well as the development of the production of raw materials for pharmaceutical industries in the country.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 194

Drug efflux pump inhibitory of Naringenin, Genistein and Resveratrol, an *in-silico* study

Zeinab Mazarei

[1]*Department of Chemistry, Faculty of Sciences, Shahid Chamran University of Ahvaz, Ahvaz, Iran*
E-mail: z.mazarei@scu.ac.ir

ARTICLE INFO

Keywords:
Flavonoids
Stilbenes
Multidrug Resistance
Anti-cancer

ABSTRACT

One of the major challenges in chemotherapy is the overexpression of drug efflux pumps such as P-glycoprotein in cancer cells [1]. Although, the first-generation of P-glycoprotein inhibitors, such as cyclosporine A and Verapamil, increased the efficiency of chemotherapeutic agents, but their application was stopped due to undesirable pharmacokinetic interactions and unfavorable side effects. Recently, it has been demonstrated that flavonoids could efficiently inhibit P-glycoprotein in a safe manner [2]. In this study, we create an in-silico model simulating the interaction of flavonoid Naringenin, isoflavonoid Genistein and structurally correlated stilbene compound, Resveratrol with a P-gp model protein. The molecular modeling was performed using SwissDock web server and critical features of the P-gp model protein was obtained from Protein Data Bank. The results revealed that all three compounds potentially interact with P-glycoprotein and Naringenin showed the highest affinity for protein binding.

References

1. Karthika C, Sureshkumar R, Zehravi M, Akter R, Ali F, Ramproshad S, Mondal B, Tagde P, Ahmed Z, Khan FS, Rahman MH. Multidrug resistance of cancer cells and the vital role of p-glycoprotein. *Life*. 2022; 12: 897.

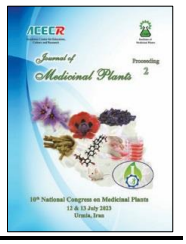
2. Cui J, Liu X, Chow L. Flavonoids as P-gp inhibitors: a systematic review of SARs. *Current Medicinal Chemistry*. 2019; 26: 4799-831.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 196

The effect of cadmium on the growth and physiological factors on Zea Mays (PL538)

Farnaz Heidari naghadehi[1], Latifeh Pourakbar[2,*], Sina Siavash moghaddam[3]

[1,2]Department of Biology, Urmia University, Urmia, Iran
[3]Department of Agriculture, Urmia University, Urmia, Iran
E-mail: l.pourakbar@urmia.ac.ir

ARTICLE INFO

Keywords:
Cadmium
Zea mays
Growth factor
Biochemical factor

ABSTRACT

Heavy metal pollution is now a serious environmental problem in the world (1). Cd (cadmium) is one of the most toxic heavy metals causing serious problems in crops (1). It is widely recognized that Due to industrial emissions and the application of both sewage sludge and phosphate fertilizers containing cadmium (Cd) taken up by plants is the main source of Cd accumulation in food. In this study maize (Zea mays L.) plants grown in Sand and perlite culture were treated with 0, 200 and 400 mM Cadmium nitrate (Cd $(NO_3)_2$) for a period of two weeks. Growth parameters and some biochemical changes were studied in roots and shoots of plants. Studied physiological makers included biomass, Soluble protein contents and free amino acic content. Roots are likely to be firstly affected by heavy metals since much more metal ions are accumulated in roots than shoots (2). Thus, Cd toxicity obviously inhibits plant root growth (1). With increase concentration of cadmiom the fresh weight of shoot and roots, Soluble protein contents and free amino acic content decreased. Cd can be easily absorbed by plant roots and transported to shoots, results in disorders in biochemical and physiological processes, and then affects plant growth and biochemical factors.

References

1. Huybrechts, M., Cuypers, A., Deckers, J., Iven, V., Vandionant, S., Jozefczak, M., & Hendrix, S. (2019). Cadmium and plant development: An agony from seed to seed. *International journal of molecular sciences*, *20*(16), 3971.

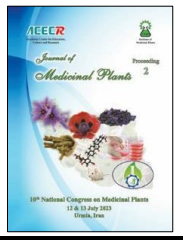
2. TRAN, T. A., & Popova, L. P. (2013). Functions and toxicity of cadmium in plants: recent advances and future prospects. *Turkish Journal of Botany*, *37*(1), 1-13.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 197

Saffron (*Crocus sativus* L.) response to carbon nanotubes under salinity stress

Tayebah Farsi[1,*], Majid Shokrpour[1], Leila Tabrizi[1], Reza Salehi[1]

[1]*Deptartment of Horticultural Science and Landscape, Faculty of Agriculture, University of Tehran, Karaj, Iran*
E-mail: shokrpour@ut.ac.ir

ARTICLE INFO

Keywords:
Sodium chloride
Saffron
nanoparticles
morphological traits

ABSTRACT

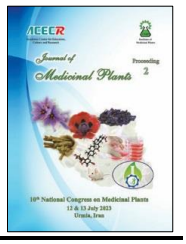
In order to investigate the effect of carbon nanotubes and salinity stress on saffron growth, a factorial experiment was run based on a completely randomized design with three replications. Three levels of salinity(0,50and 100 mM sodium chloride), and multi-walled carbon nanotube agent with an outer diameter of 20-30 nm in five levels of 0,50,100,150 and 200 mg/ L were applied as the studied factors. Two foliar spraying of nanotubes were used in the vegetative growth stage. Two weeks after each foliar spraying application, morphological traits such as the number of leaves, the fresh and dry weight of leaves, number of buds, and corms were measured. In the third stage, the corms were harvested when the leaves were completely dried. The results of the analysis of variance in the first stage, which was four months after cultivation, showed that salinity stress was significant for the fresh weight of leaves. At the second stage of harvest, which was five months after planting, due to the increase in salinity, it was found a significant salinity effect for some measured traits in terms of the fresh and dry weight of leaves, the number of corms and buds. The nanotube effect was significant only in leaf dry weight in these two stages, however no significant interaction effect was observed in all studied traits. Comparing the trait means under the salinity levels showed a decreasing trend by elevating the salinity dose from 50 to 100 mM for the fresh weight of leaves. The maximum dropping of trait mean occurred in the salinity of 100 mM for the dry weight of the leaves (0.32%). The number of corms and buds had a decline trend due to the salinity increase. There was an upward trend in terms of the dry weight of leaves of plants exposed to 50 to 100 mg nano-tube doses at the first stage of harvest, however the higher doses produced a steady status. In general, the increase in salinity and the duration of exposure caused to severe suppression of the morphological traits of saffron, in this regard, using the carbon nanotubes could alleviate the stress effects in some traits.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 198

Characterization of phytoconstituents and evaluation of antibacterial activity of silver nanoparticles synthesized by extract of *Oxalis corniculata* from Kelardasht - Iran

Mahdieh Ezoji[1,*], Shahab Ojani[2]

[1]*Department of Microbiology, Tonekabon Branch, Islamic Azad University, Tonekabon, Iran*
[2]*Young Researchers and Elite Club, Tonekabon Branch, Islamic Azad University, Tonekabon, Iran*
E-mail: Mahdiehezouji@gmail.com

ARTICLE INFO

Keywords:
Oxalis corniculata
Silver nanoparticles
Antibacterial activity
FT-IR
Phytochemical

ABSTRACT

Nowadays, the generation of antibiotic-resistant bacteria has become the greatest health challenges and serious concerns to be considered. In recent times, nanoparticle technology got the pin point in the development of new antibacterial agent which is successfully used against antibiotic-resistant bacterial strain [1-2]. Our present project was conducted to characterize the phytoconstituents present in the aqueous extract of *Oxalis corniculata* and evaluate the antibacterial efficacy of silver nanoparticles. After screening of phytochemicals; The extract of *Oxalis corniculata* as the reducing agent was used for the biosynthesis of silver nanoparticles. Reduction of Ag^+ ion was obtained after 24 h using *Oxalis corniculata* extract in the presence of 1 mM silver nitrate ($AgNO_3$) solution. These nanoparticles were characterized by using UV-Vis, FTIR, XRD, FE-SEM and TEM techniques. Then, antibacterial activities were assessed against *Staphylococcus aureus* and *Escherichia coli*. Aqueous extract of *Oxalis corniculata* leaves contain flavonoids, phenolic compounds, cardiac glycosides, tannins, saponins, alkaloids, terpenoids, coumarins and etc. UV-Vis spectrum showed absorption peak around 420 nm. The FT-IR technique showed presence of -CH, -NH, -COOH etc. XRD analysis confirmed the structure, crystal size and nature of the silver nanoparticles. SEM and TEM result revealed that synthesized nanoparticles had particle size 40-90 nm. Also, silver nanoparticles showed strong antibacterial activity. In conclusion, according to the results of the present project, silver nanoparticles by *Oxalis corniculata* extracts can be an important ingredient in the suppression of microbial diseases.

References

1. Fierascu I.C, Fierascu I. *et al*., Phytosynthesis of silver nanoparticles using *Leonurus cardiac* L. extracts. *Materials.* 2023; 16: 1-25. doi: 10.3390/ma16093472.

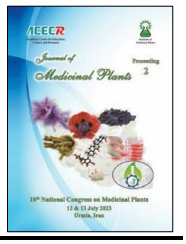
2. Karakaş İ, Sağır L. B, Hacıoğlu Doğru N. Biological activities of green synthesis silver nanoparticles by *Plantago lanceolata* L. leaves. *GSC Biological and Pharmaceutical Sciences*. 2023; 22 (02): 290-296. doi: 10.30574/gscbps.2023.22.2.0079.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 199

Investigation of antioxidant, antibacterial and anticancer potential of silver nanoparticles synthesized by *Tragopogon collinus* Extract from Kelardasht - Iran

Mahdieh Ezoji[1,*], Shahab Ojani[2]

[1]*Department of Microbiology, Tonekabon Branch, Islamic Azad University, Tonekabon, Iran*
[2]*Young Researchers and Elite Club, Tonekabon Branch, Islamic Azad University, Tonekabon, Iran*
E-mail: Mahdiehezouji@gmail.com

ARTICLE INFO

Keywords:
Tragopogon collinus
Silver Nanoparticles
Pharmaceutical applications
Antioxidant activity
Cytotoxic effect

ABSTRACT

Silver Nanoparticles (Ag-NPs) are widely used in medical and pharmaceutical applications due to their antimicrobial properties [1-2]. In this project, Ag-NPs were synthesized using *Tragopogon collinus* aqueous extract as a reducing and capping agent. The presence of synthesized Ag-NPs was first confirmed with UV-Visible, FE-SEM, TEM, XRD, and FT-IR analyses, and then their antibacterial characteristics were studied based on the (MIC) and (MBC). Findings from the FT-IR and UV-Vis spectra showed the successful formation of Ag-NPs because the functional groups involved in the synthesis process and adsorption peaks were well developed. Furthermore, the Ag-NPs had peak absorption at 430 nm in the spectrometry. The XRD peaks 38°, 44°, 64°, and 77° for leaves extract can be assigned the plane of silver crystals (111), (200), (220), and (311), respectively. The FE-SEM analysis showed that the synthesized Ag-NPs were spherical in shape. The particle size histogram revealed that the average particle size of the Ag-NPs was 50 nm. MIC and MBC results showed the strong antibacterial effects of the synthesized Ag-NPs. Nanoparticles could exert the inhibitory effect of $DPPH^0$ free radicals in a dose-dependent manner. MTT results showed that Ag-NPs had a dose-dependent cytotoxic effect and significantly reduced cell survival. This project showed a higher cytotoxic effect of the green synthesized nanoparticles on (AGS) gastric adenocarcinoma cell line than the extract. Consequently, the biosynthesis of Ag-NPs using aqueous extract of *Tragopogon collinus* has antibacterial, anticancer and antioxidant activities. Hence, it can be used as a drug candidate.

References

1. Vizitiu D.E, Sardarescu D.I, *et al*., Grapevine plants management using natural extracts and phytosynthesized silver nanoparticles. *Materials.* 2022; 15(22): 8188. doi: 10.3390/ma15228188.

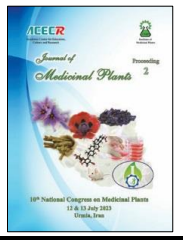
2. Montazeri N, Ojani S. Application of Catalysts in the Synthesis of Heterocyclic Compounds. Tonekabon Branch: Islamic Azad University. 2018.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 200

The effect of sodium chloride and sodium sulfate on the production of total flavonoids in the *in vitro* culture of *Nitraria schoberi*.

Mojtaba Askarizadeh[1], Hamideh Khalaj[2,*], Nasim Zarinpanjeh[3], Hadi Kalantari khalilabad[4]

[1] *Department of agriculture-biotechnology, Payame Noor Unvierstiy, Tehran, Iran.*
[2] *Department of agriculture, Payame Noor Unvierstiy, Tehran, Iran.*
[3] *Medicinal Plant Research Center, Institute of Medicinal Plants, ACECR, Karaj, Iran*
[4] *Medicinal Plant Research Center, Institute of Medicinal Plants, ACECR, Karaj, Iran*
E-mail: h.khalaj@pnu.ac.ir

ARTICLE INFO

Keywords:
In vitro culture
Qara-e- Dagh
Salt stress
Total Flavonoid

ABSTRACT

Nitraria schoberi is a drought resistant plant and has valuable medicinal properties such as antioxidant, antimicrobial, antifungal, anti-inflammatory and antiviral [1, 2]. In this research, the segments of the cotyledon leaves along with the hypocotyl of the *in vitro* germinated seeds were cultured as explants in MS medium with 2 mg/L of BAP and 0.5 mg/L of IBA and different concentrations of sodium chloride (0, 50 and 100 mM) and sodium sulfate (0, 10 and 20 mM). Experiments were conducted in the form of a factorial completely random design with 4 replications. The results of the analysis of variance showed that the effect of different levels of salts on the amount of total flavonoid is significant at the 99% probability level. The highest mean of total flavonoids in the leaf tissue of Qara-e-Dagh plant (24.6 mg/g) was related to the treatment of using 50 mM of sodium chloride along with 10 mM of sodium sulfate.Also, the lowest total flavonoid (8.17 mg/g) was related to the treatment of using 100 mM of sodium chloride along with 20 mM of sodium sulfate. It is concluded that the use of appropriate concentrations of sodium chloride and sodium sulfate in the *in vitro culture* of Qara-e- Dagh plant can be effective in increasing the production of secondary metabolites such as total flavonoid.

References

1. Zheleznichenko T, Banaev E, Asbaganov S, Voronkova M, Kukushkina T, Filippova E, Mazurkova N, Shishkina L, Novikova T. 2018. *Nitraria schoberi* L. hairy root culture as a source of compounds with antiviral activity against influenza virus subtypes A (H5N1) and A (H3N2). *3 Biotech*, 8:260. doi: 10.1007/s13205-018-1280-5.

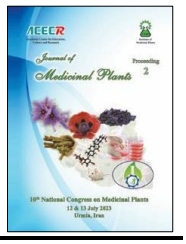
2. Sharifi-Rad J., Hoseini Al-Fatemi SM, Sharifi-Rad M, Teixeira da Silva JA. 2015. Antibacterial, antioxidant, antifungal and anti-inflammatory activities of crude extract from *Nitraria schoberi* fruits. *3 Biotech.* 5: 677-684. doi: 10.1007/s13205-014-0266-1.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 201

Investigating the Allelopathic Effect of Some Medicinal Plants on the Germination and Initial Growth of Garden Cress and Pigweed Weed

Hanieh Yazdi[1], Zahra Poursolimani[1, *], Mohammad Jamal Saharkhaiz[1]

[1]*Department of Horticulture, Shiraz Faculty of Agriculture, Shiraz University, Shiraz, Iran*
E-mail: hanieyazdi19@gmail.com

ARTICLE INFO

Keywords:
Allelopathic
Biological control
Germination
Medicinal plant

ABSTRACT

Environmental pollution and weed resistance to herbicides have led to the use of biological weed control methods such as natural herbicides [1]. In order to investigate the allelopathic effect of the medicinal plants of Montain savory and Mexican flower (*Agastache foeniculum*) on the germination and growth of the weeds of pigweed and garden cress, a factorial experiment in the form of a completely randomized design with concentrations of 0, 100, 200, 400, 600, 800, 1000 and 1200 Mµ/L of aqueous and alcoholic extracts of two medicinal plants were applied on the seeds of pigweed and garden cress weeds with three repetitions in the laboratory of medicinal plants of the Faculty of Agriculture of Shiraz University. The results showed that different concentrations of savory medicinal plants and Mexican flower decreased the germination percentage, germination speed, stem length, root length, fresh and dry weight of garden cress and pigweed weed. The allelopathic index was influenced by the type of medicinal plant, so that the allelopathic index of the savory medicinal plant was higher than the Mexican flower on the germination and other growth parameters of garden cress weed compared to pigweed weed. Therefore, high concentrations of the extract of savory had the greatest inhibitory effect on the growth of weeds, which seems to be possible to use the extract of this plant in the fight against weeds by observing the necessary precautions to make a natural herbicide.

References

1. Abd-ElGawad, A., El Gendy, A. E. N., El-Amier, Y., Gaara, A., Omer, E., Al-Rowaily, S., ... and A. Elshamy. *Saudi J. Biol. Sci*. **2020**. *27*(7), 1900-1906.

2. Azirak, S., and S. Karaman. *Acta Agric. Scand*. **2008,** *58*: 88-92.

3. Baleroni, C.R.S., M.L.L. Ferrarese, A.L.Braccini, C.A. Scapim and O. Ferrares- Filho. *Seed Sci. &Technol*. **2000**. *28*: 333-340.

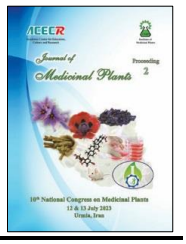
4. Chon, S.U., Jang, H.G., Kim, D.K., Kim, Y.M., Boo, H.O., and Y.J. Kim. *Sci. Hortic*. **2005**. *106* (3): 309-317.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 203

The effect of harvest time on essential oil content of *Ocimum kilimandscharicum*

Kosar Izadpanah[1], Mohammad Mahmoodi Sourestani[1,*], Hossein Motamedi[2]

[1]*Department of Horticulture, Agriculture Faculty. Shahid Chamran University of Ahvaz, Ahvaz, Iran*
[2]*Professor, Department of Biology, Science Faculty. Shahid Chamran University of Ahvaz, Ahvaz, Iran*
E-mail: m.mahmoodi@scu.ac.ir

ARTICLE INFO

Keywords:
Ocimum
Monthly changes
Essential oil

ABSTRACT

Ocimum is the sixth genus of the lamiaceae, which include valuable aromatic and medicinal plants distributed in tropical, subtropical and temperate regions of the world. (Rahul et al., 2020). *Ocimum kilimandscharicum* is one of the few perennial basil species that is an important source of essential oil and aromatic chemical compounds (Dhawan et al., 2015). This plant has been used to cure various diseases such as cold, cough, abdominal pain, measles and anti-ulcer. (Agrawal et al., 2017) The climatic conditions have a great impact on the growth and development of the plant as well as its active substances. Therefore, this experiment was conducted to study the monthly changes essential oil of fresh and dried camphor medicinal basil. Aerial parts of plant was harvested in the middle of each month and part of it was dried for extracting essential oil and another part was dried at laboratory temperature. Essential oil was extracted by distillation method with Clevenger for 3 hours from fresh and dry plants. The amount essential oil was 0.21% in early spring and April and had a relatively stable trend until July (0.2%) and increased in August (0.42%) and again declined in September (0.29%). Essential oil content reached to the highest value (0.59%) in October and then it had a decreasing trend, and after a slight increase in December (0.33%). The lowest amount of essential oil (0.10%) was recorded in January and February and increased again in March (0.34%). The trend of changes in the amount of dry plant essential oil was almost the same as that of fresh plant essential oil. Overall, the best harvest time seems to be October.

References

1. Agrawal, R. 2017. Traditional Uses and Pharmacological Action of *Ocimum kilimandscharicum* A Review. *Journal of Ultra Chemistry*, 13(6): 140-144.

2. Dhawan, S.S. Shukla, P., Gupta, P., and Lal, R.K. 2015. A cold-tolerant evergreen interspecific hybrid of *Ocimum kilimandscharicum* and *Ocimum basilicum*: analyzing trichomes and molecular variations. Original article, Published July 09, 2015, 1-10.

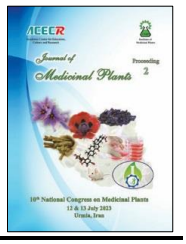
3. Rahul, V.P. Kapoor, B., Sarkar, S., and Jeet, S. 2020. Seasonal incidence of *Ocimum* tingid bug, *Cochlochila bullita* Stal (Heteroptera: Tingidae) on three different species of *Ocimum viz. Ocimum basilicum* L., *Ocimum sanctum* L. and *Ocimum kilimandscharicum Guerke*. *Journal of Pharmacognosy and Phytochemistry*, 9(4): 3138-3144.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 204

Protective effect of *Ferulago angulata* aerial part and root extracts against scopolamine-induced memory deficit

Nafise sepahdoost[1], Maliheh Soodi[2 *], Homa Haji mehdipoor[3]

[1] *Department of Nanobiotechnology, Faculty of Biological Sciences, Tarbiat Modares University, Tehran, Iran*
[2]*Institute for Natural Products and Medicinal Plants, Tarbiat Modares University, Tehran, Iran*
[3]*Traditional Medicine and Materia Medica Research Center and Department of Traditional Pharmacy, School of Traditional Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran*
E-mail: soodi@modares.ac.ir

ARTICLE INFO

Keywords:
Ferulago angulata
Alzheimer's Disease
Dementia
Memory

ABSTRACT

Alzheimer's disease (AD) is a progressive neurodegenerative disorder characterized by memory deficits and is the leading cause of dementia [1]. *Ferulago angulata*, a medicinal herb belonging to the Apiaceae family, possesses various beneficial properties, including antioxidant, anti-apoptotic, neuroprotective, and cholinesterase inhibitory effects [2]. The objective of this study is to assess the potential memory-enhancing effects of F. angulata in an animal model of dementia.The aerial parts and roots of F. angulata were collected, dried, and subjected to methanol extraction using the maceration method. A total of 48 Wistar rats were divided into six groups, including a control group, a scopolamine group (1.5 mg/kg), groups receiving scopolamine in combination with the aerial part extract (400 mg/kg), the root extract (400 mg/kg), and Rivastigmine (2.5 mg/kg). The extracts were administered orally for ten consecutive days, and spatial memory was evaluated using the Morris water maze test, which commenced on the seventh day of treatment. During the training period, scopolamine was injected intraperitoneally one hour after the administration of the extracts, and the behavioral test was conducted 30 minutes after scopolamine injection.The results demonstrated that both the aerial part and root extracts of *F. angulata* extracts exhibited positive effects in improving spatial memory in the animal model of dementia. Moreover, these effects were comparable to those observed in the group receiving Rivastigmine. Hence, *F. angulata* shows promise as a potential candidate for further investigation in the treatment of AD

References

1. Garre-Olmo JJRdn. Epidemiology of Alzheimer's disease and other dementias. 2018; 66(11):377-86.

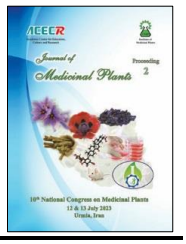
2. Lorigooini Z, Koravand M, Haddadi H, Rafieian-Kopaei M, Shirmardi HA, Hosseini Z. A review of botany, phytochemical and pharmacological properties of Ferulago angulata. *Toxin Reviews*. 2019; 38(1):13-20.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 206

Antioxidant activities and chemical variability in volatile composition among four *Dracocephalum* species

Seyedali Hashemi[1], Marjan Talebi[2], Seyed Abdulmajid Ayatollahi[2,3], Mona Khoramjouy[3], Mehrdad Faizi[4,*]

[1]*School of Pharmacy, Shahid Beheshti University of Medical Sciences, Tehran, Iran*
[2]*Department of Pharmacognosy, School of Pharmacy, Shahid Beheshti University of Medical Sciences, Tehran, Iran*
[3]*Phytochemistry Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran*
[4]*Department of Toxicology and Pharmacology, School of Pharmacy, Shahid Beheshti University of Medical Sciences, Tehran, Iran*
E-mail: m.faizi@sbmu.ac.ir

ARTICLE INFO

Keywords:
Dracocephalum
Antioxidant activity
DPPH
Nitric oxide scavenging
CAA

ABSTRACT

Dracocephalum species (Lamiaceae) are used for versatile pharmacological effects (1). Essential oils (EOs) and their individual volatile organic constituents are widely used as fragrances in perfumes and cosmetics, additives and active ingredients in nutraceuticals and pharmaceutical products (2). In the present study the essential oils of *Dracocephalum moldavica* (seeds and aerial parts), *D. polychaetum* (aerial parts), *D. multicaule* (aerial parts), *and D. thymifloroum* (aerial parts) were extracted by hydrodistillation method. The EOs were analyzed by gas chromatography–mass spectrometry. Antioxidant activities of EOs of *Dracocephalum* spp. aerial parts were measured using five different methods: 2,2-diphenyl-1-picrylhydrazyl (DPPH), nitric oxide free radical scavenging, ferric reducing antioxidant power (FRAP), oxygen radical absorbance capacity (ORAC) and cellular antioxidant activity (CAA) methods. The volatile components were characterized in the EOs. Alpha-pinene, limonene, beta-thujene, and caryophyllene oxide were the most important metabolites obtained from the plants. In terms of antioxidant activities, the IC_{50} of EOs in *D. moldavica* was 104.35 ± 1.37 mg/l (FRAP), *D. polychaetum* 0.176 ± 0.0078 mg/l (ORAC) and *D. thymifloroum* 0.33 ± 0.33 mg/l (CAA). While EO of *D. moldavica* with IC_{50} of 62.8 ± 2.96 mg/l (DPPH) and free radical nitric oxide scavenging of 61.83% show more antioxidant activity compared to the others in these two tests. According to the findings of this study, the EOs of the aforementioned selected *Dracocephalum* species can be used as putative protective agents against oxidative stress due to their volatile compounds.

References

1. Moghaddam HH, Emadi F, Esmaeil-jamaat E, Kamalinejad M, Alijaniha F. Plants from Genus Dracocephalum in Iran: Pharmacology and Phytochemistry Overview. *Curr. Drug Discov. Technol.* [Internet]. 2022 Apr 30 [cited 2023 May 15]; 19(5).

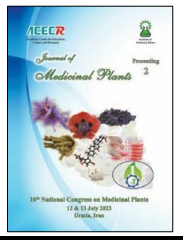
2. Golkar P, Moattar F. Essential Oil Composition, Bioactive Compounds, and Antioxidant Activities in *Iberis amara* L. *Nat. Prod. Commun.* [Internet]. 2019 May 1 [cited 2023 May 15]; 14(5).

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 207

Investigation of chemical characterizations and anticonvulsant effects of *Haplophyllum acutofolium* aqueous extract

Seyedali Hashemi[1], Mona Khoramjouy[2], Marjan Talebi[3], Mehrdad Faizi[4,*]

[1]*School of Pharmacy, Shahid Beheshti University of Medical Sciences, Tehran, Iran.*
[2]*Phytochemistry Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran*
[3]*Department of Pharmacognosy, School of Pharmacy, Shahid Beheshti University of Medical Sciences, Tehran, Iran*
[4]*Department of Toxicology and Pharmacology, School of Pharmacy, Shahid Beheshti University of Medical Sciences, Tehran, Iran*
E-mail: m.faizi@sbmu.ac.ir

ARTICLE INFO

Keywords:
Flavonoid
Quercetin
Haplophyllum acutofolium
RP-HPLC-PDA
Anticonvulsant

ABSTRACT

Epilepsy affects many people globally, with treatment-resistant seizures in one-third of patients. Adverse effects of antiepileptic drugs drive the need to explore natural products for discovering therapeutic agents with fewer unwanted effects (1). The *Haplophyllum* genus (Rutaceae) and its metabolites including alkaloids, coumarins, flavonoids, and lignans have been used for managing central nervous system (CNS) disorders (2). The CNS effects might be attributed to quercetin, a flavanol isolated from some species of the genus. This study aimed to quantify the quercetin content in aqueous extract of *H. acutofolium* using RP-HPLC-PDA. Additionally, total phenolic (TPC) and flavonoid contents (TFC) were measured using Folin-Ciocalteu and Aluminum chloride colorimetric methods, respectively. The anticonvulsant effects of the extract were also assessed using pentylentetrazole (PTZ) and maximal electroshock (MES) models at different doses. TPC and TFC of *H. acutofolium* aqueous extract were calculated as 61.48 ± 2.34 mg gallic acid E/g and 21.13 ± 3.15 rutin E/g. The average quercetin content was calculated as 49.87 ± 0.24 mg/g in the *H. acutofolium* aqueous extract. The survival rate of mice from convulsion following PTZ injection (100 mg/kg), and the potential of the extract to protect animals from hind limb tonic extension (HLTE) in the MES test were considered as indicators of anticonvulsant activity. Notably, the extract exhibited significant anticonvulsant effects at a dose of 400mg/kg in the MES and PTZ tests. The results of this study suggest that *H. acutofolium* can be considered as a potential anticonvulsant agent due to the presence of flavonoids, particularly quercetin.

References

1. Ekbatan MR, Khoramjouy M, Gholamine B, Faizi M, Sahranavard S. Evaluation of Anticonvulsant Effect of Aqueous and Methanolic Extracts of Seven Inula Species. *Iran. J. Pharm. Res.* [Internet]. 2019 Sep 1 [cited 2023 May 15]; 18(Suppl1):208.

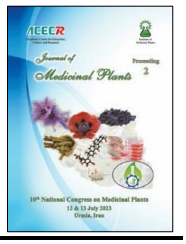
2. Mamadalieva NZ, Siddikov DR, Sagdullaev SS. Medicinal Plants of the Apiaceae and Rutaceae Families from the Chimgan Mountains (Uzbekistan): Ethnopharmacology, Chemical Composition and Biological Activities. *Current. Traditional Medicine* [Internet]. 2018 Apr 16 [cited 2023 May 15];4(3): 166-83.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 208

Investigation of the properties of *Rucus hyrcanus* in Vajargah (Guilan Province)

Sara Khoshdel Vajary[1,*], Elham Kiani[2] , Hamidreza Naseri[3], Pouyan Dehghan Rahimabadi[4]

[1]*M.Sc. Student, Medicinal and Industrial Plants, University of Tehran, Iran*
[2]*M.Sc. International Desert Research Center, University of Tehran, Iran*
[3]*Assistant Professor, International Desert Research Center, University of Tehran, Iran*
[4]*Ph.D. Combat desertification, Department of Arid and Mountainous Areas Restoration, University of Tehran, Iran*
E-mail: sara.khoshdel.va@ut.ac.ir

ARTICLE INFO

Keywords:
Ruscus hyrcanus
Medicine
Vajargah
Soil

ABSTRACT

Ruscus hyrcanus, referred to as “Kooleh Khas” in Persian language, is spread across the Hyrcanian ecoregion, including the wet valleys and forests near the Caspian sea. This species is an evergreen shrub with thick roots and stems which can reach up to 1 meter high. Iran’s traditional medicine mentions a variety of uses for the plant, like as a vasoconstrictor and anti-nephritis. According to local and unofficial reports, a massive volume of the plant rhizomes is collected annually from the forests in north of Iran and exported to other countries, especially Turkey. Therefore, its exploitation must be principled. This study focused on ecological and geographical of *Rucus hyrcanus* in “Vajargah” in Guilan Province. For this purpose, soil sampling and identifying the associated species were done. The results showed that the parameters of lime and phosphorus have no significant relationship among soil samples from different sampling sites. Conversely, the amount of absorbable potassium in the soil samples had a significant relationship at the level of 1% with the soil of the sampled areas among soil samples from different sampling sites. Moreover, *Fagus orientalis*, *Quercus castaneifolia*, and *Polypodium vulgare* were seen in association with *Ruscus hyrcanus*.

References

1. Ahmadi, H., Rahimmalek, M., Zeinali, H., 2014. Assessment of the genetic variation of chamomile (*Matricaria chamomilla* L.) populations using phytochemical, morphological and ISSR markers. *Biochem. Syst. Ecol*. 54, 190–197. Balica, G., Vlase, L., Deliu, C., Tămaş, M.

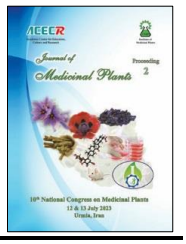
2. Crişan, G., 2007. Comparative phytochemical study on rhizome and tissue culture of *Ruscus aculeatus* L. *Planta Med*. 73, 226.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 210

The effects of different nutrients on growth and active substances of Thyme (*Thymus vulgaris* L.)

Saeide Hosseini[1]

[1]*Department of Horticulture, Faculty of Agricultural Engineering, University of Isfahan, Iran*
E-mail: saeide6939@gmail.com

ARTICLE INFO

Keywords:
Agrihansa
Thyme
Essential oil
Thymol
Carvacrol

ABSTRACT

In order to investigate the effect of nitrogen, phosphorus, potassium and Agrihanza complete fertilizer on the growth and effective substances of thyme, a greenhouse experiment was conducted on the seedlings of this plant. The plants in the stage of 4 to 6 leaves were transferred to pots containing soil, sand and peat in equal proportions and kept in the greenhouse at an average temperature of 26 to 31 degrees Celsius during the day and 16 to 20 degrees Celsius at night. . The treatments included NK, NP, K, P, N, NPK, PK and complete Agrihansa fertilizer, which were compared with the control (without fertilizer). . The amounts of these elements used included 55 mg of K2O and P2O5, N per kilogram of potting soil. The results of this research showed that the highest shoot fresh weight and shoot dry weight were obtained in NPK treatment. The weight of green shoots, green shoots, and leaves of the plant was the highest in NPK treatment. The highest amount of essential oil was observed in Agrihansa treatment. The highest percentage of essential oil obtained from thyme medicinal leaves was observed in Agrihansa treatment (1.76%) and the lowest percentage of essential oil was observed in NPK treatment (0.93%). The highest percentage of thymol (67.98%) was seen in Agrihansa treatment, and the percentage of carvacrol in NP treatment was more than other treatments.

References

1. Ozcan, M. and J.C. Chalchat. 2004. Aroma profile of *Thymus vulgaris* L. growing wild in Turkey. *Bulg. J. Plant Physiol*. 30:68-73.

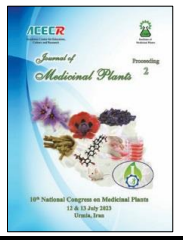
2. Hudaib, M., E. Speroni, A.M. Dipietar and V. Cavrini. 2002. GC/MS evaluation of thyme (*Thymus vulgaris* L.) oil composition and variations during the vegetative cycle. *J. Pharm. Biomed. Annal*. 29:691-700.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 211

Estimation of cardinal temperatures of Lallemantia (*Lallemantia iberica*) seeds germination using non-linear regression models

Ramin Piri[1,*], Razieh Karami[1], Roya Siahkamari[1], Abdolhosein Rezaei[2]

[1]*Department of Agronomy and Plant Breeding, Tehran University, Tehran, Iran*
[2]*Department of Agricultural Sciences and Natural Resources, Gorgan University, Gorgan, Iran*
E-mail: Raminpiri88@yahoo.com

ARTICLE INFO

Keywords:
Cardinal temperatures
Lallemantia
Medicinal plants
Seed germination

ABSTRACT

Lallemantia is one of the valuable plants of the Lamiaceae family and is successfully cultivated in areas where water resources are limited [1]. The temperature range for germination is determined by the base, optimal, and ceiling temperatures, which can create some environmental restrictions for the geographical distribution of medicinal plants [2]. In order to estimate the cardinal temperatures of Lallemantia seeds, an experiment was conducted based on randomized completely design with three replications and 8 temperature levels (5, 10, 15, 20, 25, 30, 35 and 40 °C) in the seed laboratory of Tehran University. The germinated seeds were counted every day and then the rate and percentage of germination were calculated and to check and predict the cardinal temperatures of Lallemantia seed germination, three models (segmented, dent-like and modified beta) were used. By evaluating three relevant non-linear regression models and based on the coefficient of determination (R2), Root Mean Square Error (RMSE) and correlation coefficient (R), the best model was selected. Based on the segmented model of the cardinal temperatures of Lallemantia seeds, respectively, for the speed and percentage of germination, including the base temperature (6.44 °C, 6.63 °C), optimal temperature (24.19 °C, 23.65 °C) and the maximum (39.63 °C, 40.34 °C) was determined. Determining these ecological parameters can be useful for quantifying the characteristics of Lallemantia seeds to different climatic variables, especially temperature.

References

1. Nori Shargh D, Kiaei SM, Deyhimi F, Mozaffarian V, Yahyaei H. The volatile constituent's analysis of *Lallemantia iberica* (M.B.) Fischer & Meyer from Iran. *Natural Product Research: Formerly Natural Product Research*, 2009; 23(6): 546-54.

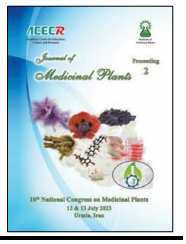
2. Hakansson I, Myrbeck A, Ararso E. A review of research on seedbed preparation for small grains in Sweden. *Soil. Tillage. Res.* 2002; 64: 23-40.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 212

The effect of foliar application of hydrogen sulfide on changes in absorption of elements under salinity stress in (*Lavandula angustifolia*)

Elhameh Danshvand[1], Fatemeh Rahmani[1,*], Nasser Abbaspour[1], Amir Rahimi[2]

[1]*Department of Biology, Faculty of Science, Urmia University, Urmia, Iran*
[2]*Department of Plant Production and Genetics, Faculty of Agriculture, Urmia University, Urmia, Iran*
E-mail: f.rahmani@urmia.ac.ir

ARTICLE INFO

Keywords:
Abiotic stress
Lavandula
Sodium hydrosulfide
Nitrate

ABSTRACT

Lavender (*Lavandula angustifolia*) is a perennial and evergreen plant from the mint family (Lamiaceae) [1]. In most saline soils, the main cause of salinity is the high amount of sodium chloride which causes ionic and osmotic stresses in plants as a result of the accumulation of sodium and chlorine ions. High amounts of sodium reduce the absorption of essential elements needed by the plant, such as: potassium and nitrate. The adverse effects of salinity on nitrogen uptake and assimilation is one of the limiting factors for plant growth under salinity stress conditions [2]. The competition for the absorption of chlorine and nitrate on the surface of the root cell membrane and as a result, the reduction of nitrate intake is one of the reasons for the adverse effect of salinity on nitrogen in plants [3]. In this research, lavender plant seeds were planted in pots containing perlite and watered every other day for four months by half strength Hoagland's solution. Salinity stress was applied in three different concentrations including 0, 150 and 300 mM and the plants were exposed to NaCl for 7 and 14 days. Hydrogen sulfide was sprayed in two different concentrations including 100 and 200 µM for 72 hours with 24 hour intervals. Then, the plants were sprayed once a week until the end of the experiment period. Changes in the content of (Na^+, K^+, $NO3^-$, Cl^-) ions were measured. Data analysis was done using SPSS computer software and the averages were compared with Duncan's multi-range test. The results showed that hydrogen sulfide caused a significant decrease in the amount of sodium, chlorine and nitrate ions in the leaves and roots and an increase in the absorption of potassium and nitrate ions in the leaves and roots, and the greatest improvement effect was related to the concentration of 200 micromolar hydrogen sulfide. From the above results, it was concluded that sulfide Hydrogen effectively reduces salinity stress in lavender plants.

References

1. Paul JP, Brophy JJ, Goldsack RJ, Fontaniella B. Analysis of volatile components of *Lavandula canariensis* (L.) Mill. a Canary Islands endemic species, growing in Australia. *Biochem. Syst. Ecol*. 2004; 32: 55-62.

2. Munns, R., and Tester, M. 2008. Mechanisms of salinity tolerance. *Annu. Rev. Plant Biol*. 59, 651–681. doi: 10.1146/annurev.arplant.59.032607.092911

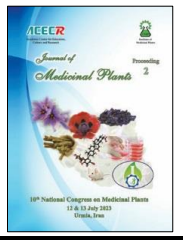
3. Naseri, S., Heidari, M., Jafari, S. and Daneshvar, M. H. (2019) Effect of potassium nitrate on the activity of nitrate reductase enzymum, amino acid, nitrate and ion accumulation in Pistachio Seedlings under NaCl Stress Conditions. *Journal of Process and Plant Function* 7(27): 253-268.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 213

Evaluation of basil (*Ocimum basilicum* L.) seed germination response to cardinal temperatures

Razieh Karami[1], Ramin Piri[1,*], Abdolhosein Rezaei[2]

[1]*Department of Agronomy and Plant Breeding, Tehran University, Tehran, Iran*
[2]*Department of Agricultural Sciences and Natural Resources, Gorgan University, Gorgan, Iran*
E-mail: Raminpiri88@yahoo.com

ARTICLE INFO

Keywords:
Basil
Cardinal temperatures
Seed germination

ABSTRACT

Basil is an annual plant belonging to the mint family that its essential oil is used in various pharmaceutical, cosmetic and health industries [1]. Seed germination is one of the critical and important steps in the life cycle of a plant and the key process in seedling emergence [2]. In order to estimate the cardinal temperatures of Basil seeds, an experiment was conducted based on randomized completely design with three replications and 8 temperature levels (5, 10, 15, 20, 25, 30, 35 and 40 °C) in the seed laboratory of Tehran University. The germinated seeds were counted every day and then the rate and percentage of germination were calculated and to check and predict the cardinal temperatures of Basil seed germination, three models (segmented, dent-like and modified beta) were used. By evaluating three relevant non-linear regression models and based on the coefficient of determination (R2), Root Mean Square Error (RMSE) and correlation coefficient (R) for the germination rate and germination percentage, segmented model and modified beta model were selected as the best models, respectively. Based on the segmented model, the cardinal temperatures of basil seeds for the germination rate including the base temperature (6.64 °C), optimum (15 °C) and maximum temperature (42.60 °C) were determined. Also, based on the modified beta model, cardinal temperatures of basil seeds were determined for germination percentage, including base (6.26 °C), optimum (23.16 °C) and maximum (42.03 °C) temperatures.

References

1. Phanahinia M, Sanikhani M, Kheiri, A. Morphological Characteristics and essential oil production of sweet basil (*Ocimum basilicum* L.) under application of nitrogen and iron. *Journal of Agricultural Science and Sustainable Production*, 2017; 26(4): 157-166.

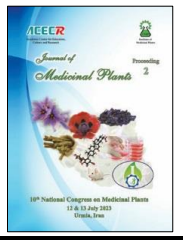
2. Forcella F, Benech Arnold RL, Sanchez R, Ghersa CM. Modeling seedling emergence. *Field Crops Research*, 2000; 67: 123-139.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 214

Study on phytochemical characteristics of sesame seeds and sesame cake

Najme Bahrami[1], Maryam Kolahi[2], Mohammad Javaherian[1]

[1]*Department of Chemistry, Faculty of Science, Shahid Chamran University of Ahvaz, Ahvaz, Iran*
[2]*Department of Biology, Faculty of Science, Shahid Chamran University of Ahvaz, Ahvaz, Iran*
E-mail: Najmebahrami1375bah@gmail.com

ARTICLE INFO

Keywords:
Antioxidant
Sesame Cake
Sesame Seed

ABSTRACT

Sesame plant with the scientific name *Sesamum indicum* belongs to the genus Sesamum and the Pedaliaceae family [1]. The obtained by-product of sesame seed oil extraction is called sesame cake. Sesame is used in various aspects of daily life such as food, feed, and cosmetics. The health food applications of sesame are increasing [2]. This study aimed to evaluate the antioxidant activity of sesame seeds and sesame cake. In this research, the folin Ciocalteu method was used to measure the total phenolic content, the flavonoid content was measured using the quercetin standard curve, and the antioxidant capacity was measured using the ABTS method. The results of this study showed that the phenolic and flavonoid content in the cake was significantly higher than sesame seeds, also the cake showed a higher antioxidant capacity than sesame seeds. Due to its high antioxidant properties, the use of sesame cake is recommended in livestock and poultry food industries and cosmetic-hygienic products [3].

References

1. Boru. M. Sesame (Sesamum indicum L.) Research and Production Status in Ethiopia: A Comprehensive Review. *Ecol. Evol*. **2021**, 6(2), 38-41.

2. Wei. P.; Zhao. F.; Wang. Z.; Wang. Q.; Chai. X.; Hou. G.; Meng. Q. Sesame (Sesamum indicum L.): A Comprehensive Review of Nutritional Value, Phytochemical Composition, Health Benefits, Development of Food, and Industrial Applications. *Nutrients*. **2022**,14(19), 4079.

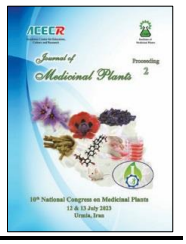
3. Şahin. S.; Elhussein. E. A. A. Assessment of sesame (*Sesamum indicum* L.) cake as a source of high-added value substances: from waste to health. *Phytochemistry Reviews* ,**2018**, 17, 691-700.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 217

Investigating some characteristics of soil and habitat of *Achillea eriophora* DC. In the Golgohar region of Sirjan

Hamid Reza Naseri[1,*], Mohammad Reza Ahmadi Kouhbanani,[2] Rahim Sotoudeh Bahreini[2], Javad Pourrezaei[3]

[1]*International Desert Research Center, University of Tehran, Tehran, Iran*
[2]*Golgohar Research and Technology Management, Sirjan, Iran*
[3]*Department of Rangelands and Watershed Management, Behbahan Khatam Alanbia University of Technology, Behbahan, Iran*
E-mail: hrnasseri@ut.ac.ir

ARTICLE INFO

Keywords:
Soil properties
Plant density
Rainfall
Ecotone

ABSTRACT

Achillea eriophora DC. is a perennial medicinal plant belonging to the Asteraceae family. There are more than 130 species of this genus and 19 of which are growing wild in Iran [1]. In order to investigate some environmental parameters of this plant A study area with an area of 4560 ha was selected in the Golgohar region of Sirjan (Kerman Province). Soil sampling to 90 cm depth was carried out by digging profiles. The results show that *A. epiphora* grows in lands with a low slope and good drainage, the salinity in the soil profile varies between 1.3 and 0.5 dS/m from the surface to the depth. The habitat soil of this plant is not rich in phosphorus and nitrogen and is somewhat calcareous (11.3 %) and the soil texture around the plant root systems is light loam to sandy loam. According to meteorological statistics, the habitat of *A. eriophora* in the Golgohar region has a dry climate with an average rainfall of 124 mm meanwhile elevation varies from 1730 to 1995 m which confirms the results of Huber-Morath [2]. The density of this species is equivalent to 435.5 to 621.3 bases per hectare depending on distribution. Dominant species associated with this plant are Artemisai sieberi and Zygophyllum eurypterum. Based on the results and geographical location, A. eriophora species is spread in the ecotone range of the Iran-Turani vegetation zone to Saharo-Sindian so It is recommended to plant and develop this type of plant in the western and southern part of Kerman province.

References

1. Mozaffarian V A dictionary of Iranian Plant Names. Tehran: Farhang Moaser Publication. 2009.

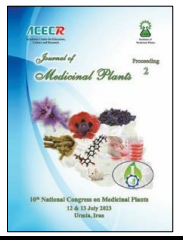
2. Huber-Morath A. *Achillea*. In: Rechinger KH. fil (ed.) Flora Iranica, Graz: Akademische Druck- und Verlagsanstalt.1986 (158) 49-71.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 219

Green synthesis and antibacterial effect of silver nanoparticles by using the extract of leaves of *Berberis integerrima* from Taleqan - Iran

Sina Hasanzade[1,*], Shahab Ojani[2]

[1]*Department of Biology, Tehran Medical Sciences Branch, Islamic Azad University, Tehran, Iran*
[2]*Young Researchers and Elite Club, Tonekabon Branch, Islamic Azad University, Tonekabon, Iran*
E-mail: Sinahasanzade96@gmail.com

ARTICLE INFO

Keywords:
Berberis integerrima
Antibacterial activity
X-ray Diffraction
Staphylococcus aureus
Escherichia coli

ABSTRACT

As nanoparticles have multiple applications, there are many different methods for the production of silver nanoparticles (Ag-NPs). Recently, plants are being used in the synthesis of nanoparticles, due to their cost - effectiveness and eco-friendliness approach [1-2]. In this project, the green synthesis and antibacterial effect of silver nanoparticles by using the extract of leaves of *Berberis integerrima* from Taleqan - Iran. The extract of *Berberis integerrima* as the reducing agent was used for the biosynthesis of Ag-NPs. Reduction of Ag^+ ion was obtained after 24 h using *Berberis integerrima* extract in the presence of 1 mM silver nitrate ($AgNO_3$) solution. The sizes, structural, optical and morphological properties of nanoparticles were analyzed by facility of X-ray Diffraction and Field Emission Scanning Transmission Electron Microscope. UV-Vis spectrum exhibit an absorption band at around 420-450 nm suggesting the formation of biological Ag-NPs. The size and morphological properties of nanoparticles were assessed by TEM which showed that particles have spherical shape with diameter of about 10-50 nm. Ag-NPs presented the antibacterial activity against Gram positive (*Staphylococcus aureus*) and Gram negative (*Escherichia coli*) bacteria. The extract of *Berberis integerrima* has the ability of reducing Ag^+ ion to Ag-NPs. Also, Ag-NPs produced by green synthesis have good antibacterial activity.

References

1. Salayová A, Bedloviˇcová, *et al*., Green synthesis of silver nanoparticles with antibacterial activity using various medicinal plant extracts: morphology and antibacterial Efficacy. *Nanomaterials.* 2021; 11: 1005. doi: 10.3390/nano11041005.

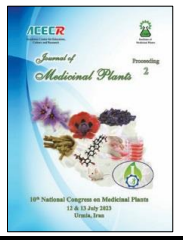
2. Rajeshkumar S, Bharath L. Mechanism of plant-mediated synthesis of silver nanoparticles—A review on biomolecules involved, characterisation and antibacterial activity. *Chem. Biol. Interact*. 2017; 273: 219-227. doi: 10.1016/j.cbi.2017.06.019.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 220

Evaluation of antioxidant and antibacterial activity of floweres of *Capsella bursa-pastoris* (L.) Medicus from Gorgan - Iran

Sina Hasanzade[1,*], Shahab Ojani[2]

[1]*Department of Biology, Tehran Medical Sciences Branch, Islamic Azad University, Tehran, Iran*
[2]*Young Researchers and Elite Club, Tonekabon Branch, Islamic Azad University, Tonekabon, Iran*
E-mail: Sinahasanzade96@gmail.com

ARTICLE INFO

Keywords:
Capsella bursa-pastoris (L.) Medicus
Free radical scavenging
Folin Ciocalteu (FC)
Bacillus anthracis
Salmonella typhi

ABSTRACT

Extreme production of free radicals in the human body causes direct damage to biological molecules that leads to the different types of diseases. The natural or synthetic antioxidants inhibit directly the production or restrict propagation or nullify the free radicals produced in the human body to protect the immune system [1-2]. *Capsella bursa-pastoris* (L.) Medicus is one of the most valuable medicinal species of the Brassicaceae family. The present project aimed to evaluation of antioxidant and antibacterial activity of floweres of *Capsella bursa-pastoris* (L.) Medicus from Gorgan - Iran. In this project, after extracting the aqueous and ethanol extracts, the antioxidant potential was evaluated by 2, 2-diphenyl-1-picrylhydrazyl ($DPPH^0$) free radical scavenging and FRAP assay. Then, Folin Ciocalteu (FC) reagent and aluminum complex ($AlCl_3$) were used to assess total phenolic content (TPC) and total flavonoid content (TFC), respectively. Later, antibacterial activity was evaluated by disk diffusion method. The results showed that the highest amount of phenol and flavonoid were obtained by ethanol extract and shaker extraction method. The highest amount of free radical scavenging $DPPH^0$ and FRAP were related to aqueous extract and shaker extraction method. The highest inhibition zone diameters for *Bacillus anthracis* and *Salmonella typhi* in the concentration of 400 mg/ml were 16.86±0.35, and 23.45±2.06 respectively. The results showed that the solvent type and extraction method had a great impact on the amount of antioxidant compounds and antibacterial effects. Considering the few studies performed about this plant, the results of this study can be a good report for further research.

References

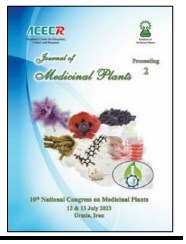
1. Lebanov L, Chung Lam S. *et al*., Radical scavenging activity and metabolomics profiling study of *ylang- ylang* essential oils based on high-performance thin-layer chromatography and multivariate statistical analysis. *Journal of Chromatography B.* 2021; 1179. doi: 10.1016/j.jchromb.2021.122861.
2. Pourshamsian K, Ojani S. Phytochemical screening of the aqueous extract of seeds of *Polylophium involucratum* (Pall.) Boiss. From RAMSAR-IRAN. *Planta Medica*. 2016; 82 (05): PC62. doi:10.1055/s-0036-1578764.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 221

Reaction of lemon grass (*Cymbopogon citratus* (DC.) Stapf) medicinal plant to silicon nanoparticles application

Afsaneh Vafaeian[1], Sahnaz Fathi[1,*], Hamideh Jaberian[1], Mohammad javad Nazari deljou[2]

[1]*Department of Medicinal Plants, Shahid Bakeri Higher Education Center of Miandoab, Urmia University, Urmia, Iran*
[2]*Department of Horticultural Science, Faculty of Agriculture, Mahabad Branch, Islamic Azad University, Mahabad, Iran*
E-mail: sh.fathi@urmia.ac.ir

ARTICLE INFO

Keywords:
Electrolyte leakage
Relative Water Content
Chlorophyll

ABSTRACT

The lemon grass plant *Cymbopogon citratus* (DC.) Stapf belongs to the Poaceae family, which is widely distributed in the tropical and subtropical regions of the world (Mukarram et al., 2021a, b). It has a high amount of citral (70-80%) in its essential oil. Citral is responsible for creating a lemon-like smell in this plant. Various pharmacological effects including anti-inflammatory, antioxidant, anti-cancer, anti-mutation and antimicrobial effects have been reported from this plant (Kiani, 2022). In terms of citral, the essential oil of this plant is very similar to lemon balm essential oil, and the amount of volatile oil in lemon balm is very low (0.1 to 0.2 percent), so its production is very expensive. This experiment was conducted in the greenhouse of Shahid Bakri Higher Education Center in a factorial manner based on a randomized complete block design in three replications. Silica treatment was done as foliar spraying at three levels of zero, 150 and 300 nm. The results of the analysis of variance showed that there was a significant difference between the treatments in terms of beta-carotene, chlorophyll a, total chlorophyll, percentage of relative humidity and ion leakage at the level of 1% and in terms of chlorophyll b at the level of 5%, and the mean comparisons showed that all the traits Apart from ion leakage, the highest amount was related to the treatment of 150 mg/liter of silica. In terms of ion leakage, the highest value was related to the concentration of 300 mM

References

1. Mukarram M, Khan MMA, Uddin M, Corpas FJ., An alternative tool to increase essential oil content in lemongrass (*Cymbopogon flexuosus*) 2021a; Irradiated chitosan (ICH): *Acta Physiologiae Plantarum*. In press.

2. Mukarram M, Khan MMA, Zehra A, Choudhary S, Aftab T, Naeem M, Biosynthesis of lemongrass essential oil and the underlying mechanism for its insecticidal activity. 2021b; In: Aftab, Tariq, Hakeem, Khalid R. (Eds.), Medicinal and Aromatic Plants Healthcare and Industrial Applications. Springer Nature,

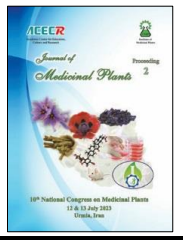
3. Kiani HS, Ali A, Zahra S, Hassan ZU, Kubra KT, Azam M, Zahid HF, Phytochemical Composition and Pharmacological Potential of Lemongrass (Cymbopogon) and Impact on Gut Microbiota. *Applied. Chem*. 2022, 2, 229–246.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 222

Allelopathic effect of *Eucalyptus camaldolensis* on the morphological parameters of *Secale montanum*

Banafsheh Heidari Koholi[1,*], Mohammad Hassan Assareh[2], Shoukufeh Enteshari[3], Anahita Shariat[4]

[1] *Department of Basic Science, Payame Noor University, Najafabad, Iran*
[2] *Managing Board, Seed and Plant Certification and Registration Institute, Karaj, Iran*
[3] *Department of Basic Science, Payame Noor University, Najafabad, Iran*
[4] *Biotechnology Research Department, Research Institute of Forests and Rangelands, Tehran, Iran*
E-mail: banafshehhk@gmail.com

ARTICLE INFO

Keywords:
Allelopathy
Eucalyptus camaldolensis
Secale montanum
Morphological parameters

ABSTRACT

The use of allelochemicals as natural herbicides is a new approach to reduce the adverse effects of chemical herbicides on the environment and prevent weed resistance to herbicides [1]. In this study, the allelopathic effect of leaves and roots of *Eucalyptus camaldolensis* on *Secale montanum* was tested in greenhouse conditions in 2018 at the Research Institute of Forests and Rangelands. The purpose of this experiment is to use biological tools as a suitable alternative in growing plants, to reduce the consumption of toxins and environmental pollutants, and to provide an organic cultivation method for the improvement and health of society, and to determine effective substances on the growth of weeds, and to use it as a natural herbicide and reducing the amount of competition between weeds and crops in cultivated lands [2]. The used treatments were: control, dry and wet leaf powder, ethanolic leaf extract, dry and wet leaf aqueous extract and root secretions. The parameters measured in this study included morphological parameters. The results obtained from the greenhouse phase showed that in all the parameters measured, the inhibitoriest effect was related to the ethanolic extract. Aqueous extracts of fresh leaves and dry leaves also had an inhibitory effect and the measured parameters also showed a decrease. The fresh and dry leaf powders used acted as a covering layer and prevented moisture from escaping. The effect of root secretions was also investigated in pots containing one-year-old eucalyptus seedlings, which in this case completely prevented the seeds from germinating.

References

1. Khalaj, H. Investigating the power of allelopathy in controlling weeds. Ph.D. thesis in the field of crop ecology. Aburihan Campus, University of Tehran, 2018.

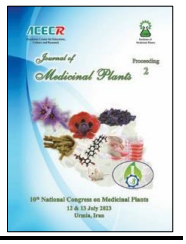
2. Rice, E.L. Allelopathy, 2nd edition., Academic Press, Orlando, Fl. 1984.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 223

Study about effect of plant density on chicon yield in witloof's chicory

Jaber Panahandeh[1], Ali Ahangaran[2,*], Mohammadreza Darparesh[3], Alireza Gholamshahi[4], Shahla Abdollahi[5]

[1]Department of Horticultural Engineering, Faculty of Agriculture, University of Tabriz, Tabriz, Iran
[2]Department of Horticultural Engineering, Faculty of Agriculture, University of Tabriz, Tabriz, Iran
[3]Department of Organic Chemistry, Faculty of Chemistry, University of Tabriz, Tabriz, Iran
[4]Department of Biosystems Engineering, Faculty of Agriculture, University of Tabriz, Tabriz, Iran
[5]Department of Horticultural Engineering, Faculty of Agriculture, University of Tabriz, Tabriz, Iran
E-mail: Ali.ahangaran1210@gmail.com

ARTICLE INFO

Keywords:
Chicory
Cichorium
Plant Density
Hydroponic
Solid Substrate

ABSTRACT

Chicory with the scientific name Cichorium intybus L. is a perennial plant from the Asteraceae family. Production of chicon as a valuable vegetable, the roots of this plant are the most important source used for the production of inulin and oligofructose. One of the most important issues is planting density and the type of variety is one of the important and effective factors on plant growth [1]. During this experiment, the effect of 4 plant density and two cultivars of chicory witloof (YellowStar and Pagana) were studied. The production of chicon was tested in two ways, including the use of a solid substrate and the other method of hydroponic floating in a nutrient solution. The results of the experiment showed that the density of the plant is a very important influencing factor on the growth of the resulting plants and subsequently the shoots obtained from these roots [2]. The highest amount of fresh weight was obtained in the Pagana variety in solid substrate and there was no significant difference between the fresh weight obtained from the YellowStar variety in two methods and the Pagana variety in the floating method, and the lowest amount was related to the Pagana variety in the floating method of chicon production. Regarding the dry weight of the whole chicon per unit area, the highest value was related to the Pagana variety in solid bed and the lowest value was related to the Pagana variety in the floating method.

References

1. Gordon D. H., Hughes J. C., Manson A. D., Soil fertility requirements of root chicory (*Cichorium intybus var. sativum*). *Journal of Plant Nutrition*. 2018; 41(20), 2644-2659.

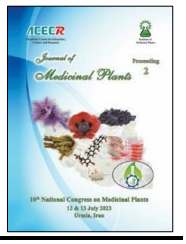
2. Zamaniyan M, Panahandeh J, Tabatabaei S. J., Motallebie-Azar A, Effects of different ratios of K: Ca in nutrient solution on growth, yield and chicon quality of witloof chicory (*Cichorium intybus* L.). *International Journal of AgriScience*. 2022; 2(12), 1137-1142.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 224

Encapsulation of *Thymus daenensis* essential oil in *Ferula gummosa* resin to control *Penicillium* sp.

Razieh Azimi[1,*], Vahid Rowshan[2]

[1]*Research Institute of Forests and Rangelands, Agricultural Research, Education and Extension Organization (AREEO), Tehran, Iran*
[2]*Department of Natural Resources, Fars Agricultural and Natural Resources Research and Education Center, Agricultural Research, Education and Extension Organization (AREEO), Shiraz, Iran*
E-mail: azimiorgchem@gmail.com

ARTICLE INFO

Keywords:
Ferula gummosa
nanoemulsion
Penicillium
Thymus daenensis

ABSTRACT

All species of Thymus are rich in essential oils (EOs) and often contain phenolic compounds which are strong antiseptics. *Thymus daenensis*, a perennial dwarf shrub native plant to semi-arid zones of Iran, is considered as an aromatic and medicinal plant. The strong antimicrobial effect of EO extracted from *T. daenensis* makes it an ideal candidate for an alternative antimicrobial agent [1, 2]. However, its application in food systems is limited because of low water solubility, high volatility and low stability. The present study was undertaken to overcome such problems by encapsulating the *T. daenensis* EO into nanoemulsion formulated by Tween 80, *Ferula gummosa* resin and water using ultrasonic assisted emulsification. The prepared nanoemulsion was characterized in terms of physical stability, particle size, particle size distribution, and shape, using dynamic light scattering (DLS) and field emission scanning electron microscopy (FE-SEM). Then, antifungal activity of the nanoemulsion was investigated against *Penicillium* sp. The most stable nanoemulsion was produced utilizing the optimal ratio of Tween 80: EO: resin (6:2:1), with an average particle size of 65 nm, and spherical in shape. On the basis of the results, *T. daenensis* nanoemulsion revealed the strong antifungal activity with MIC value of 1.25 mg/mL.

References

1. Zarshenas MM, Krenn L. A critical overview on *Thymus daenensis* Celak.: phytochemical and pharmacological investigations. *J. Integr. Med*. 2015; 13: 91–98. doi: 10.1016/S2095-4964(15)60166-2.

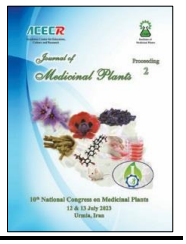
2. Moghimi R, Aliahmadi A, Rafati H, Abtahi HR, Amini S, Feizabadi MM. Antibacterial and anti-biofilm activity of nanoemulsion of *Thymus daenensis* oil against multi-drug resistant Acinetobacter baumannii. *J. Mol. Liq*. 2018; 265:765-70. doi:10.1016/j.molliq.2018.07.023.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 225

Design, formulation, and anticancer studies of solid lipid nanoparticles & liposomal *Aloe vera* extract

Liana Parseghian[1], Hossein Behboudi[2,], Samad Nejad Ebrahimi[1,], Hasan Rafati[3,*]

[1]*Department of Phytochemistry, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*
[2] *Department of Biology, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*
[3]*Department of Pharmaceutical Engineering, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*
E-mail: h_rafati@sbu.ac.ir

ARTICLE INFO

Keywords:
HepG2
MTT assay
Cell viability
Aloin
Emodin

ABSTRACT

Aloe vera, a succulent plant, is utilized to moisturize and soothe facial tissues as an anti-irritant. Due to its powerful anti-inflammation activity, this plant is also used to treat wounds, acne, and eczema. Moreover, the skin leaf of the Aloe vera plant contains Aloin derivatives that exhibit anticancer properties, specifically against the HepG2 cell line. This is attributed to the high concentration of anthraquinones present in the plant, which are currently being extensively studied for their potential health benefits, including cancer prevention. In this study, the hydroalcoholic extract obtained from the skin leaves of Aloe vera was obtained using an ultrasonic probe. The cytotoxicity of the extract was tested against HepG2 cells using an MTT assay with an IC_{50} value of 139.68 µg/ml. The Solid Lipid Nanoparticle (SLN) and a liposome from the extract were fabricated. The particle size and stability were evaluated by the Dynamic Light Scattering (DLS) technique. The findings indicated that the average particle sizes of 98.15 nm and 185 nm, along with a polydispersity index (PDI) of 0.16 and 0.07, respectively, were observed. Both nanoparticles SLN and liposomes demonstrated good stability. According to the MTT assay results, it was observed that the ACE liposome exhibited a higher ability to reduce cell viability after 48 hours of incubation, with an IC_{50} value of 89.30 µg/ml, compared to the SLN and crude extract. Moreover, the current research is focused on examining the influence of liposome size on cell viability. It has been observed that the fabrication of nanoparticles resulted in enhanced cytotoxic activity compared to the crude extract, demonstrating improved efficacy.

References

1. R. Majumder, C. K. Das, and M. Mandal, “Lead bioactive compounds of Aloe vera as potential anticancer agent,” *Pharmacological Research*, vol. 148. Academic Press, Oct. 01, 2019. doi: 10.1016/j.phrs.2019.104416.

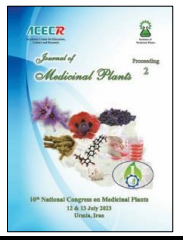
2. A. Balaji *et al.*, “Biomaterials based nano-applications of Aloe vera and its perspective: a review,” *RSC Advances*, vol. 5, no. 105. Royal Society of Chemistry, pp. 86199–86213, Oct. 12, 2015. doi: 10.1039/c5ra13282g.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 226

Bioactive compounds from the leaves of *Ferulago trifida* Boiss.

Reza ghafarzadegan[1], Mohammad Reza Delnavazi[2], Reza Hajiaghaee[1], Saeed Tavakoli[1], Fereshteh Heydari[3], Narguess Yassa[2,*]

[1]*pharmacognosy and pharmacutic Department of Medicinal Plants Research Center; Institute of Medicinal Plants, ACECR, Karaj, Iran*
[2]*Faculty of Pharmacy, Department of Pharmacognosy, Tehran University of Medical Sciences, Tehran, Iran*
[3]*Department of Phytochemistry, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*

ARTICLE INFO

Keywords:
Apiaceae
Ferulago
Heraclenol
Xanthotoxin

ABSTRACT

Apiaceae (*Umbelliferae*) family comprises 300 genera and 2500-3000 species distributed in most parts of the world [1]. One of the most important plants of this family can be mentioned the *Ferulago* genus. This genus consists of seven species in Iran, most of them are endemic to Iran or have spread in regions of Anatolia, Syria, Lebanon, and Iraq, they are valuable pasture plants [2]. In certain parts of Iran, some species of this genus are traditionally added to dairy products, especially in the oil made of animal fats for a pleasant taste and presentation of corruption [3]. The different parts of *Ferulago trifida* Boiss. were collected from Alamut area of Qazvin province in two divided periods. The plant was identified and confirmed by the herbarium of the Faculty of Pharmacy, Tehran University of Medical Sciences (THE-6562). Phytochemical examination of the Chloroform extracts obtained from the leaves of *F. trifida* on Silica gel (normal and reversed phases) and Sephadex LH-20 columns lead to the isolation of two compounds. The structures of the isolated compounds were identified as Heraclenol and Xanthotoxin using ^{1}H-NMR, ^{13}C-NMR and EI-MS spectral analysis, as well as by comparison with those reported in literature.

References

1. Amiri MS and Joharchi MR. Ethnobotanical knowledge of Apiaceae family in Iran: A review. *Avicenna journal of phytomedicine.* 2016; 6 (6): 621.

2. Mozaffarian V. A dictionary of Iranian plant names. *Tehran: Farhang Moaser*. 1996; 396: 396-398.

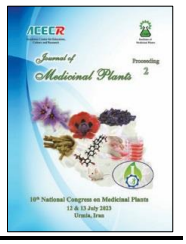
3. Sodeifian G, Ansari K, Bamoniri A and Mirjalili BF. STUDY OF CHEMICAL COMPOSITION OF THE ESSENTIAL OIL OF FERULAGO ANGULATA (SCHELCHT) BOISS. FROM IRAN USING SUPERCRITICAL FLUID EXTRACTION AND NANO SCALE INJECTION. *Digest Journal of Nanomaterials & Biostructures (DJNB).* 2011; 6 (1).

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 227

The Effect of Row Spacing, Walnut, and Pistachio Green Skin Extract on Morphological and Biochemical Traits of Chia Plant (*Salvia hispanica* L.)

Fatemeh Javadifar[1], Khodayar Hemmati[1,*], Nastaran Hemmati[1]

[1] *Department of Horticultural Science, Faculty of Plant Production, Gorgan University of Agricultural Science and Natural Resources, Gorgan, Iran*
E-mail: kh_hemmati@gau.ac.ir

ARTICLE INFO

Keywords:
Chia
Phenol
Mucilage
Organic fertilizer

ABSTRACT

Chia (*Salvia hispanica* L.) is an herbaceous, annual plant from the Lamiaceae family that is commercially produced in South American countries for food and medicinal uses [1]. Its seed is a potential source of antioxidants such as chlorogenic acid, caffeic acid, myristin, quercetin, and kaempferol, which have several health benefits like anti-aging, and anti-cancer effects. Currently, the cultivation and production of chia seed oil have not yet fully met the demand of the world market, hence its investigation was done in Gorgan region [2]. This research was conducted in a factorial design based on randomized blocks in 3 replications. The treatments included the row distance (50, 60, and 70 cm), and aqueous extract of walnut and pistachio skins at a concentration of 1000 ppm. The measured variables included phytochemical traits (total phenol of leaves and seeds, seed mucilage) and morphological traits (leaf fresh and dry weight, height, leaf area, number of inflorescences per plant, and stem diameter). The results showed that the interaction effects of walnut and pistachio skin extract treatments had a significant effect on the height, leaf area, and number of inflorescences at the probability level of 1%, but had no significant effect on stem diameter. The highest amount of seed and leaf total phenol (19.5 and 45.65 mg.g $^{-1}$ DW) was related to the treatment of walnut extract at 70 cm of row spacing The highest amount of seed mucilage (0.1%) was related to the interaction effect of pistachio extract treatment at 70 cm row spacing and the lowest (0.04) was observed in control (0.04%). The highest height (238 cm), leaf dry weight (49.66 g), number of inflorescences (268.66), seed weight (14.28 g), and leaf area (183.11) were related to the control treatment at 70 cm of row spacing, and the lowest was related to the walnut treatment. The lowest height (194 cm) was observed in the walnut peel extract, which was cultivated at 60 cm of distance. In general, the treatments of 70 cm of row spacing and walnut skin extract showed better performance than other treatments in phytochemical traits.

References

1. Ali, N.M., Yeap, S.K., Ho, W.Y., Beh, B.K., Tan, S.W. and Tan, S.G. The promising future of chia, Salvia hispanica L. *Journal of Biomedicine and Biotechnology*, 2012; 15(2). https://doi.org/10.1155/2012/171956

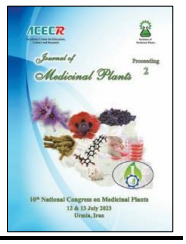
2. Enes, B.N., Moreira, L.P., Silva, B.P., Grancieri, M., Lúcio, H.G., Venâncio, V.P., Mertens-Talcott, S.U., Rosa, C.O. and Martino, H.S. Chia seed (*Salvia hispanica* L.) effects and their molecular mechanisms on unbalanced diet experimental studies: A systematic review. *Journal of Food Science*, 2020; *85*(2), pp.226-239. https://doi.org/10.1111/1750-3841.15003.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 228

Methoxylation of turpentine extracted from *Pistacia atlantica* to α-terpinyl methyl ether as a flavour and fragrance agents

Razieh Azimi[1,*], Somayeh Fekri[1], Vahid Rowshan[2]

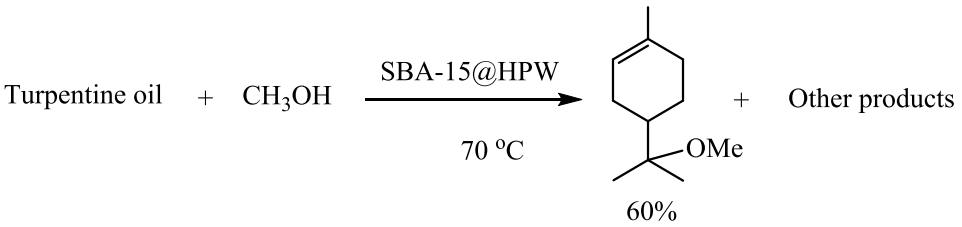
[1]*Research Institute of Forests and Rangelands, Agricultural Research, Education and Extension Organization (AREEO), Tehran, Iran*
[2]*Department of Natural Resources, Fars Agricultural and Natural Resources Research and Education Center, Agricultural Research, Education and Extension Organization (AREEO), Shiraz, Iran*
E-mail: azimiorgchem@gmail.com

ARTICLE INFO

Keywords:
Pistacia atlantica
turpentine oil
α-pinene
α-terpinyl methyl ether

ABSTRACT

Turpentine is a semifluid or fluid oleoresin, primarily the exudation of the coniferous trees and *Pistacia* atlantica. α-Pinene as the main component of the turpentine, is a renewable raw material, which constitute main building blocks for the synthesis of new important chemicals as fragrances, flavors, and pharmaceuticals [1]. The products obtained by the acid catalyzed reactions of α-pinene are significant intermediates for perfumes, pharmaceuticals, flavors, and fine chemicals. The main product of the acid-catalyzed methoxylation of α-pinene is α-terpinyl methyl ether, which smells grapefruit-like and can be used as flavor and fragrance for pharmaceuticals and food industry [2]. This work is aimed to demonstrate the possibility of using crude turpentine extracted from *Pistacia atlantica* gum to replace pure α-pinene in the acid catalyzed reactions. Firstly, $H_3PW_{12}O_{40}$ (HPW) was loaded on SBA-15 using wet impregnation to enhance the dispersion of acid sites. Then, SBA-15@HPW was utilized as a catalyst for methoxylation of turpentine to prepare the α-terpinyl methyl ether as a flavoring agent. The α-terpinyl methyl ether was successfully synthesized via methoxylation reaction of α-pinene (60% yield) and characterized by gas chromatograph analysis.



References

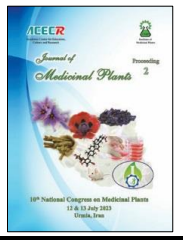
1. Frattini L, Isaacs MA, Parlett CMA, Wilson K, Kyriakou G, Lee AF. Support enhanced α-pinene isomerization over HPW/SBA-15. *Appl. Catal*. 2017; 200: 10-18. doi:10.1016/j.apcatb.2016.06.064.
2. Pito DS, Fonseca IM, Ramos AM, Vital J, Castanheiro JE. Methoxylation of α-pinene over heteropolyacids immobilized in silica. *Appl. Catal. A* 2010; 373:140–146. doi: 10.1016/j. apcata. 2009.11.006.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 229

The effect of water stress on root and leaf biomass of nitre bush (*Nitraria schoberi*)

Hamid Reza Naseri[1,*], Ali taya[1], Reza Shakeri[2]

[1]*International Desert Research Center, University of Tehran, Tehran, Iran*
[2]*Department of Environment, Behbahan Khatam Alanbia University of Technology, Behbahan, Iran*
E-mail: hrnasseri@ut.ac.ir

ARTICLE INFO

Keywords:
Soil moisture
Medicinal plant
Irrigation
Yield
Hydro-halophyte

ABSTRACT

Nitraria schoberi (Nitre bush) from Zygophyllaceae is an important medicinal plant widely used in desertification projects. Numerous compounds, such as alkaloids and flavonoids have been isolated from the leaves and roots of this genus [1]. In order to study water-stress effects on root and leaf biomass of Nitre bush, an experiment was carried out in pots based on a randomized complete blocks design with 15 replicates, in the research greenhouse of the International Desert Research Center. Water stress levels after irrigation included five levels, (irrigation after depletion of 5% as control and 10, 20, 40, and 80% of available soil moisture). The trial period was considered 60 days for the final assessment. The results of ANOVA and comparison of means indicated that the effect of water stress was a significant effect on roots and leaves. The mean comparison showed that drought stress reduced biomass and number of leaves meanwhile, the biomass of roots decreases with increasing water stress and the volume of roots decreases, but the length of roots does not show a significant difference. It was revealed that Water stress could reduce the yield of leaves by up to 61% and the yield of leaves by up to 45%. The process of yield reduction and biomass production in both leaves and roots is exponential and not a linear function. In some scientific sources, Nitre bush is introduced as a hydro-halophyte species [1], therefore, it is necessary to consider water stress on its performance when planting it as a medicinal plant.

References

1. Du Q, Xin H, Peng C. Pharmacology and phytochemistry of the *Nitraria* genus. *Molecular Medicine Reports*. 2015; 1; 11(1):11-20. doi: 10.3892/mmr.2014.2677.

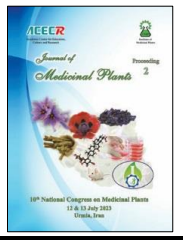
2. Grigore, M.N., Toma, C., Grigore, M.N. and Toma, C. Definition and classification of halophytes. Anatomical adaptations of halophytes: A review of classic literature and recent findings, Spirnger, 2017, 3-28.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 230

Influence of different strains of *Agrobacterium rhizogenes*, and type of explant on hairy root induction in turnip (*Brassica rapa*)

Farideh Babaloo[1], Rashid Jamei[1], Morad Jafari[2,*]

[1]*Department of Biology, Faculty of Science, Urmia University, Urmia, Iran*
[2]*Department of Plant Production and Genetics, Faculty of Agricultural, Urmia University, Urmia, Iran*
E-mail: m.jafari@urmia.ac.ir

ARTICLE INFO

Keywords:
Agrobacterium rhizogenes
explant type
Hairy root
Turnip

ABSTRACT

Cruciferous vegetables contain various bioactive chemicals known as glucosinolates (GSLs) and sulphur-containing cancer-protective chemicals [1]. Epidemiological studies show GSLs significantly reduces the risk of certain cancers and cardiovascular diseases. Turnip (*Brassica rapa*), which belongs to the Cruciferae family, is one of the most important leaf and root vegetable crops for human consumption. Turnip roots contain high amounts of GSLs, phenolic compounds and other bioactive compounds. Hairy root culture technology is an attractive alternative system for the uniform production of bioactive compounds, can continuously provide high-value medicines, foods, and healthy constituents, independent of geographical, climatic, or environmental variations. In this study, the effects of *A. rhizogenes* strain (A7, A13, ATCC 15834) and explant type (hypocotyls, cotyledons, leaves) on hairy root production in turnip were investigated. Based on the results, hairy root induction was successful induced via A7 and A13 strains in all explants. Maximum hairy root induction (37%) was obtained using the A13 strain in leaf explants. Induced hairy roots of turnip is recommended for use as an alternative system for the production of its secondary metabolites.

References

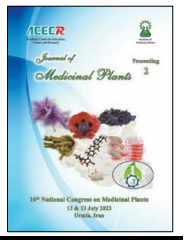
1. Kastell A, Zrenner R, Schreiner M, Kroh L, Ulrichs C, Smetanska I, Mewis I. Metabolic engineering of aliphatic glucosinolates in hairy root cultures of *Arabidopsis thaliana*. *Plant Molecular Biology Reporter*. 2015; *33*, 598-608.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 231

Separation, Purification and Identification of 2-Phenylethanol from Concrete of Rose Petal (*Rosa damascena* mill L.) by Column Chromatography

Negar shafaei Tonekaboni[1,3], Nastaran Hemmati[2,*], Sepideh Maghsoudlou Rad[3], Maziar Ahmadi Golsefidi[4]

[1] *Department of Pharmacy, Shahid Beheshti University of Medical Science, Tehran, Iran*
[2]*Department of Horticulture Science, Faculty of Agriculture, Ferdowsi University of Mashhad, Mashhad, Iran*
[3]*R&D Unit of Noyan Daroo Salamat Golestan Company, Agh Gha Industrial Station, Iran*
[4]*Department of Chemistry, Faculty of Science, Gorgan Branch, Islamic Azad University, Gorgan, Iran*
E-mail: Nastaran.hemmati@mail.um.ac.ir

ARTICLE INFO

Keywords:
Damask rose
Chromatography
TLC
HPLC

ABSTRACT

2-Phenylethanol is an aromatic alcohol with a rose scent. This colorless and water-soluble substance is found in the essential oil of many flowers, such as the rose (*Rosa damascena* mill L.). Mainly, this compound is used in perfumes, cosmetics, and hygiene products. Considering that one of the aromatic and valuable components of the essential oil of the rose is the 2-phenylethanol compound, and in the traditional methods of extracting essential oils in Iran (distillation with water and steam), this compound usually enters the rose water due to its high solubility in water, the produced essential oils generally lack this compound or contain small amounts of 2-phenylethanol, which causes a decrease in quality and relatively low prices in the world markets. For this reason, concrete was used in the present study to purify and use it in different forms of extract. In this method, about 50 grams of dried petal powder of damask rose was weighed in a cartouche and placed in a 1000 ml Soxhlet. Extraction was done with hexane solvent for 6 hours at 50°C. After the evaporation of the solvent by rotary evaporation, the concrete was concentrated. Then, choosing the appropriate mobile phase was done by spotting the extract on TLC paper with different ratios of solvents, and the mobile phase of ethyl acetate: petroleum ether (25:75) was selected for isolation. 354 separated fractions were analyzed by thin-layer chromatography and the 2-phenylethanol compound was isolated with 89.99 percent purity. To ensure the identification, the target fractions were checked by HPLC and 2-phenyl ethanol standard at 210 nm with methanol: water (1:1) mobile phase. Finally the presence of 2-phenylethanol in the fractions was confirmed.

References

1. Yaghoobi, M., Farimani, M.M., Sadeghi, Z., Asghari, S. and Rezadoost, H. Chemical analysis of Iranian Rosa damascena essential oil, concrete, and absolute oil under different bio-climatic conditions. *Industrial Crops and Products*, 2022; *187*(3). https://doi.org/10.1016/j.indcrop.2022.115266.

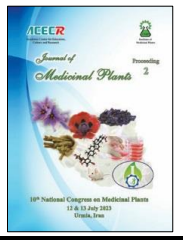
2. Yarazavi, M., Shamspur, T., Afzali, D. and Mostafavi, A. Comparison between the concretes obtained from fresh and distilled *Rosa damascena* mill. flowers. *Journal of Essential Oil Bearing Plants*, 2016*; 19*(2), pp.479-484. https://doi.org/10.1080/0972060X.2014.977581.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 232

Acetyl cholinesterase inhibitory activity of Yazdi onion (*Allium jesdianum*) and Lorestan summer onion (Nectaroscordeum Coelzi) extract

Ghaziani F.[1], Dorosti N.[2]

[1]*Department of Animal Sciences, Faculty of agriculture, College of Agriculture and Natural Resources, University of Tehran, Karaj, 77871-31587, Iran*
[2]*Faculty of Chemistry, Lorestan University, Khorramabad, Iran*
E-mail: ghaziani@ut.ac.ir

ARTICLE INFO

Keywords:
Nectaroscordeum Coelzi
Allium jesdianum
Acetyl cholinesterase, cholinesterase inhibitor

ABSTRACT

Alzheimer's disease (AD) is the most common cause of dementia in adults. The main class of drugs currently used to treat AD are acetylcholinesterase inhibitors (ChE-Is)[1]. Cholinesterase inhibitor, a chemical that binds to the enzyme cholinesterase and prevents it from breaking down the neurotransmitter, acetylcholine. The Liliaceae family is one of the most important groups of plants, which onion is the most valuable in terms of food and medicine. Yazdi onion (Jesdianum Allium) named the local Ben Serkh and Lorestan summer onion (Nectaroscordeum Coelzi) with the local name Anshek are from this layer. Before, anticancer activity of the methanolic extract of Allium Jesdianum and Nectaroscordeum Coelzi investigated against human cancer HeLa and K562 cell lines [2]. In the present work, we investigated the inhibitory cholinesterase activity of the methanol extract in these compounds. Lorestan summer and Yazdi onions from the heights of Sefidkouh in Khorramabad Collected by a botanist and at the Agricultural Research Center. The order was coded with the numbers 11253 and 5520. Yazdi onion and lorestan summer onion by methanol hydro alcoholic solvent (1:3) was soaked. Solutions obtained for concentration by rotary device and their solvent was evaporated. The desired concentration tests were prepared from the extract in distilled water. The results of enzyme experiments with Elman method [3] showed that summer onion extract had the inhibition against acetyl-cholinesterase (AChE) (IC50 of 2.53 mg/ml). Glycosidic steroids are an important source of Yazdi onion, and the alcoholic extract of summer onion also contains alkaloids, saponins and tannins, which It seems that alkaloids are effective in their inhibitory properties.

References

1. Marucci G. & et. Al, Efficacy of acetylcholinesterase inhibitors in Alzheimer's disease, *Neuropharmacology*, 2021; 190, 1 June 2021, 108352.

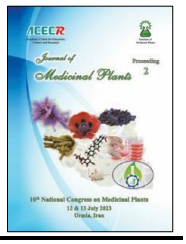
2. Dorosti N, & et. al. Anticancer activity evaluation of methanolic extract of *Allium jesdianum* and Nectaroscordeum Coelzi against HeLa and K562 cell lines. *Yafteh.* 2017;19(1): 31-41.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 233

The reaction of Balango medicinal plant (*Lalelemantia royleana*) to the Withholding of irrigation

Yusef Vakili[1], Shahnaz Fathi[1,*], Azam Seyedi[2]

[1]*Department of Medicinal Plants, Shahid Bakeri Higher Education Center of Miandoab, Urmia University, Urmia, Iran*
[2]*Department of Horticultural Science, Faculty of Agriculture, University of Jiroft, Jiroft, Iran*
E-mail: sh.fathi@urmia.ac.ir

ARTICLE INFO

Keywords:
Anthocyanin
Essential oil
Phenolic compounds
Soluble sugars

ABSTRACT

Balango (Lallemantia iberica Fischer & C.A. Meyer) belongs to the Lamiaceae family. Considering its medicinal and industrial properties and its role in agriculture, this plant is considered a multipurpose plant. The oil of this plant is used in tanning, leather making, dyeing, lubricant, as a substance to prevent wood decay, furniture wax, printer ink, soap preparation, and in lighting linoleum factories, polishing oil, painting oil and grease oil (Shahbazi et al., 2012). Medicinally, balango seeds have mucilage, which is known as an expectorant, diuretic and anti-abdominal medicine (Asghari et al., 2017). This experiment was conducted based on a randomized complete block design in a farm located in Miandoab city. The treatments included complete irrigation (S1), withholding of irrigation from the beginning of flowering to the end of ripening (S2) and withholding of irrigation from the beginning of branching to physiological ripening (S3). The results of comparing means show that dehydration, especially the withholding of irrigation from the beginning of branching to physiological ripening, had a significant decrease in essential oil yield and anthocyanin content, and in terms of phenolic compounds and soluble sugars, there was no significant difference between treatments S1 and S2, and the lowest value was related to treatment S3. In terms of proline, the highest amount was related to the treatment of S3 solution, these results were in agreement with the effect of stress on lemongrass plants (Kazemi Nasab et al., 2015).

References

1. Amanzadeh Y, Khosravi dehaghi N, Ghorbani AR, Monsef-Esfahani HR and Sadat-Ebrahimi SE. Antioxidant activity of essential oil of *Lallemantia iberica* in flowering stage and post-flowering stage. *Biological Sciences*, 2011, 6(3): 114-117.

2. Shahbazi Doorbash S, Alizadeh K, and Fathirezaie V. Study on planting possibility of Dragon's head (*Lallemantia iberica* F. & C.M.) landraces in cold rainfed conditions. *Iran Dryland Agricultural J.* 2012.1(2): 82-95.

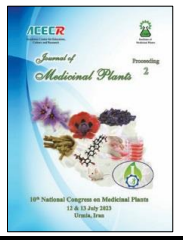
3. Kazemi Nasab A, Yarnia M, Lebaschy M H, Mirshekari B, and Rejali F.The Response of Drought Stressed Lemon Balm (*Melissa officinalis* L.) to Vermicompost and PGPR. *Biological Forum – An International J.* 2015. 7(1): 1336-1344.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 234

Evaluation of Some Bioactive Compounds and Antioxidant Activity of *Rosa canina* Fruits from Sanandaj

Maolan Rasouli[1], Abbas Hassani[1,*], Shahla Shameh[1], Ramin Maleki[2]

[1]*Department of Horticultural Science, Faculty of Agriculture, Urmia University, Umia, Iran*
[2]*Research Department of Chromatography, Iranian Academic Center for Education, Culture and Research (ACECR), Urmia, Iran*
E-mail: a.hassani@urmia.ac.ir

ARTICLE INFO

Keywords:
Ascorbic acid
Rosa canina
Total phenol

ABSTRACT

Rosa canina known as Dog rose is one of the most important species of Rosaceae family [1]. This plant is traditionally used to reduce pain and treat inflammation in Iran [2]. *Rosa canina* fruits are also used for treatment of colds, scurvy, fever, rheumatic, and urinary tract and kidney diseases [3]. The purpose of this work is to evaluate some bioactive compounds and antioxidant activity of *Rosa canina* fruits from Sanandaj located in West of Iran. Total phenol and flavonoid content, anthocyanin, ascorbic acid and DPPH radical scavenging activity were measured by spectrophotometer. The level of total phenol and total flavonoid content were obtained 8.59 mg gallic acid g^{-1} fresh weight and 1.35 mg quercetin g^{-1} fresh weight, respectively. The value of anthocyanin and ascorbic acid were detected 3.73 mg l^{-1} and 13.10 mg g^{-1} fresh weight, respectively. The DPPH (IC_{50}) radical scavenging activity was expressed 2.47 µg ml^{-1}. In general, *Rosa canina* fruit is rich in natural products and can be considered as a useful medicinal plant in various food, pharmaceutical and cosmetic industries.

References

1. Jamali M, Ghanbari A, Estaji A, Torabi Giglou M, Saidi M. Genetic diversity of dog rose (*Rosa canina* L.) using ISSR markers. *Iran J. Genet. Plant Breed.* 2019; 8(2): 1-8.

2. Selahvarzian A, Alizadeh A, Baharvand PA, Eldahshan OA, Rasoulian B. Medicinal properties of *Rosa canina* L. *Herb. Med. J.* 2018; 3(2): 77-84.

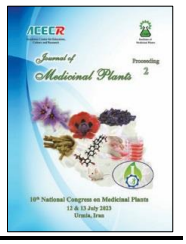
3. Shameh S, Alirezalu A, Hosseini B, Maleki R. Fruit phytochemical composition and color parameters of 21 accessions of five *Rosa* species grown in North West Iran. *J. Sci. Food Agric*. 2019; 99(13): 5740-5751.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 235

The effect of salicylic acid application on the absorption of some macro elements of the *Dracocephalum moldavica* L. medicinal plant

Sahnaz Fathi[1,*]

[1]*Department of Medicinal Plants, Shahid Bakeri Higher Education Center of Miandoab, Urmia University, Urmia, Iran*
E-mail: sh.fathi@urmia.ac.ir

ARTICLE INFO

Keywords:
Essential oil
Phosphorus
Lamiaceae

ABSTRACT

Salicylic acid is one of the phenolic compounds that the root cells of some plants and different microorganisms can produce [1]. It is considered as a plant-regulating hormone-like substance and plays a role in defense strategies against various stresses. Dracocephalum moldavica L. is an herbaceous plant belonging to the mint family (Lamiaceae). All the organs of the plant contain essential oil. In traditional medicine, it is used as a sedative, diuretic, astringent, antipyretic, and flatulence [2]. This experiment was conducted in the research farm of Shahid Bakri Higher Education Center of Miandoab in a completely randomized block design in three replications. Salicylic acid treatment was performed at four levels of 0, 5, 10 and 15 mM. The results of analysis of variance showed that the effect of different doses of salicylic acid on the examined traits was significant. One mM salicylic acid treatment increased the fresh weight of the aerial part by 30%, and the concentration of 1.5 mM increased the dry weight by 50% and the amount of essential oil by 24% compared to the control treatment. The amount of nitrogen and phosphorus in the leaf at a concentration of 1.5 mM increased by 14.96 and 25%, respectively, compared to the control, and in terms of the amount of potassium in the leaf, the concentration of 0.5 mM with a 1.92% increase compared to the control had the greatest effect. The results of this experiment are similar to The findings of Nasiri et al [3].

References

1. Hayata Q, Hayata Sh, Irfan M and Ahmad A. Effect of exogenous salicylic acid under changing environment: A review, *Environmental and Experimental Botany*. 2010, 68: 14–25.

2. Nasiri Y, Zandi H, and Morshedloo MR. Effect of salicylic acid and ascorbic acid on essential oil content and composition of dragonhead *Dracocephalum moldavica* (L.) under organic farming. *Journal of Essential Oil Bearing Plants*. 2018. 21: 362 – 373.

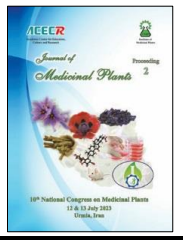
3. Shuge T, Zou X, Zhang F, and Yang T. Essential oil composition of the *Dracocephalum moldavica* L. from Xinjiang in China. *Pharmacol Res*. 2009.1(4):172–174.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 236

Synergistic Antibacterial Effects Between the Traditional Antibiotics and the Stable Nanoemulsion of Cinnamaldehyde and 1,8-Cineol

Roya Moghimi[1,*], Atousa aliahmadi[2], Hasan rafati[3]

[1]*Department of Organic Chemistry, Faculty of Chemistry, University of Mazandaran, Babolsar, Iran*
[2]*Department of Biology, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*
[3]*Department of Phytochemistry & Chemical Engineering, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*
E-mail: r.moghimi@umz.ac.ir

ARTICLE INFO

Keywords:
Synergistic effect
Nanoemulsion
Antibacterial action
Active compounds of EOs

ABSTRACT

Essential oils (EOs) and their active compounds are gaining interest as alternatives to synthetic antibiotics because of their antimicrobial activity [1]. Unfortunately, EOs have several drawbacks, such as low solubility in the aqueous phase and instability. [2]. The encapsulation of EOs in suitable drug delivery systems, such as nanoemulsions, is an appropriate way to enhance their bioavailability and increase their biological activities [3]. In this study, a stable nanoemulsion of cinnamaldehyde and 1, 8-cineol was prepared using a sonicator. In continue, the antibacterial activity of the stable nanoemulsion was assessed against *E. coli*, *P. aeruginosa* and *S. aureus* using broth dilution assay. In addition, the synergistic effects of the stable nanoemulsion and traditional antibiotics (chloramphenicol, amoxicillin, and azithromycin) were analyzed and the fractional inhibitory concentration index (FICI) was determined. Our results revealed that the stable nanoemulsion of cinnamaldehyde and 1,8-cineol (particle size = 27.76 ± 0.37 nm) had noticeable antibacterial activity against selected microorganisms with the minimum inhibitory concentrations (MICs) values of 1,1 and 2 mg/ml against *E. coli*, *P. aeruginosa*, and *S. aureus*, respectively. Calculation of the FICI revealed a partial synergy between the nanoemulsion and azithromycin against *E. coli* and *P. aeruginosa*. This synergistic effect between nanoemulsions and traditional antibiotics is a potential option for improving the effectiveness of antimicrobial agents.

References

1. Yap PSX, Yiap BC, Ping HC and Lim SHE. Essential oils, a new horizon in combating bacterial antibiotic resistance. *The open microbiology journal.* 2014; 8: 6.

2. Lima TS, Silva MFS, Nunes XP, Colombo AV, Oliveira HP, Goto PL, Blanzat M, Piva HL, Tedesco AC and Siqueira-Moura MP. Cineole-containing nanoemulsion: Development, stability, and antibacterial activity. *Chemistry and Physics of Lipids.* 2021; 239: 105113.

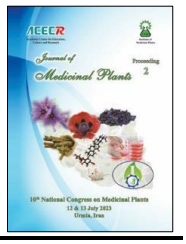
3. Abd El-Hack ME, El-Saadony MT, Saad AM, Salem HM, Ashry NM, Ghanima MMA, Shukry M, Swelum AA, Taha AE and El-Tahan AM. Essential oils and their nanoemulsions as green alternatives to antibiotics in poultry nutrition: a comprehensive review. *Poultry science.* 2021.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 237

Evaluation of acetylcholinesterase inhibitory activity and anticancer activity of olive leaf methanol extracts

Ghaziani, F.[1], Dorosti, N.[2], Afshar, F.[3]

[1]*Department of Animal Sciences, University of Tehran, Karaj, Iran*
[2]*Faculty of Chemistry, Lorestan University, Khorramabad, Iran*
[3]*Department of Science, Garmsar Branch, Islamic Azad University, Garmsar, Iran*
E-mail: ghaziani@ut.ac.ir

ARTICLE INFO

Keywords:
Alzheimer's disease
acetylcholinesterase
K562
HeLa
Cytotoxicity.

ABSTRACT

Olive leaves have the highest antioxidant activity and free radical scavenging power among the different parts of the olive tree. It has been determined that its antioxidant capacity is almost twice that of green tea and four times that of vitamin C. Oleuropein is the most important phenolic compound of olive leaf. One of the important compounds obtained from the hydrolysis of oleuropein is hydroxytyrosol, which has ten times the oxygen radical absorption capacity of green tea and is a substance with strong antioxidant and antimicrobial properties. The aim of this study was to investigate acethylcholinesterase inhibitory and anticancer activity of the methanolic extract of olive leaf against human cancer HeLa and K562 cell lines. Among the 13 different varieties of olives in the surrounding areas of Khorram Abad, the sevillano variety has the highest amount of oleuropein, which was used from this variety. Cholinesterase inhibitory activities of the crude extract were analyzed according to the modified method of Ellman and the results showed IC50 of 2.15 mg/mL (AChE). In an experimental study, after acquiring methanolic olive leaves extracts, their effects on HeLa and K562 cell lines were investigated and compared with cyclophosphamide standard drug at 24, 48, 72 hour after incubation and different concentrations of extracts ranging from 31.25 to 250 µg/ml using MTT assay.

References

1. Shakarami Z. & et. al, Antioxidant and immunomodulatory effects of olive leaf extract on serum level of Th17 related cytokines. *Yafte* 2015; 17 (3) :67-77.

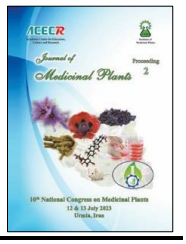
2. Ruzzolini J. et. Al, Cancer Glycolytic Dependence as a New Target of Olive Leaf Extract, *Cancers* 2020, 12(2), 317.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 238

Molecular docking of natural compounds as potential inhibitors against Estrogen receptor alpha of breast cancer

Liana Parseghian[1], Samad Nejad Ebrahimi[1,*]

[1]*Department of Phytochemistry, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*
E-mail: s_ebrahimi@sbu.ac.ir

ARTICLE INFO

Keywords:
Flavonoid
Alkaloid
Resveratrol
Dock score
Breast cancer

ABSTRACT

The Estrogen Receptor (ER) is a transcription factor that is dependent on ligands and plays a crucial role in regulating numerous genes in various target tissues. It is also involved in the development and progression of breast cancer. There is a growing demand for the identification and development of naturally occurring chemicals, such as flavonoids, alkaloids, and resveratrol, as anticancer drugs due to their lower toxicity compared to synthetic ones. This study aimed to investigate the potential of these compounds as antagonists against Estrogen Receptor alpha through molecular docking analysis. The Docking score, binding affinity, and pharmacokinetic parameters were evaluated and compared to Tamoxifen, the most used hormone treatment medicine. The results showed that all tested groups had promising activity, with the best-docked alkaloid, resveratrol, and flavonoid scoring -9.70, -11.50, and -13.39 respectively, and binding affinities of -76.09, -73.91, and -85.20 kJ/mol. These scores were compared to the positive control Tamoxifen, which scored -11.10 and had a binding affinity of -78.71 kJ/mol. Additionally, an ADMET analysis was conducted, indicating that these natural chemical derivatives are suitable candidates for further in vitro and in vivo testing to develop effective therapeutics against breast cancer.

References

1. K. Sak, “Epidemiological Evidences on Dietary Flavonoids and Breast Cancer Risk : A Narrative Review,” vol. 18, pp. 2309–2328, 2017, doi: 10.22034/APJCP.2017.18.9.2309.

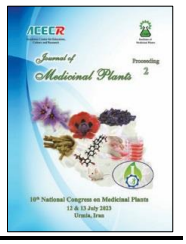
2. A. Brockmueller *et al.*, Resveratrol’s anti-cancer effects through the modulation of tumor glucose metabolism, vol. 13, no. 2. 2021. doi: 10.3390/cancers13020188.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 241

Chemical Composition of the Essential Oil From leaves of *Trachyspermum reginei.*

Saeed Tavakoli[1], Hasan Rezadost[2], Mehrdad Kashefi[1], Matin Mahinzare[1], Fereshteh Heydari[2], Reza Ghafarzadegan[1,*]

[1] *Medicinal Plants Research Center, Institute of Medicinal Plants, ACECR, Karaj, Iran*
[2] *Department of Phytochemistry, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*

ARTICLE INFO

Keywords:
Trachyspermum
Essential Oil
Sabinene
beta-Pinene

ABSTRACT

Apiaceae (*Umbelliferae*) family contains about 450 genera and 3700 species which can be found worldwide [1]. Due to its diverse climate, Iran hosts a large number of species of the *Apiaceae* family. So far 121 genera, 360 species and 122 endemic species have been identified in Iran by botanists. Many medicinal and aromatic species such as celery, black cumin, green cumin, Kermani cumin, fennel, ajwain, etc. are in this family [2]. The *Apiaceae* family includes many large and small genera. Among the small genera, we can mention the genus *Trachyspermum*, which until now only one species with the scientific name *T. ammi* was reported in Iran. A new species of this genus was collected and named by Dr. Yousef Ajani and Dr. Valioallh Mozaffarian in 2017 [3]. This report is about first study of phytochemical analysis of *Trachyspermum reginei* leaves. For this research, plants were collected from Chaharmahal Bakhtiari province in 2022 and identified by a botanist of Tehran University. Essential oil was extracted from the air-dried and comminuted plants using hydrodistillation method for 4 h by a Clevenger-type apparatus. As a result of GC and GC-MS analysis of the essential oil From leaves of Trachyspermum reginei., a total of 22 compounds was identified in the leaves, of which Sabinene (47.12%), beta-Pinene (17.98%) and α-Pinene (13.28 %) were main compounds.

References

1. Mozaffarian V. Flora of Iran, No.54: Umbelliferae. Tehran: Publication of *Research Institute of Forests and Rangelands*; **2007**.

2. Akalin E, Demirci B, can Başer KH. A Chemotaxonomic Study on the Genus Ferulago, Sect. Humiles (Umbelliferae). Biodiversity: Springer; **2002**. p. 309-13.

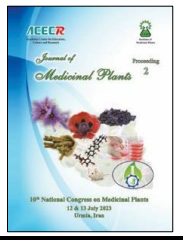
3. Bulut G, Tuzlacı E, Doğan A, Şenkardeş İ. An ethnopharmacological review on the Turkish Apiaceae species. *Journal of Faculty Pharmacy of Istanbul University*. 2014;44(2):163-79.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 242

Study of Antimicrobial activity of Essential Oils from Different Parts of *Trachyspermum reginei.*

Reza Ghafarzadegan[1], Hasan Rezadost[2], Seyed Vahid Ghasemi[1], Meraj Najafi[1], Fereshteh Heydari[2], Saeed Tavakoli[1,*]

[1] *Medicinal Plants Research Center, Institute of Medicinal Plants, ACECR, Karaj, Iran*
[2] *Department of Phytochemistry, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*

ARTICLE INFO

Keywords:
Trachyspermum
Antimicrobial
Essential Oil
A. brasiliensis

ABSTRACT

Apiaceae family (*Umbelliferae*) is one of the largest plant families on earth and in Iran. Each of the plants of this family has various preparations and also has various biological effects [1]. *Apiaceae* plants exhibit a broad spectrum of activities, for instance, antithrombotic, hypotensive, antioxidant, and insecticidal [2]. In 2017, a new species of *Trachyspermum* was collected by Dr. Ajani near Shahrekord and named for the first time [3]. In this study, flowers, stems and leaves of *Trachyspermum reginei* were collected from Chaharmahal Bakhtiari province, Iran. The plant was dried and extracted by Clevenger apparatus, antimicrobial activities of the mentioned oil were tested against some gram positive and gram negative bacteria via disk diffusion method and the activity was expressed as minimal inhibitory concentration (MIC). Antimicrobial activity of the Essential Oils From Different Parts were evaluated against a set of seven bacterial strains, *Salmonella paratyphi* A (ATCC 5702), *Staphylococcus aureus* (ATCC 29737), *Staphylococcus epidermidis* (ATCC 12228), *Escherichia coli* (ATCC 10536), *Klebsiella pneumonia* (ATCC 10031), *Bacillus subtilis* (ATCC 6633) and *Shigella dysenteriae* (PTCC 1188) provided from Iranian Research Organization for Science and Technology (IROST). Results show that although essential oil of *T. reginei* is sensitive to many of examined micro organisms, its antifungal activity is high significantly. Among the three tested fungi, *A. brasiliensis* was only found susceptible to flowers, stems, leaves and roots oils (IZ: 12 and 16 mm).

References

1. Amiri MS and Joharchi MR. Ethnobotanical knowledge of Apiaceae family in Iran: A review. *Avicenna Journal of Phytomedicine.* 2016; 6 (6): 621.

2. Pannek J, Gach J, Boratyński F and Olejniczak T. Antimicrobial activity of extracts and phthalides occurring in Apiaceae plants. *Phytotherapy Research.* 2018; 32 (8): 1459-1487.

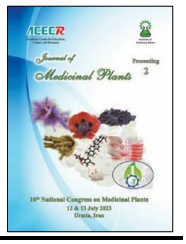
3. Ajani Y and Mozaffarian V. Trachyspermum reginei sp. nov.(Apiaceae) from southwest Iran. *Nordic Journal of Botany.* 2019; 37 (6).

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 243

In vitro polyploidy induction in *Nepeta asterotricha* as a rich source of triterpenic acids

Haniye Dalvand[1], Hassan Esmaeili[1], Mansoureh Tavan[1], Mohammad Hossein Mirjalili[1,*]

[1]*Department of Agriculture, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*
E-mail: mhosseinmirjalili@gmail.com

ARTICLE INFO

Keywords:
Nepeta sp.
Polyploidy
Morphological analysis
colchicine

ABSTRACT

The genus *Nepeta* includes more than 280 species around the world, which shows significant diversity in growth forms, pollination biology, flower morphology and specialized metabolites. This genus is represented by 79 species in Iran's flora, of which 42 species such as *Nepeta asterotricha* are native to Iran [1]. *N. asterotricha* is a perennial plant that is exclusive to Yazd province of Iran. This plant has shown antibacterial, antifungal and antiviral properties. During our ongoing research, the plant is characterized with remarkable triterpenic acids (TAs) including betulinic, oleanolic, and ursolic acids. In the present study, *in vitro* induction of polyploidy was carried out to explore morphological and possible changes in the plant phytochemical traits. For instance, the plant nodal segments were exposed to different concentrations of filter-sterilized colchicine (0.005, 0.1, 0.2 and 0.3 mg/L) for 12 and 24 hours. The highest survival percentage of polyploidized seedlings was observed at concentrations of 0.05 and 0.1, respectively. The treated *in vitro* regenerates were morphologically thicker with darker green leaves, thick trichome and lower plant height than untreated plants. After the establishment and propagation of the treated plants, changes in ploidy level were checked by flow cytometry method. Significant changes in the TAs were observed in the polyploidized plantlets.

References

1. Goldansaz S.M, Jafarian Jeloudar Z, Safaeian R, Sonboli A. Comparison of the chemical constitutions, antibacterial, anti-*Candida*, and antioxidant activity of *Nepeta asterotricha* Rech. F. essential oil. *America J Essen Oils Nat Prod*. 2019; 7(2): 15-22. 233269695.

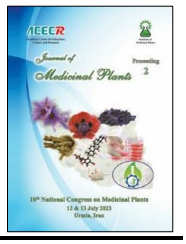
2. Tavan M, Azizi A, Sarikhani H, Mirjalili M.H, Rigano M.M. Induced polyploidy and broad variation in phytochemical traits and altered gene expression in *Salvia multicaulis*. *Scientia Horticulturae*. 2022; 110592. doi**:** 10.1016/j.scienta.2021.110592.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 244

Comparing the Efficiency of Conventional and non-conventional Extraction Techniques of *Cassia angustifolia*

Mohammad Hossein Jabbari[1], Masoud Rahimi[1], Samad Nejad Ebrahimi[1,*]

[1]*Department of Phytochemistry, Medicinal Plants and Drug Research Institute, Shahid Beheshti University, Evin, Tehran, Iran*
E-mail: s-ebrahimi@sbu.ac.ir

ARTICLE INFO

Keywords:
Sennoside
Senna
Sonication
Laxative

ABSTRACT

Senna (*Cassia angustifolia* M.) is a native plant of India, Malaysia, and parts of South Africa that contains various medicinal properties such as anti-inflammatory, antimicrobial, and anti-diabetic effects [1]. The leaves of the senna plant are approved by the Food and Drug Administration (FDA) as a laxative drug due to its various anthraquinone compounds like sennosides, aloe emodin, etc. [2]. In this study, different extraction methods such as Soxhlet, Maceration, Sonication, and hyphenation of maceration-sonication have been used to optimize the sennoside extraction, as the major anthraquinone compounds, from senna at room temperature. Based on the obtained results the maceration (ethanolic solvent 50% for 2 h) and sonication (ethanolic solvent 50%, 10 minutes at power 30%) methods were identified as the optimal extraction techniques yielding the highest amounts of extract 8.1% and 8.4%, respectively. Of the two methods mentioned above, maceration is eco-friendlier and more cost-effective, as its yield does not significantly differ from the sonication technique. The impact of elevated temperatures (50°C) on maceration yield was examined in the following stage. After evaluating the results, the optimal sennosides extraction condition was determined to be a 2-hour maceration at 50°C, resulting in a yield of 9.3%. Additionally, the total amount of phenolic compounds increased from 44.06 to 54.24 µg gallic acid.mg^{-1} sample. In conclusion, the senna extract underwent a High-Performance Liquid Chromatography (HPLC) analysis to assess both its quality and quantification

References

1. Halim, M., The phytochemicals, antioxidant and antimicrobial properties of senna alata and senna tora leaf extracts against bacterial strains causing skin infections. *Journal of Pharmacognosy and Phytochemistry*, 8(2), 2043-2048. 2019.

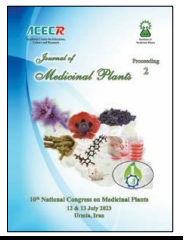
2. Dhoble, L.R., P.R. Itankar, and S.K. Prasad, Formulation, development and evaluation of sennoside enriched Senna extract tablets of different concentrations. *Journal of Pharmacognosy and Phytochemistry*, 2019. **8**(2): p. 2043-2048.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 247

Essential Oil Content and Composition of Vetiver (*Chrysopogon zizanioides*) Accessions Cultivated at Different Regions

Niloofar Aryanasl[1], Ali Sonboli[2,*], Mohammad Hossein Mirjalili[1]

[1]*Department of Agriculture, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*

[2]*Department of Biology, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*

E-mail: a-sonboli@sbu.ac.ir

ARTICLE INFO

Keywords:
Aromatic plant
Vetiver oil
Root yield
Khusimol
Iso-valencenol

ABSTRACT

Chrysopogon zizanioides (L.) Roberty commonly known as Vetiver or Khus grass is a fast growing perennial grass belonging to the family Poaceae that is originated from central middle east and India [1]. The plant is also known as an eco-friendly plant to prevent soil erosion. The essential oil mainly isolated from its fibrous roots is one of the most important ingredient in perfumery products [2]. Due to the commercial importance of the essential oil, vetiver is recently introduced and cultivated in Iran. In the present study, the essential oil content and composition of the plant cultivated at the three different geographical regions including Bushehr, Saveh, and Tehran was studied. The roots of the plant samples were collected from three-year old plants in winter 2023, and dried in the shade at ambient temperature. The essential oils were then isolated from dried roots (50 g) using hydrodistillation method by *Clevenger type apparatus*. The essential oils content (w/w %) was in the order of Saveh (1.44%) > Bushehr (1.09%) > Tehran (0.61%). In the essential oils analyzed by GC-FID and GC-MS khusimol, iso-valencenol and khusimone were characterized as principal compounds. While, khusimol (8.3%), iso-valencenol (14.9%) and khusimone (4.7%) were found with the highest percentages in Tehran accession, the content of these compounds in Bushehr and Saveh oils were almost similar and in lower amounts. The results of this study showed the effect of environmental and geographical conditions on the quantity and quality of the essential oils, that could be used in selection of the best accession for cultivation programs.

References

1. Adams RP, Nguyen S, Johnston DA, Park S, Provin TL & Habte M. Comparison of vetiver root essential oils from cleansed (bacteria-and fungus-free) vs. non-cleansed (normal) vetiver plants. *Biochemical Systematics and Ecology* 2008; 36(3): 177-182.

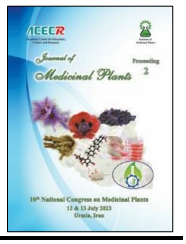
2. Frey C. Natural flavors and fragrances: chemistry, analysis, and production. 2005, 33-39.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 248

Encapsulation *Syzygium Aromaticum* (clove) extract by hydrogel film for the treatment of skin wounds and studying its biocompatibility

Razieh Kordzangeneh[1], Saadat Rastegarzadeh[1,*], Hossein Motamedi[2], Elham Hoveizi[2]

[1]*Department of Chemistry, Faculty of Science, Shahid Chamran University of Ahvaz, Ahvaz, Iran*
[2]*Department of Biology, Faculty of Science, Shahid Chamran University of Ahvaz, Ahvaz, Iran*
E-mail: rkzangeneh@yahoo.com

ARTICLE INFO

Keywords:
Hydrogel film
Syzygium Aromaticum
Clove
Wound dressing
Release

ABSTRACT

The aim of this research is preparation of a suitable wound dressing for superficial skin wounds by using a hydrogel film loaded with *Syzygium Aromaticum* (clove) plant extract and investigation of its antibacterial properties, release of the active species and biocompatibility. Extraction from clove plant was done by three methods with different solvents. Then hydrogel films with and without plant extract were prepared using agarose and κ-carrageenan polymers. The antibacterial properties of clove plant extract and hydrogel films were determined by two methods including disk diffusion and broth medium. Results showed that only the hydrogel containing ethanolic maceration extract was able to inhibit *Bacillus Subtilis* and *Staphylococcus Aureus* bacteria, which is the reason, for the lack of outer membrane in gram positive bacteria. As a result, ethanolic maceration extract was selected as the optimized extract. The amount of total biophenol of the five different extracts was calculated using the Folin-Ciocalteu assay and it was found that the ethanolic maceration extract has the highest amount of total biophenol. The percentage of polymers used in the hydrogel was optimized through the morphology and release. The hydrogel prepared using 1.5% (w/v) agarose, 1% (w/v) carrageenan and 3% (w/v) glycerol was selected as the optimal hydrogel film. The morphology of hydrogels was investigated by FESEM images. Biocompatibility results showed that clove plant extract increases cell viability and the healing process. With further studies on this type of hydrogel, wound dressings with plant extract can be produced with the aim of quickly healing wounds [1, 2].

References

1. Gavan A, Colobatiu L et al. Development and evaluation of hydrogel wound dressings loaded with herbal extracts. *Processes*. 2022; 10(242). doi: 10.3390/pr10020242.

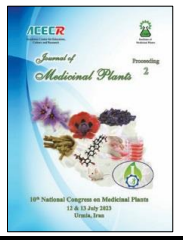
2. Davoodi-Roodbordeii F, Afshar M et al. Topical hydrogel containing *Fumaria Vaillantii* Loisel. extract enhances wound healing in rats. *BMC Complement Altern. Med*. 2019; 19(254). doi: 10.1186/s12906-019-2645-y.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 249

In Vitro Callus Induction in *Cannabis Sativa* L. for Further Indirect Plant Mass Propagation and Cell Suspension Culture for the Production of Cannabinoids

Ayyub Rezghiyan Kordkandi[1], Hassan Esmaeili[1,*], Mohammad Hossein Mirjalili[1]

[1]*Department of Agriculture, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*
E-mail: h_esmaeili@sbu.ac.ir; h.esmaili_6007@yahoo.com

ARTICLE INFO

Keywords:
Cannabinoids
Cannabis
Callus induction
Plant Growth Regulators (PGRs)

ABSTRACT

Cannabis sativa L. is an important annual industrial herb belongs to the family Cannabinaceae along with extensive pharmacological properties. The plant produced a unique class of terpenophenolic compounds called cannabinoids. Cannabidiol (CBD) and Tetrahydrocannabinol (THC) are the important of cannabinoids constitutes in the plant [1]. Callus induction recognized as a fundamental step in indirect plant mass propagation and establishment of cell suspension culture in order to specialized metabolites production. The present study was accomplished to evaluate the effects of different explant types (young leaves and axillary buds) and plant growth regulators (2, 4-D, BA, IBA) combinations on callus induction of *C.sativa* in *in vitro* condition. The explants were disinfected and subsequently transferred to culture media supplemented with different combinations of auxins and cytokinins. The results showed that 1 mg/L BA combined with 0.5 mg/L IBA had the highest effect on the plant callus induction rate in both leaves (86%) and axillary buds (77%) explants after four weeks in MS medium. Friable calli and and the highest fresh weight was archived from leaf explant cultured on MS medium fortified with 1 mg/L BA and 0.5 mg/L IBA. This information can be interestingly considred for further use in the biotechnological programs of the plant.

References

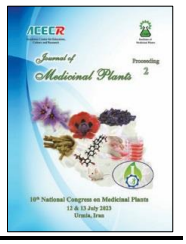
1. Guo G, and Jeong B.R. Explant, medium, and plant growth regulator (PGR) affect induction and proliferation of callus in Abies koreana. *Forests*, 2021; 12(10), p.1388.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 250

Variation in Yield Traits and Essential Oil Content of *Thymus vulgaris* Cultivated in Different Regions

Ayyub Rezghiyan Kordkandi[1], Hassan Esmaeili[1,*], Abouzar Alizadeh[2], Ali Dowlatshah[2]

[1]*Department of Agriculture, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*
[2]*Academic Center for Education, Culture and Research (ACECR), Khorramabad, Iran*
E-mail: h_esmaeili@sbu.ac.ir

ARTICLE INFO

Keywords:
Thyme
Phenotype
Drug yield
Essential oil content
Environmental condition

ABSTRACT

Thymus vulgaris is a perennial medicinal plant belongs to Lamiaceae family generally known as thyme. People have used it for many centuries as a flavoring agent, culinary herb, and herbal medicine [1]. Thyme has been known to be an antiseptic, antimicrobial, medication, astringent, anthelmintic, carminative, disinfectant, and medicinal drugs. The therapeutic parts of this plant are the flowering branch and its dried leaves. Most of the volatile substances identified in thyme oil belong to the group of monoterpenes, where in thymol and carvacrol are the two main components of thyme essential oil [2]. The essential oil content and quality depends on various factors such as harvest time and season, geographical area and agricultural factors. In this study, the effect of different cultivation areas (Khorramabad, Kuhdasht and Noorabad) on the morphological traits and essential oil content of *T.vulgaris* was investigated. The results showed that Noorabad and Kohdasht regions showed the highest content of essential oil (2.13 and 2.10%, respectively). The highest plant height was also related to Khorramabad region (26.73 cm). No significant differences was obsorverd in the fresh and dry weight of the plant in three regions. Although the Kohdasht area had the highest fresh weight (531.7 g) with significant difference with other regions, dry weight had no significant differences among the areas. This study showed the potential of the plant for growing in different climatic regions and selection the best environment condition for obtaining the high drug yield and maximum essential oil production of this plant.

References

1. Kuete V. Thymus vulgaris. *Medicinal spices and vegetables from Africa*. 2017, 599-609.

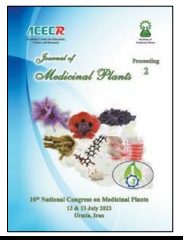
2. Rota M.C, Herrera A, Martínez R.M, Sotomayor J.A and Jordán M.J. Antimicrobial activity and chemical composition of *Thymus vulgaris*, Thymus zygis and Thymus hyemalis essential oils. *Food Control*, 2008, 19(7): 681-687.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 251

Effect of Methyl Jasmonate Elicitation on Some Physiological and Biochemical Characteristics of Oregano (*Origanum vulgare* L.) Medicinal Plant

Fatemeh Pourgholamian[1], Saeed Tarkesh Esfahani[1,*], Afagh Tabandeh Saravi[2]

[1]*Department of Arid Land and Desert Management, School of Natural Resources and Desert Studies, Yazd University, Yazd, Iran*
[2] *Department of Environmental Science, School of Natural Resources and Desert Studies, Yazd University, Yazd, Iran*
E-mail: s.tarkesh@yazd.ac.ir

ARTICLE INFO

Keywords:
Oregano
Elicitation
Antioxidant enzyme
Proline

ABSTRACT

Oregano (*Origanum vulgare* L.) is a medicinal plant from the Lamiaceae family that has several proven pharmaceutical effects such as healing and treatment of chronic rhino-sinusitis, controlling indigestion, headache, rheumatism, cataracts, acute liver toxicity, cardiovascular diseases, nephritis, inflammatory processes, and colds. Methyl jasmonate elicitor can increase the production of secondary metabolites of plants. This research was conducted with the aim of evaluating the effects of elicitation with exogenously applied methyl jasmonate on some physiological and biochemical properties of the Oregano. The experiment was conducted in the frame of a factorial completely randomized design, using two factors, including the concentration of the elicitor and the time after applying the elicitor treatment. Different concentrations of elicitor in 4 levels including 0, 0.1, 0.5 and 2.5 mM and the time after applying the elicitor treatment in 4 levels including 0, 24, 48 and 96 hours were investigated. The mean comparison of the treatments was conducted using Duncan's test at a confidence level of 95% ($P \geq 0.05$). The obtained results showed that the amount of antioxidant enzymes increased significantly until 96 hours after the elicitor treatment. Exogenous methyl jasmonate increased chlorophyll *a*, proline, and antioxidant enzymes including ascorbate peroxidase, catalase, polyphenol oxidase and peroxidase. The concentration and time of application of methyl jasmonate elicitor had no significant effect on the total protein, chlorophyll *b* and carotenoid contents. The results of this research can be useful in botany, biology, agricultural biotechnology, pharmaceutical and medical studies.

References

1. Tarkesh Esfahani S., Karimzadeh G., Naghavi M., Vrieling K. Altered gene expression and root thebaine production in polyploidized and methyl jasmonate-elicited *Papaver bracteatum* Lindl. *Plant Physiology and Biochemistry*, 2021; 158:334-341.

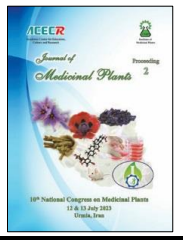
2. Morshedloo M., Ahmadi H., Yazdani D. An over review to *Origanum vulgare* L. and its pharmacological properties. *Journal of Medicinal Plants*, 2018; 17(68):15-31.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 255

Effects of Eucalyptus (*Eucalyptus globulus* L.), Chamomile (*Matricaria chammomilla* L.) and Garlic (*Allium sativum* L.) on immune response and serum lipids of broiler chickens

Aidin Azizpour [1*], **Zahra Amirajam** [2]

[1]*Department of Medicinal Plants, University of Mohaghegh Ardabili, Ardabil, Iran*
[2]*Department of Cardiology, Ardabil University of Medical Sciences, Ardabil, Iran*
E-mail: Aidin_azizpour@uma.ac.ir

ARTICLE INFO

Keywords:
Broilers
Medicinal plants
Immune system
Blood parameters

ABSTRACT

The study was conducted to evaluate the effects of medicinal plants extracts on immune system and serum lipids of broilers. In this study, 240 one-day-old (Ross 308) male broiler chicks were randomly allocated to four experimental groups, each with three replications and 20 birds in each replicate. The basal diet was consumed and the plant extracts of Eucalyptus (*Eucalyptus globulus* L.), Chamomile (*Matricaria chammomilla* L.) and Garlic (*Allium sativum* L.), at 0.1% in drinking water. The birds were vaccinated against Newcastle disease (ND) via drinking water at days 10 and 21. At days 28 and 42, three birds were selected from each experimental and blood samples were taken from to determine ND titer and humoral immune titer. At day 42, cholesterol, triglyceride, LDL and HDL were measured. At 28 days, there was no significant difference among the groups in terms of ND titer and antibody titer to SRBC. The highest ND titer and antibody titer to SRBC was measured in chamomile group and eucalyptus group ($p<0.05$), respectively on 42 days. The lowest levels of cholesterol and triglyceride were observed in garlic group ($p<0.05$). The lowest and highest levels of LDL was determined in eucalyptus group and chamomile group ($p<0.05$), respectively. The highest and lowest levels of HDL was observed in eucalyptus group and chamomile group ($p<0.05$), respectively. The results of the present study showed that the use of medicinal plants improves the immune system and blood parameters.

References

1. Sedghi M, Golian,A, Kermanshahi H, Ahmadi H. Effect of dietary supplementation of licorice extract and a prebiotic on performance and blood metabolites of broilers. *South. African. J. Anim. Sci*, 2010. 40(4): 371-380.

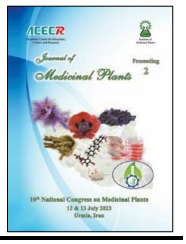
2. Yakhkeshi S, Rahimi S. Niknam A, Hoseinian H. Effects of yarrow (*Achillea millefolium*) levels on carcass characteristics, serum lipids and immune response of broilers. XIIIth European Poultry Conference, 2010. 10: 23-27.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 256

Investigating the effect of UV-B and phenylalanine spraying on the morphological characteristics of the violet plant (*Viola×wittrockiana*)

Vahid Beheshty[1], Mohammad Fatahi[1,*]

[1]*Faculty of Agriculture, Department of Horticultural Sciences, Urmia University, Urmia, Iran*
E-mail: vahidbeheshti.1981@gmail.com

ARTICLE INFO

Keywords:
Violet
UV
Amino acid

ABSTRACT

Violet (Viola×wittrockiana) is a plant from *Violaceae* family, it has flowers with various colors, beautiful and resistant to cold. This plant has an ornamental and medicinal aspect (Eskandari *et al*., 1401). UV-B rays, the most energetic light spectrum of the sun, reach the earth more than before due to the thinning of the ozone layer (Mpoloka, 2008). Ultraviolet rays have many effects on plant structure, including: changes in leaf shape, reduction of internodes, reduction of leaf area, reduction of inflorescences, and reduction of plant height (Horii *et al*., 2007; Darras *et al*., 2012). Phenylalanine is one of the most important amino acids in plant protein production, which is effective in the production of antioxidants, aromatic compounds, and fragrance (Aghaei *et al*., 2022). The importance of effective plant substances in violet and the numerous medicinal properties of this plant led us to investigate a method to prevent the inappropriate effects of ultraviolet waves by using the amino acid phenyl-alanine in order to provide a new solution while preserving this commercially valuable product from the negative effects of the waves. Increase the efficiency of this medicinal plant. Plant seedlings were grown in the greenhouse of the Faculty of Agriculture of Urmia University in 1401. The treatments applied to plant samples are as follows: UV at three levels: zero, 15 and 30 minutes. Foliar spraying of phenylalanine (1.5 grams per liter) and no foliar spraying, as well as investigating the interaction effect of UV light and foliar spraying of phenylalanine. The data was analyzed by SAS software. The results showed that In the traits of plant size, peduncle diameter, flower diameter, stem diameter, stem length, petiole length, leaf width, leaf length and leaf area, UV effect, phenyl-alanine effect and interaction effect were significant at 1% level. In the examination of dry weight and wet weight, it was also found that UV was significant at the level of 1%, the effect of phenylalanine was insignificant and the interaction was also significant.

References

1. Aghaei K, Ghasemi Pirbalouti A, Mousavi A, Naghdi Badi H, Mehnatkesh A. Effects of different fertilizers and the foliar application of L-phenylalanine on mineral contents of hyssop [*Hyssopus officinalis* L. subsp. angustifolius (Bieb.)]. Journal of Horticultural Plants Nutrition. 2022.Vol. 4, No.2.

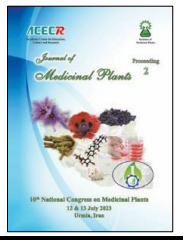
2. Darras A.I, Demopoulos V, Bali I, Tiniakou C. Photomorphogenic reactions in geranium (*Pelargonium* x *hortotum*) plants stimulated by brief exposures of ultraviolet-C irradiation. *Plant Growth Regulation*. 2012. 68(3): 343-350.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 257

The effect of nano zinc spraying on the morphological characteristics of the violet plant (*Viola×wittrockiana*)

Vahid Beheshty[1], Mohammad Fatahi[1,*]

[1]*Faculty of Agriculture, Department of Horticultural Sciences, Urmia University, Urmia, Iran*
E-mail: vahidbeheshti.1981@gmail.com

ARTICLE INFO

Keywords:
Medicinal plants
Violet
Nano zinc

ABSTRACT

Violet (Viola×wittrockiana) is a plant from *Violaceae* family, it has flowers with various colors, beautiful and resistant to cold. This plant has an ornamental and medicinal aspect (Eskandari *et al*., 1401). In connection with medicinal plants, the maximum production of effective substances while maintaining their quality is desired, nanotechnology has achieved this goal and has increased the compounds and active substances of medicinal plants (Remya *et al*., 2010). Since new characteristics and compositions of nanoparticles are found every day, their use increases accordingly. So that the produced nanoparticles can cause a revolution in all levels, especially in biotechnology, agriculture and secondary metabolites of medicinal plants (Khayam Nekoui *et al*., 2019). Zinc is one of the low-use essential elements for plants, which is absorbed as a divalent cation and has many physiological roles in plants. This element acts as an activator and cofactor of some main plant enzymes, including carbonic anhydrase, dehydrogenase, alkaline phosphatase, phospholipase and RNA polymerases, and in the metabolism of proteins, sugars, nucleic acids and fats, photosynthesis and also Auxin biosynthesis, which acts as a growth stimulating hormone, plays a role (Farahat *et al*., 2007). Plant seedlings were grown in the greenhouse of the Faculty of Agriculture of Urmia University in 1401. The treatments applied to plant samples are as follows: Foliar spraying of nano zinc in concentrations of 0, 250 and 500 ppm. The results of this study showed: The characteristics of flower diameter, flower stalk diameter, stem length, fresh weight and dry weight are significant in zero ppm foliar application.

References

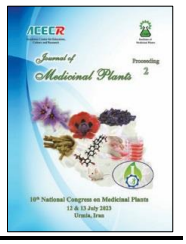
1. Remya M, Potiera V, Temminka H, Rulkensb W. Why low powdered activated carbon addition reduces membrane fouling in MBRs. *Water Research*. 2010. 44, p. 861-867.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 258

Biosynthesis characterization and antibacterial capability of silver nanoparticles using aqueous extract of *Buxus hyrcana* Pojark. from Tonekabon - Iran

Mohsen Mohammadi[1,*], Shahab Ojani[2]

[1]*Department of Biology, Tonekabon Branch, Islamic Azad University, Tonekabon, Iran*
[2]*Young Researchers and Elite Club, Tonekabon Branch, Islamic Azad University, Tonekabon, Iran*
E-mail: Mohsenmohammadi580101@gmail.com

ARTICLE INFO

Keywords:
Buxus hyrcana Pojark.
Silver nanoparticles
FT-IR
Bioactive compounds
Disc diffusion method

ABSTRACT

In the past few decades, tremendous interest and substantial research efforts were directed toward the biomedical evaluation and revaluation of metallic nanoparticles derived from noble metals, such as silver, thanks to their specific and natural chemical, biological, and physical properties [1-2]. In the present project, silver nanoparticles (Ag-NPs) were synthesized using aqueous leaves extract of *Buxus hyrcana* Pojark. and the production of Ag-NPs was confirmed by the absorption spectrum of λ max at 436 nm. The particle size of the Ag-NPs was studied by TEM and showed the presence of Ag-NPs in the size range 25-45 nm. The FT-IR studies show the presence of various functional groups such as NH_2, OH, C=O groups, which are responsible for the reduction process. The XRD indicate that the Ag-NPs are face centered cubic, and crystalline in nature. The disc diffusion method was followed to observe the bactericidal activity. The aqueous leaves extract of *Buxus hyrcana* Pojark. shows moderate antibacterial activity against gram negative bacteria, while the green synthesized Ag-NPs shows a potential bactericidal activity against both gram positive and gram negative bacteria studied in the present investigation. The bioactive compounds such as phenolic compounds present in the aqueous extract and the nanoparticles capped with the bioactive compounds of plant material are responsible for the bactericidal activity. Further studies on characterization of specific compound responsible for the killing of bacteria, resulted in the invention of new compound to control the drug resistance organisms.

References

1. Abdelghany T. M. *et al*., Recent advances in green synthesis of silver nanoparticles and their applications: About future directions. A review. *Bionanoscience*. 2018; 8(1): 5-16. doi: 10.1007/s12668-017-0413-3.

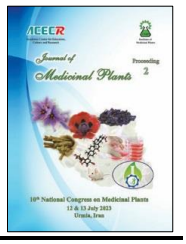
2. Bala A. *et al*., A review on phytosynthesis, affecting factors and characterization techniques of silver nanoparticles designed by green approach. *Int. Nano Lett*, 2020; 10(3): 159-176. doi:10.1007/s40089-020-00309-7.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 259

Silver nanoparticles synthesis using *Nasturtium officinale* aqueous extract and study of antibacterial and cytotoxic effects on cell line of gastric cancer (AGS)

Mohsen Mohammadi[1,*], Shahab Ojani[2]

[1]*Department of Biology, Tonekabon Branch, Islamic Azad University, Tonekabon, Iran*
[2]*Young Researchers and Elite Club, Tonekabon Branch, Islamic Azad University, Tonekabon, Iran*
E-mail: Mohsenmohammadi580101@gmail.com

ARTICLE INFO

Keywords:
Nasturtium officinale
Silver nanoparticles
Secondary metabolites
Cytotoxic effect
Nano medicine

ABSTRACT

Researchers use bionanotechnology techniques as eco-friendly and cost-effective routes to fabricate nanoparticles and nanomaterials [1-2]. In the present project, the green synthesis of silver nanoparticles (Ag-NPs) from aqueous solution of silver nitrate ($AgNO_3$) by using *Nasturtium officinale* leaves extract has been reported. Ag-NPs were characterized by UV-Vis absorption spectroscopy with an intense surface plasmon resonance (SPR) band at 445 nm which reveals the formation of nanoparticles. Fourier transmission infrared spectroscopy (FT-IR) showed that nanoparticles were capped with plant compounds. Transmission electron microscopy (TEM) showed silver nanoparticles, with a size of 10-45 nm, were spherical. The X-ray diffraction spectrum (XRD) pattern clearly indicates that Ag-NPs formed in the present synthesis were crystalline in nature. Stabilized films of exudate synthesized Ag-NPs were effective anti-bacterial agents. In addition, these biologically synthesized nanoparticles were also proved to exhibit excellent cytotoxic effect on a human gastric adenocarcinoma cell line (AGS). Accordingly, the treatment of (AGS) cancer cell line over 24 hours revealed that the cytotoxicity of the aqueous extract and synthesized nanoparticles are dose-dependent, with the greatest cytotoxic effect at a concentration of 40 and 20 µg/ml where the IC_{50} value was equal to 51.84±0.02 and 49.95±0.15 µg/ml respectively. The results confirmed that the green synthesis of silver nanoparticles by using *Nasturtium officinale* is a very good ecofriendly and nontoxic source for the synthesis of Ag-NPs as compared to the conventional chemical/physical methods. Therefore, *Nasturtium officinale* leaves provides future opportunities in nanomedicine by tagging nanoparticles with secondary metabolites.

References

1. Gan L, Zhang S. *et al*., Biosynthesis, characterization and antimicrobial activity of silver nanoparticles by a halotolerant Bacillus endophyticus SCU-L. *Prep. Biochem. Biotechnol.* 2018; 48(7): 582-588. doi: 10.1080/10826068.2018.1476880.

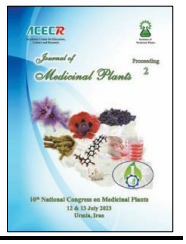
2. Arvizo R.R, Bhattacharyya S, et al., Intrinsic therapeutic applications of noble metal nanoparticles: past, present and future. *Chem. Soc. Rev*. 2012; 41(7): 2943–2970. doi: 10.1039/c2cs15355f.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 260

The effect of chilling treatment on germination characteristics of English lavender ecotypes

Maryam Aliramaji[1], Sarah Khorasaninejad[2,*]

[1,2]Department of Horticultural Sciences and landscape engineering, plant production, Gorgan University of Agricultural Sciences and Natural resources, Gorgan, Iran
E-mail: Skhorasaninejad@yahoo.com; khorasaninejad@gau.ac.ir

ARTICLE INFO

Keywords:
Chilling Treatment
Lavandula angustifolia
Peat moss
Sand

ABSTRACT

Lavender medicinal plant is a half-meter tall, woody and aromatic plant and is one of the most important medicinal plants in the world, especially in the aromatherapy industry [1]. The lavender genus has 39 species in the world and the English lavender (*Lavandula angustifolia*) species has been allocated more cultivated area, significantly [1]. Seed stagnation is one of the problems of seed germination, and chilling treatment is one of the ways to eliminate seed dormancy. By creating cold temperature conditions, the embryo's need for oxygen is better met and the seed germinates better in these conditions. [2]. So that over the years, they have become native to different regions of the world and have become the ecotype of those regions, Therefore, they have various germination characteristics [3]. In order to investigate the effect of chilling treatments and seven ecotypes of *L.angustifolia* in two media in a factorial experiment based on a completely randomized design with three replications was implemented. The investigated treatments include three levels of chilling treatments (0, one and two months) and seven ecotypes of *L.angustifolia* (Spain-Fito®, USA, Organic munstead-Renee's Garden®, USA, Munstead-Strictly Medicinal®, USA, Hidcote-Renee's Garden®, Canada- Burpee®, Canada- McKenzie®, Hungary- Garafarm®) in two media (peat moss, sand). According to the results, ecotypes, medium and chilling, separately effect on plumule and radicle length were significant. Ecotypes had significant effect on germination speed. By comparing the averages, the best plumule and radicle length was in the peat moss cultivation bed and one month of chilling. So that the maximum length of plumule and germination speed were related to Hungary ecotype and the maximum length of radicle was obtained in USA, Munstead-Strictly Medicinal®, Canada-Burpee®, Canada-McKenzie®.

References

1. Gorgini Shabankareh H, Khorasaninejad S, Soltanloo H. Shariati V. Investigation of the effects of drought stress and abscisic acid foliar application on yield, physiological and biochemical properties of lavender (*Lavandula angustifolia* cv. Organic Munstead). *Journal of Crop Production*. 2021; 14(20): 65-82.

2. Sanginabadi H, Khorasaninejad S, Hemmati K, Ghasemnejad A. A study on propagation methods of *Lavandula stricta* Del. Iranian Journal of Medicinal and Aromatic Plants. 2016; 32(3).

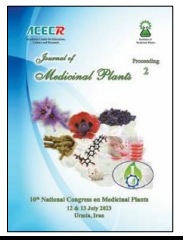
3. Chorli S, Khorasaninejad S, Hemmati K, Kashefi B. The study of morphological characteristics, antioxidant and essential oil contents of the medicinal plant *Stachys lavandulifolia* Vahl. in habitats of Semnan, Razavi, and North Khorasan provinces. Journal of Iranian Plant Ecophysiological Research. 2017 Jan 1; 11(41):41-52.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 261

The effect of gibberellic acid on germination characteristics of *Lavandula angustifolia* ecotypes

Maedeh Koohi[1], Sarah Khorasaninejad[2,*]

[1, 2]Department of Horticultural Sciences and landscape engineering, plant production, Gorgan University of Agricultural Sciences and Natural resources, Gorgan, Iran
E-mail: Skhorasaninejad@yahoo.com; khorasaninejad@gau.ac.ir

ARTICLE INFO

Keywords:
Lavandula angustifolia
Plumule
Radicle
Cooling requirement

ABSTRACT

Medicinal plants have had many therapeutic uses in the world and in Iran for a long time [1]. The lavender genus has 39 species in the world and the English lavender (*Lavandula angustifolia*) species has been allocated more cultivated area, significantly [2]. So that over the years, they have become native to different regions of the world and have become the ecotype of those regions, Therefore, they have various germination characteristics. One of the methods of propagation of lavender is through seeds, but since it has irregular germination and on the other hand, it is native to cold regions, it is expected that its germination will be improved by using gibberellic acid (GA3) [3]. In order to investigate the effect of GA3 and six ecotypes of *L.angustifolia* in two media in a factorial experiment based on a completely randomized design with three replications was implemented. The investigated treatments include three levels of GA3 concentration (0, 400 and 800 ppm) for 72 hours and five ecotypes of *L.angustifolia* (Iran-Pakan bazr®, Iran- Research Institute of Forests and Rangelands (RIFR) 31122, Italy-Blumen®, Germeny- Pharmasaat®, France-Ruhlemann's) in two media (peat moss, sand). According to the results, different concentrations of GA3, ecotypes and media and the interaction three factors on plumule and radicle length were significant. So that the maximum length of root and stem was related to the concentration of 400 ppm and peat moss cultivation medium, German ecotype. It can be concluded that since the average temperature of Germany is lower than the rest of the regions and considering that GA3 replaces the cooling requirement, the obtained results can be justified.

References

1. Chorli S, Khorasaninejad S, Hemmati K, Kashefi B. The study of morphological characteristics, antioxidant and essential oil contents of the medicinal plant *Stachys lavandulifolia* Vahl. in habitats of Semnan, Razavi, and North Khorasan provinces. *Journal of Iranian Plant Ecophysiological Research*. 2017 Jan 1; 11(41):41-52.

2. Gorgini Shabankareh H, Khorasaninejad S, Soltanloo H. Shariati V. Investigation of the effects of drought stress and abscisic acid foliar application on yield, physiological and biochemical properties of lavender (*Lavandula angustifolia* cv. Organic Munstead). *Journal of Crop Production*. 2021; 14(20): 65-82.

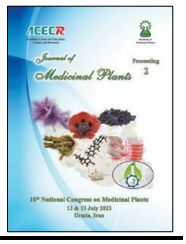
3.Sanginabadi H, Khorasaninejad S, Hemmati K, Ghasemnejad A. A study on propagation methods of *Lavandula stricta* Del. *Iranian Journal of Medicinal and Aromatic Plants*. 2016; 32(3).

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 262

Comparison of The Efficacy of *Achillea millefolium*, *Valeriana officinalis* and *Astragalus hamosus* on Primary Dysmenorrhea

Rayehe Khodaparsti, Mitra Arman, Seyede Zahra Khademi

[1]*Department of Biology, Payam Noor University, Hormozgan, Iran*
E-mail: rayehekhodaparsti@yahoo.com

ARTICLE INFO

Keywords:
Primary Dysmenorrhea
Stragalus hamosus
Achillea millefolium
Valeriana officinalis

ABSTRACT

Primary dysmenorrhea is menstrual pain without pelvic pathology. Since dysmenorrhea is one of the common complaints of women in reproductive age and results in absenteeism from school/work and limitations in daily activities [1] , and given its importance and the fewer complications caused by medicinal plants, the present research investigated the effects of such medicinal plants as *Achillea millefolium*, *Valeriana officinalis* and *Stragalus hamosus* on primary dysmenorrhea to find out whether these plants were effective for treating dysmenorrhea and which one was more effective. This clinical trial was conducted on 120 women of reproductive age in Bandar Abbas County in 2021after receiving the Ethics Committee approval. The participants were selected based on the initial questionnaire that was distributed among them. Someone's who suffered from dysmenorrhea pain were enrolled in the research. They were divided into four 30-member groups. Three groups received the medicinal plants and the control group a placebo together with the instructions on how to use them. The participants used the medicinal plants for three consecutive months and recorded the intensity of the menstrual pain before using the medicinal plants and after taking them based on the Visual Analog Scale. The data were analyzed using SPSS. There were significant differences between all three medicinal plants and control groups (p=0.0001) All three medicinal plants were effective in reducing dysmenorrhea pain and The results also indicated that Stragalus hamosus was the most effective followed by Valeriana officinalis, Achillea millefolium and the placebo. Since they have fewer complications, all of them can be used to treat dysmenorrhea.

References

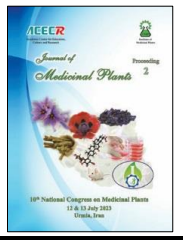
1. Kalvandi, R., Alimohammadi, S. H., Pashmakian, Z., Rajabi, M. (2014). The Effects of Medicinal Plants of Melissa Offcinalis and Salvia officinalis on Primary Dysmenorrhea. *Scientific Journal of Hamadan University of Medical Sciences*, 21(2), 105-109.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 263

Combining fertilizers (chemical, organic and biological) affect on antioxidant enzymes, carbohydrate and protein content in *Satureja khuzestanica* Jamzad

Samaneh Asadi-Sanam[1,*], Abuzar Hashempour[2], Bohlul Abbaszadeh[1], Fatemeh Askari[1]

[1]*Research Institute of Forests and Rangelands, Agricultural Research education and extension organization (AREEO), Tehran, Iran*

[2]*Citrus and Subtropical Fruits Research Center, Horticultural Sciences Research Institute, Agricultural Research, Education and Extension Organization (AREEO), Ramsar, Iran*

E-mail: asadisanam@rifr-ac.ir

ARTICLE INFO

Keywords:
Bio-fertilizers
Carbohydrate
Medicinal plants
Organic
Thiobacillus

ABSTRACT

Satureja khuzistanica Jamzad. is a medicinal species of the Lamiaceae, with a natural habitat in the west and southwest of Iran [1]. This species is widely commercialized for its essential oil and curative properties. The available literature contains multiple sources of information that suggest how the production of secondary metabolites by plants can be related directly to the availability of organic manure and nutrient fertilizers. While chemical fertilizers are increasingly becoming less popular in comparison with the advantages brought by organic manure [2]. This research aimed to evaluate the combined effects of chemical, biological and organic fertilizers on activities of antioxidant enzymes and carbohydrate and protein content of *S. khuzistanica*. This research was conducted as a randomized-complete-block-design (RCBD) accompanied by 14 nutritional treatments, i.e. 1- C (control), 2- nitrogen, phosphorus and potassium (NPK; 50-25-25 Kg.ha^{-1}), 3- CM_{30} (cattle manure: 30 ton.ha^{-1}), 4- CM_{60} (60 ton.ha^{-1}), 5- CM_{30}+NPK, 6- CM_{60}+NPK, 7- V_5 (vermicompost: 5 ton.ha^{-1}), 8- V_5+NPK, 9- GM (*Glomus mosseae*), 10- GI (*Glomus intravagale*), 11- S_0+T, 12- S_{250}+T, 13- S_{500}+T (S: sulfur: 0, 250 and 500 Kg.ha^{-1}, T: *thiobacillus*) and 14- V_5+T in three replications administered on *S. khuzistanica* plants during 2017-2019. Fertilizer treatments were selected based on the results of soil analysis. The leaf samples of *S. khuzistanica* (0.25 g) at full flowering stage, were pulverized in liquid nitrogen with mortar and pestle. The supernatant was used to measure phytochemical parametes by means of a spectrophotometer. In each year, the application of S_0+T resulted in the highest amount of carbohydrate, peroxidase (POD) and catalase (CAT) activity. In addition, this treatment caused the highest amount of superoxide dismutase (SOD) activity (58.1 unit/mg protein) in the first year. The results indicated that the APX antioxidant activity was enhanced by sulfur combined with *Thiobacillus* (S_{500}+T and S_0+T), 180.2 and 203.3 units/mg protein. Min in the first and second years, respectively. According to the results, the maximum amounts of polyphenol oxidase (PPO) activity (0.08 unit/mg protein. min) and total protein (11.3 mg/g fresh wt) occurred in response to the V_5 treatment in 2017. Then, in second year, V_5+NPK caused maximum PPO activity (0.17 Unit/mg protein. min). In fact, the results indicated that combining bio-fertilizers with organic fertilizers can be a good alternative to chemical fertilizers in *S. khuzistanica*.

References

1. Jamzad Z. Thyme and Savory Iran. *Publishing Research Institute of Forests and Rangelands*. **2009**, P.171.

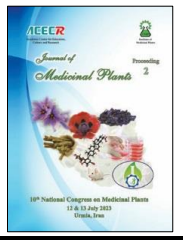
2. Dudai N. Quality Management of Food Crops for processing. **2005**, 77-90.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 264

Economic estimation of the production of *Thymus daenensis* Celak in rainfed conditions (Damavand)

Samaneh Asadi-Sanam[1,*], Mohammad Hossein Lebaschy[1], Meysam Ansari[1], Masoumeh Layegh Haghighi[1]

[1]*Research Institute of Forests and Rangelands, Agricultural Research education and extension organization (AREEO), Tehran, IRAN*
E-mail: asadisanam@rifr-ac.ir

ARTICLE INFO

Keywords:
Economic
Essential oil
Medicinal plants
Thymol
Yield

ABSTRACT

Given the increasing water needs of agriculture and the demand of water from other sectors, one major question is how to economize water use in agricultural production, particularly in countries with limited land and water resources [1], including Iran. This research was carried with the aim of producing and optimization suitable patterns for the cultivation and introducing of the valuable species of *Thymus daenensis* under dry farming as a research-extension pilot in Absard research station of Damavand during 2016-2020. Considering that *Thymus* is a perennial plant and its initial growth is slow, therefore the first year of growth of this plant can be called the year of establishment with an average survival rate of more than 80%. In this project, based on the researches in this station and some other regions, by consuming 25 tons of manure per hectare along with 45 and 60 kilograms per hectare of urea and superphosphate, quantitative and qualitative yield of *Th. daenensis* was investigated. The height of the plant (22 cm) and the canopy (38 × 41 cm) were measured, and then the yield of the shoot, the percentage of essential oil and its compounds, and finally the economic estimation of the plant was investigated. The average essential oil production in four years of economic growth of the plant was 2.6%. 21 compounds in the essential oil of this species were measured and detected, which constituted 99.6% of the essential oil content. The highest composition in the essential oil formed from thymol (73%) and gama-terpinen (7.2%). The identified compounds were included hydrocarbon monoterpenes (15%), oxygenated monoterpenes (79.6%), hydrocarbon sesquiterpenes (4.9%), and oxygenated sesquiterpenes (0.3%). The average yield of dry flowering *Th. daenensis* in pilot was 1500 kg/ha. Taking into account the price of 40,000 Tomans (in 2021) for each kilogram of dried flowering branches, the income of pilot of this species will be 60 million Tomans per hectare . According to the yield of thyme (1500 kg/ha) in the third year, the "economic year of plant growth" compared to the annual yield of wheat plant (800 kg/ha), the rainfed cultivation of the *Th. daenensis* as a perennial medicinal plant compared to the crop cultivation of wheat according to the present climatic conditions can ultimately provide high added value and economic benefits to dryland farmers and rangeland users in sloping lands of the country and suitable areas for the cultivation of high-value this plant.

References

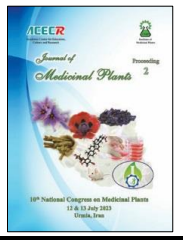
1. Debaeke Ph & Aboudrare A. *European Journal of Agronomy*. **2004**, 21: 433-446.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 265

Value Chain Economic Analysis of Rosa Damascene in Iran

Alireza Karbasi

[1]*Department of Agricultural Economics, Ferdowsi University of Mashhad*
E-mail: arkarbasi2002@yahoo.com

ARTICLE INFO

Keywords:
Rosa
Value chain
Iran

ABSTRACT

Mohammedi flower with the scientific name Rosa damascene is the name of a type of rose that Iranians have realized its edible and therapeutic properties since the past, and they are the pioneers in the production of rose water and rose in the world (1), and Iran has the largest cultivated area of this product in the world. Therefore, in the present research, the value chain of Rosa has been examined and analyzed from the economic aspect, and the points of opportunity, threat, weakness and strength have been examined. The research indicates that the Rosa value chain includes four parts consist of Inputs, flower production, processing and packaging and product sales. Every year, during the flower harvesting seasons, traditional and industrial businesses start their activities in many areas. Most of the them that produce rose water are located in Fars, Isfahan, Kerman, and West Azerbaijan provinces. In Iran, rose water has taken over most of the processing of the rose flower and has a high share in export and domestic sales. Rose essence is a product with high added value, which is widely used in cosmetics and pharmaceutical industries. The Persian Gulf countries are the main consumers of Iran's rose water, and the largest volume of exports is also to these countries and then to European countries is in a limited way. The organic nature of the product is very important and is one of the basic things in taking over global markets (2). And one of the main strategies for the development of the value chain and exports is to closely monitor the process of cultivation and drying of this product according to global standards.

References

1. Mevlüt Gul, Soner Kazaz, Hasan Baydar & Bekir Sitki Sirikci (2015) A Study About Technical, Economical Situation, Problems and Improvement of Oil Rose (*Rosa damascena* Mill.) in Turkey, *Journal of Essential Oil Bearing Plants*, 18:3, 613-626.

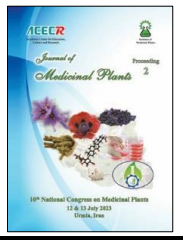
2. M. Ikiz & V. Demircan (2013) Comparative Economic Analysis of Organic and Conventional Rose Oil (*Rosa damascenae* Mill.) Cultivation in Lakes Region, Turkey, *Journal of Essential Oil Bearing Plants*, 16:3, 352-363.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 268

Morphological and molecular authentication of Squill onion in Iran

Bahareh Saeedabadi[1], Ali Sonboli[2,*], Mohammad Hossein Mirjalili[1], Ghasem Eghlima[1]

[1]*Department of Agriculture, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*
[2]*Department of Biology, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*
E-mail: a-sonboli@sbu.ac.ir

ARTICLE INFO

Keywords:
Asparagaceae
Bellevalia
Bellevalia glauca
Drimia maritima

ABSTRACT

Drimia maritima (L.) Stearn with the common name of "Squill", belongs to the Asparagaceae family. It is acknowledged as a medicinally valuable species, which is native to the Mediterranean region, Africa, and India. This species grows in Southern regions of Iran including Khuzestan and Fars Provinces [1]. In Traditional Iranian Medicine, Squill onion was used for skin problems such as injury, haemorrhoids, warts, dandruff and seborrhea [2]. In our ethnobotanical survey of West Azerbaijan Province medicinal plants, an interesting plant species locally known as Squill was collected from Mahabad, which is used by native people in treatment of alopecia, rheumatism and skin problems. In the present study, the morphological and molecular identification and authentication of the collected Squill was studied. Total genomic DNA was extracted and sequenced amplified nrDNA ITS region. Taxonomic determination of the plant using morphological characters by Flora of Iran revealed that the species is belonged to the *Bellevalia glauca* (Lindl.) Kunth. Subsequently, molecular authentication based on nrDNA ITS sequences data with available sequences in GenBank (NCBI nucleotide Blast) was in accordance with morphological results and confirmed its belonging to the genus *Bellevalia*. Finally, it can be concluded that the plant with the common name of Squill used in Mahabad is a species of *Bellevalia*.

References

1. Gholamhosseinian A, Falah hossein SF, Mirtaj aldini S. The inhibitory effect of some iranian plants extracts on the alpha glucosidase. *Iran. J. Basic Med. Sci*. 2008; 11(1):1-9.

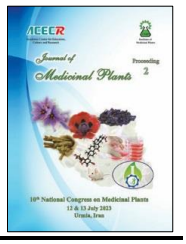
2. Cowen, David L. "Squill in the 17th and 18th centuries." *Bulletin of the New York Academy of Medicine* 50.6 (1974): 714.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 269

Green synthesis of silver nanoparticles from *Morus Alba* Fruit extract and assessment its anthelmintic effects against different stages of strongyle nematodes compared to commercial silver nanoparticles

Awat Samiei[1], Mousa Tavassoli[1], Bijan Esmaeilnejad[1,*]

[1]*Department of Pathobiology, Faculty of Veterinary Medicine, Urmia University, Urmia, Iran.*
E-mail: b.esmaeilnejad@urmia.ac.ir

ARTICLE INFO

Keywords:
Strongyle
Morus alba
Nanoparticles
Green synthesis
Nematicidal potential

ABSTRACT

The current study was designed to green synthesize silver nanoparticles (GRAgNPs) using Morus alba Fruit extract and evaluate their nematicidal effects against strongyle nematodes compared to commercial silver nanoparticles (CAgNPs) in vitro. The nanoparticles were characterized by Ultraviolet-visual absorption spectography, transmission electron microscopy, and X-ray diffraction. Next, uptake of AgNPs by the L1 larvae, egg hatch inhibition (EHI) and the motility of infectious larvae (L3s), and the ultrastructural analysis of the eggs and worms were conducted. Moreover, some of oxidative/nitrosative stress indicators, including total antioxidant status content (TAC), protein carbonylation (PCO), lipid peroxidation (MDA), and DNA damage were assessed in the homogenized samples of strongyle L3s. The GRAgNPs had spherical shape, 20-30 nm in diameter with rough surface. Following incubation with GRAgNPs at concentrations of 43.40, 21.70 and 10.85 ppm, and CAgNPs at concentrations of 43.40, 21.70, EHI was measured to be <90%. Also, concentrations of 43.40 and 21.70 ppm of GRAgNPs inhibited larval motility by > 90%. The LC50 at 24 h of treatment for GRAgNPs and CAgNPs was determined to be 8.62 and 10.34 ppm, respectively. GRAgNPs and CAgNPs in a concentration-dependent manner resulted in the induction of oxidative/nitrosative stress evidenced by decreased TAC levels, and increased levels of MDA and PCO, together with increased DNA damage. The uptake of AgNPs by the L1 larvae revealed that FITC labeled GRAgNPs fluoresced with high intensity largely in the intestinal area. SEM analysis of eggs and larvae revealed that GRAgNPs can penetrate the cuticle of larvae, change the tegmentum and ultimately kill the worm. In conclusion, GRAgNPs had more robust anthelminthic effects than the standard antiparasitic and CAgNPs. They could be considered as a promising antiparasitic agent.

References

1. Barbosa AC, Silva LP, Ferraz CM, Tobias FL, de Araújo JV, Loureiro B, Braga GMAM, Veloso FBR, de Freitas Soares FE, Fronza M, Braga FR. Nematicidal activity of silver nanoparticles from the fungus Duddingtonia flagrans. *Int. J. Nanomedicine*, 2019; 14(1): 2341. Doi: 10.2147/IJN.S193679.

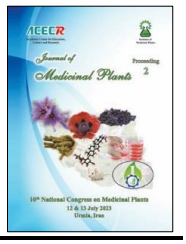
2.Peachey LE, Pinchbeck GL, Matthews JB, Burden FA, Behnke JM, Hodgkinson JE. Papaya latex supernatant has a potent effect on the free-living stages of equid cyathostomins in vitro. *Vet. Parasitol*, 2016; 228(1): 23-29. doi: 10.1016/j.vetpar.2016.07.036.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 270

Effect of plant growth regulators on cormlet formation of Saffron (*Crocus Sativus* L.) Cultured *in vitro*

Oula Almishar[1], Hassan Esmaeili[1], Mohammad Hossein Mirjalili[1,*]

[1]*Department of Agriculture, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*
E-mail: m-mirjalili@sbu.ac.ir

ARTICLE INFO

Keywords:
BAP;6-benzyl amino purine
Crocus sativus
In vitro propagation
Tissue culture

ABSTRACT

Saffron (*Crocus sativus* L.) belongs to Iridaceae family is a valuable and commercial spices plant in the world [1]. The plant stigmas are collected for medicinal and food purposes. The plant is sterile triploid and does not produce seeds, hence, it is propagated vegetatively using corms. The natural propagation rate of the plant is relatively low. So, the plant *in vitro* cultures can be employed as an efficient method for mass propagation such as saffron. The present study was conducted to evaluate the effect of different plant growth regulators (PGRs) on cormlets production of *C. sativus* in *in vitro* condition. For instance, the buds on the well disinfected corms were cut and cultured on the Murashige and Skoog (MS) medium containing different concentrations of PGRs including BAP (1, 2 and 4 mg/l), 2,4-D (3 mg/l), and NAA (1 mg/l). The maximum cormlet formation was obtained from the explants cultured on the MS medium supplemented with 4 mg/l BAP. This finding can be considered for further mass propagation and *in vitro* cloning of saffron.

References

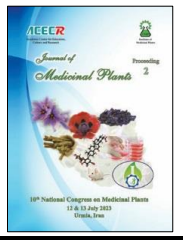
1. Renau-Morata, B.; Moyá, L.; Nebauer, S.G.; Seguí-Simarro, J.M.; Parra-Vega, V.; Gómez, M.D.; Molina, R.V. *Industrial Crops and Products*. 2013; 46, 97-104.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 271

In vitro callus culture of *Astragalus gossypinus* as a potential source of medicinally important astragalosides

Rezvan Zahedi[1], Mohammad Hossein Mirjalili[1,*]

[1] *Department of Agriculture, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, 1983969411, Tehran, Iran*
E-mail: m-mirjalili@sbu.ac.ir

ARTICLE INFO

Keywords:
Cell suspension culture
Fabaceae
Specialized metabolite
Triterpenoids

ABSTRACT

The genus *Astragalus* L., belongs to the family Fabaceae, includes about 3000 species in the world. They are widely distributed throughout the temperate region of the world like Europe, Asia, North America, South America and mountains in Africa [1]. *Astragalus gossypinus* is one of the valuable species that has been used in traditional medicine due to its anti-oxidant and anti-mutagenic activity [2]. *A. gossypinus* was previously reported to have a wide range of aromatic triterpenoid saponin called astragalosides. Pharmacological activities such as enhanced immunomodulatory, anti-oxidant, and anti-inflammatory of astragalosides have been reported [3]. In the present study, *in vitro* callus induction and culture establishment for the possible production of astragalosides were conducted. The plant seeds were aseptically cultured on the Murashige and Skoog (MS) and *in vitro* seedlings were considered as explant source. Callus induction was performed from in vitroseedling roots cultured on solid MS medium supplemented with sixteen different concentration of plant growth regulators (KIN, BAP, NAA, IBA, and 2,4-D). The maximum callus induction (100%) was observed on MS medium containing (0.5 mg/l kin+0.5 mg/l 2,4-D). Induced calli were friable and light green. Among different concentration of auxins and cytokinins, KIN and 2,4-D had a better effect on callus induction than the others. Freeze-dried calli were extracted by methanol and analyzed by high-performance liquid chromatography-photodiode array (HPLC-PDA). The plant calli were produced 1.36, 0.12, and 0.04 mg/g DW astragaloside IV, astragaloside I, and astragaloside II, respectively. This information can be considered for the production of these medicinally important compounds through cell suspension culture in bioreactors.

References

1. Keskin, C., & Kaçar, S. (2013). *Turkish Journal of Biology*, *37*(1), 122-128

2. Ghasemian-Yadegari, J., Fard Ardali, J. K., Nikbakht, M. R., Rashidipour, M., Nouraie, H., Sikevandi, S. J., ... & Mirzania, F. (2023). *Current Bioactive Compounds*, 19(3), 11-17.

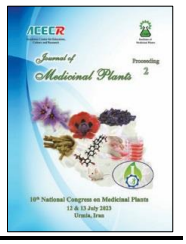
3. Jiang, K., Lu, Q., Li, Q., Ji, Y., Chen, W., & Xue, X. (2017). *International immunopharmacology*, *42*, 195-202.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 272

Different culture media and explant type on the induction and multiplication of callus from *Salvia hydrangea* dc. ex benth

Bahareh Saeedabadi[1],·Mehdi Moridi Farimani[2], Mohammad Hossein Mirjalili[1*]

[1] *Department of Agriculture, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, 1983969411, Tehran, Iran*
[2] *Department of Phytochemistry, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, 1983969411, Tehran, Iran*
E-mail: m-mirjalili@sbu.ac.ir

ARTICLE INFO

Keywords:
Antiprotosoal
Lamiaceae
Perovskone
Sage

ABSTRACT

Lamiaceae is one of the most important plant family comprise more than 200 genera and 4000 species that are mainly known as the source of terpenoids [1]. *Salvia hydrangea* dc. ex benth is a perennial plant native to Iran which has many uses in traditional Iranian medicine [2]. Salvadione, perovskone, and hydrangenone are the most important isoprenoid compounds with antiplasmodial and antiprotozoal properties that are recently isolated from the plant [3]. In the present study, in vitro callus induction and establishment of the plant cell suspension culture for the possible production of isopronoids were carried out. For instance, different explants (leaf, petiole and stem) were cultured on Murashige and Skoog (MS) medium supplemented with different plant growth regulators (NAA, BAP, 2,4-D, KIN) for callus induction. Maximum callus induction (100%) was observed from the leaf explants cultured on MS medium fortified with 2,4-D (0.5 mg/l) and KIN (0.5 mg/l). Induced calli were friable and bright yellow. The highest growth rate, fresh weight (16.1 g), and dry weight (0.7 g) were recorded on the medium containing 5 mg/l of both NAA and BAP. Methanolic extract of freeze-dried calli was analyzed by HPLC-MS for the possible production of isopronoids. The phytochemical analysis revealed that the plant calli produced perovskone. Our findings can be interestingly exploited for the production of this valuable antiplasmodial and antiprotozoal compounds through biotechnological methods.

References

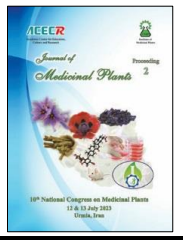
1. Diemer, F., Caissard, J. C., Moja, S., Chalchat, J. C., & Jullien, F. (2001). *Plant Physiology and Biochemistry*, 39(7-8), 603-614.
2. Amin, G. H. Ministry of Health and Medical Education Press 1 (1991): 64-5.
3. Moridi Farimani, M., et al. *Journal of natural products* 74.10 (2011): 2200-2205.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 273

In vitro callus induction and cell suspension culture establishment of *Glycyrrhiza glabra* as a potential source of glycyrrhizin and glabridin

Rezvan Zahedi[1], Mohammad Hossein Mirjalili[1,*]

[1] *Department of Agriculture, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, 1983969411, Tehran, Iran*
E-mail: m-mirjalili@sbu.ac.ir

ARTICLE INFO

Keywords:
Fabaceae
Hairy root
Specialized metabolite

ABSTRACT

Licorice (*Glycyrrhiza glabra* L.), a perennial plant belongs to the Fabaceae family, is distributed from southern Europe to eastern Asia [1]. The root of *G. glabra* is known as a source of glycyrrhizin and glabridin, which are widely used in cosmetic, food, and pharmaceutical industries [2]. Several biological properties of these compounds such as anti-inflammatory, anti-ulcer, anti-allergic, diuretic, demulcent, emollient, antispasmodic, and expectorant have been reported [3]. In this present study callus induction was carried out from the plant hairy roots cultured on Murashige and Skoog (MS) medium supplemented with different plant growth regulators (Kin, 2,4-D and BAP). The highest callus induction (100%) was obtained from the roots cultured on the medium containing 1mg/l 2,4-D and 1mg/l BAP. The calli induced were white and friable. The plant cell suspension culture (CSC) was also established from the friable calli. The highest cell fresh weight in CSC was at the third week. Established cell culture were produced 0.2 mg/g glycyrrhizin and 0.05 mg/g glabridin. This information can be used for commercial production of these medicinally important compounds through biotechnological methods.

References

1. Esmaeili, H., & Karami, A. (2022). Biological, Medicinal, and Nutritional Properties and Applications, 2, 361-381.

2. Srivastava, M., Singh, G., Sharma, S., Shukla, S., & Misra, P. (2019). *Journal of plant growth regulation*, 38, 373-384.

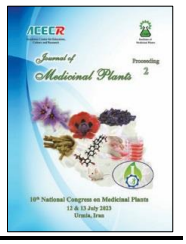
3. Liu, X., Yan, S., Zhou, H., Wu, H., Wang, S., Yong, X., & Zhou, J. (2023). Separation and Purification Technology, 123731.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 274

Light emitting diodes (led) quality affect the morphological attributed traits of Damiana (*Turnera Diffusa*) medicinal plant

Oula Almishar[1], Hassan Esmaeili[1], Mohammad Hossein Mirjalili[1]*

[1] *Department of Agriculture, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, 1983969411, Tehran, Iran*
E-mail: m-mirjalili@sbu.ac.ir

ARTICLE INFO

Keywords:
Controlled Growth Systems
Damiana
Light Quality
Phenotype

ABSTRACT

Damiana (*Turnera diffusa* Willd. ex Schult.) belongs to the Passifloraceae is a small shrub native to South Texas, Mexico, Central and South America [1]. The plant has been employed in traditional medicine for enhancing libido, treating anxiety, and as an aphrodisiac. Different phytochemical compounds such as damianin, apigenin, luteolin, quercetin, cineole, thymol, arbutin, and tetraphyllin B have been isolated and identified from the plant so far. Light is a biologically effective stimulus which can play a major role in the growth and development of plant as well as increasing of plant specialized metabolites. Currently, the light emitting diodes (LEDs) are known as the best artificial lights sources in controlled growth systems. In the present study, the effect of different LED quality (blue, red, blue + red), UV, and white (control) on some morphological traits of *T. diffusa* was investigated in a completely random design (CRD) experiment in *in vitro* condition. The light treatments had significant effect on the leaf length and width The used light treatments had no significant effect on the plant stem length. The used light treatments had no significant effect on the plant stem length. The highest number of stem length (4.61 cm) was observed from the in vitro cultured plants treated with LED light red + blue. This light treatment was significantly increased the leaf length and leaf width compared with other treatments. Red and red + blue lights were also increased the plant leaf width. The obtained results can be interestingly used for the mass production of the plant materials.

References

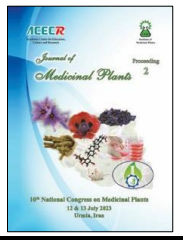
1. Everitt, J.H., D.L. Drawe, R.I. Lonard**.** 2002. Trees, Shrubs, and Cacti of South Texas. *Texas Tech University Press*. p. 208. ISBN 978-0-89672-473- 0.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 275

Morphological diversity of *Bellevalia glauca* (lindi.) kunth population in north west of Iran

Bahareh Saeedabadi[1], Ghasem Eghlima[1], Ali Sonboli[2], Mohammad Hossein Mirjalili[1*]

[1] *Department of Agriculture, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, 1983969411, Tehran, Iran*

[2] *Department of Biology, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, 1983969411, Tehran, Iran*

E-mail: m-mirjalili@sbu.ac.ir

ARTICLE INFO

Keywords:
Asparagaceae
Azerbaijan
Homoisoflavonoid

ABSTRACT

The genus *Bellevalia* Lapeyr. belongs to the Asparagaceae family. The genus comprises over 65 taxa, which the largest number of species are located in the Irano-Turanian region [1]. *Bellevalia* species are a rich source of homoisoflavonoid compounds that have anti-cancer properties [2]. *Bellevalia glauca* is one of the species belonging to this genus, which is widely distributed in Iran [3]. The present study was done to investigate the morphological diversity of 12 populations collected from West and East Azerbaijan, and morphological characteristics such as number of leaves, stem length, fresh and dry weight of aerial parts, bulb diameter, bulb length, bulb fresh and dry weight was measured. The results showed that most of these characteristics are influenced by the growth region. the Ganahdar population (West Azerbaijan Province) had the highest number of leaves (10), bulb diameter (66.28 mm), bulb length (9.43 cm), fresh (180.25 g) and dry weight (57.24 g) of bulb, While, Kol Tappeh population (West Azerbaijan province) had the highest stem length (30.36 cm), aerial parts fresh (92 g) and dry weight (6.9 g). The aerial parts dry weight, fresh weight, and the bulbs fresh weight (CVs of 51.42, 50.93, and 46.41%, respectively) were the main morphological features with high variability among the other studied populations.

References

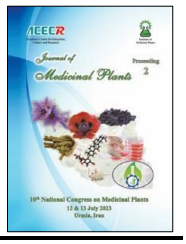
1. Feinbrun, N. Caryology, taxonomy, geography. *Palestine J Bot* 1 (1940): 336-08.
2. El-Elimat, Tamam, et al. *Phytochemistry* 203 (2022): 113343.
3. Jafari, Azarnoosh, et al. (2021).

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 276

Evaluation and determination of phenolic compounds and yield of *Equisetum arvense* L. extract under the influence of different solvents

Bahareh Saeed-Abadi[1], Ghasem Eghlima[1*]

[1] *Department of Agriculture, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*
E-mail: gh_eghlima@sbu.ac.ir

ARTICLE INFO

Keywords:
Extraction
Phenolic compounds
Solvent
Equisetum arvense

ABSTRACT

Common horsetail (*Equisetum arvense* L.) is one of the most important medicinal species of the Equisetaceae family, which has many biological properties such as antioxidant, antifungal, antibacterial, anti-inflammatory, nerve and heart protective, diuretic and immunological [1]. The aerial parts of this plant are used to treat osteoporosis, tuberculosis, repair bone fractures, bladder and kidney problems, and to stop bleeding [2]. The objective of this research was to study effect of different solvents (water, ethanol and methanol) in the extraction efficiency of phenolic compounds from aerial parts of *E. arvense*. According to Duncan test at 5% level, results showed the solvent used for extraction has significant effect on the extract yield and phenolic compounds. The yield of the extract in water, ethanol and methanol solvents was 12.32, 7.35 and 9.8 %, respectively. HPLC analyses of all extracts revealed that the major phenolic acids identified in the tested extracts were gallic acid, chlorogenic acid, coumaric acid and ferulic acid, whereas rutin and quercetin were the major of flavonoids. Ferulic acid was extracted only in aqueous extract (0.340 mg. g^{-1} DW). The highest amount of rutin (1.67 mg. g^{-1} DW) and quercetin (1.73 mg. g^{-1} DW) was observed in Methanolic extract. Overall, the results show that methanol, is more effective solvents for phenolic compounds extraction from common horsetail.

References

1. Al-Snafi A.E. The pharmacology of *Equisetum arvense*—A review. *IOSR J. Pharm.* 2017; 7: 31–42. doi: 10.9790/3013-0702013142.

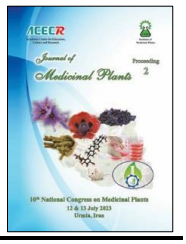
2. Masłowski M, Miedzianowska J, Czylkowska A, Strzelec K. Horsetail (*Equisetum arvense*) as a Functional Filler for Natural Rubber Biocomposites. *Materials*, 2020; 13: 2526; doi:10.3390/ma13112526.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 277

Authentication of five commercial vegetable oils used in cosmetic industry based on fatty acid composition

Deniz Khanmohammadi[1], Ali Sonboli[2 *], Hassan Rezadoost [1*]

[1] *Department of Phytochemistry, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, 1983969411, Tehran, Iran*

[2] *Department of Biology, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, 1983969411, Tehran, Iran*

E-mail: a-sonboli@sbu.ac.ir; h_rezadoost@sbuac.ir

ARTICLE INFO

Keywords:
Fatty acid
GC-FID
Herbal oil
Cosmetic
Iran

ABSTRACT

Vegetable oils are widely used in the food, cosmetic and medicinal industries. Therefore, in order to obtain pure and original oils, the need to the authentication (i.e. identification of adulterants) seems necessary. In this research, identification of fatty acid composition of five commercial vegetable oils used in cosmetic industry including; Rose hip, Hemp seed, Poppy seed, Argan and Moringa, was performed by gas chromatography (GC-FID) analysis. Briefly, Fatty acid methyl esters (FAME) were prepared with 2-M methanolic potassium hydroxide solution and the resulting FAME identified by GC-FID (Ref.). Compound identification and quantification was based on matching each peak retention times with those of standards FAME and the single-area percentage method, without considering corrections for response factors. While, linoleic acid (C18:2) was the most abundant fatty acid in Rosehip, Hemp seed and Poppy seed oils with 57.0, 58.0 and 50.0 %, respectively, Oleic acid (C18:1) was characterized as principal components in Argan (54.0%) and Morina (77.7%) oils. Our results were in accordance with those published in references for the studied oils. This study revealed that fatty acid profiles identified by GC-FID, could be considered as a feasible method of implementing authenticity criteria for commercial oils used in cosmetic products.

References

1. Woo KL, Kim JL. New hydrolysis method for extremely small amount of lipids and capillary gas chromatographic analysis as n(O)-tert.-butyldimethylsilyl fatty acid derivatives compared with methyl ester derivatives. *J. Chromatogr A.* 1999 Nov 12; 862(2):199-208. doi: 10.1016/s0021-9673(99)00934-6. PMID: 10596977.

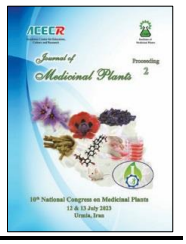
2. Hajinezhad, Ahmad, and Seyed Sina Hosseini. "Ultrasound assisted biodiesel production from Eruca Sativa as an indigenous species in Iran." *International Journal of Renewable Energy Research (IJRER)* 7, no. 2 (2017): 556-564.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 278

Evaluation of medicinal plants effective in remedy of kidney problems; a research study in Karaj city

Atefeh Babaei[1], Shahrokh Kazempour Osaloo[1], Ali Sonboli[2], Majid Ghorbani Nohooji[3,*]

[1] *Department of Plant Biology, Faculty of Biological Sciences, Tarbiat Modares University, Tehran, Iran*
[2] *Department of Biology, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*
[3] *Medicinal Plants Research Center, Institute of medicinal Plants, ACECR, Karaj, Iran*
E-mail: m.gh.nahooji@gmail.com

ARTICLE INFO

Keywords:
Medicinal plants Store
Karaj
Mistakes and Frauds
Misuse
Improper use

ABSTRACT

Karaj with an area of 1419 km2, is the fourth largest city in Iran and is located in the central district of Alborz province. The plant biodiversity of this city is rich due to its proper soil and water resources. On the other hand, the city is made up of different ethnic groups and tribes of Iranians due to its proximity to the capital and the large migration rate of people [1, 2]. Kidney problems such as kidney stones and other complications can cause serious diseases. A significant part of medicinal plants is used by the ethnic people in the stores of Karaj city, while they have not been carefully studied before. Thus, there may be mistakes or defects in their identification and utilization. This research was aimed to investigating the types and prevalence of the use of medicinal plants and their traditional uses in the treatment of kidney problems in the medicinal plant markets of Karaj. After the preliminary study and data collection in the field, the plant species are listed and the information used in the treatment of kidney problems such as the Persian name, the parts used, the methods of consumption and their medicinal properties are selected from the selected plants. The results were in accordance with the previous information about ethnobotany and knowledge of traditional Iranian herbal medicine and confirmed the traditional uses of medicinal plants. But in some cases, were showed mistakes, frauds and misuse of medicinal plants in treatments of kidney diseases. The most important of them, which are commonly used as aromatic water, boiled and infused are *Zea mays*, *Ceracus avium*, *Tribulus terrestris*, and *Alhaji pseudoalhaji* plants. They are widely distributed and consumed in city stores. Considering the historical and cultural background of Karaj, this study can be regarded as a baseline for more scientific studies on the use of medicinal plants in this city.

References

1. Razaghi, H., Zayyari, K., Zayyari, K., Saeedi.R, N. (2011). 'The Polycentric and Multi-core Model of City and Metropolis: from Theory to Practice (A case of Karaj)', *Geographical Research*, 26(102), pp. 73-100.

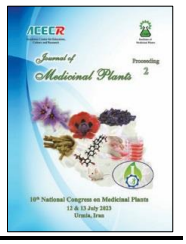
2. Meshkini, A., Alipour, S., Hajizadeh, M. (2020). 'Explaining the Levels of Urban Creativity in the Metropolitan Cities (Case study: Karaj metropolis)', *Human Geography Research*, 52(2), pp. 385-400. doi: 10.22059/jhgr.2017.62460.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 279

Bioinformatic investigation to evaluate the protein stability of RNA silencing suppressor in Cucumber mosaic virus

Mehdi safaeizadeh[*1], Abbas Saidi[1], Masoumeh Fallah Ziarani[1]

Department of Cell & Molecular Biology, Faculty of Life Sciences & Biotechnology, Shahid Beheshti University, Tehran, Iran
E-mail: m.safae2010@gmail.com

ARTICLE INFO

Keywords:
CMV
RNA Silencing
protein stability
GRAVY

ABSTRACT

Cucumber mosaic virus (CMV) is a member of the Cucumovirus genus of the Bromoviridae family. Compared to other plant viruses, this virus has the widest host range and it has been reported from different regions in Iran. In this research, bioinformatic analysis of RNA Silencing Suppressor from Iranian strain of CMV was evaluated to check the stability of this protein. The results of the study showed that the percentage of GC was 53.4%. The theoretical protein isoelectric point of the investigated protein was 6.91. In this range, the target protein is precipitated. The higher the GC percentage of the examined protein, the more stable that protein over 50 percent. Also, the instability index and aliphatic index for this protein were 75.27 and 49.90, respectively. Average GRAVY (hydrophobic property of protein) calculated for this protein was obtained by dividing the sum of hydropathy calculated for all amino acids in the protein by the total number of amino acids of that protein. In this research, Grand average of hydropathicity (GRAVY) -1.111 was obtained, which indicates the non-polarity of the investigated protein. The results of bioinformatic analysis showed that this protein is not among the stable proteins and is not able to maintain its structure completely at high temperatures.

References

1. Li-Na D, Yue-Tao L, Yuan-Zhen W, Teng L, Rui G, Jun C, Wei Z, Xiao-Li T (2022) Plant Disease Resistance-Related Signaling Pathways: Recent Progress and Future Prospects. *International Journal of Molecular Science.* 23: 16200. https://doi.org/10.3390/ijms232416200.

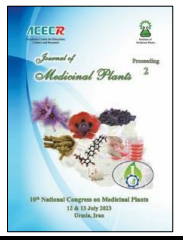
2. Roger WI, Yangnan G, Dan K, Dorothea T (2022) Exciting times in plant biotic interactions. *Plant Cell* 34(5): 1421-1424.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 280

Investigation of hormonal changes in Arabidopsis thaliana plant under the effect of biological stress by Pseudomonas aeruginosa

Mehdi safaeizadeh[*1], Ali Akbar Ghotbi-Ravandi1, Masoumeh Fallah Ziarani[1]

[1] *Student, Department of Cell & Molecular Biology, Faculty of Life Sciences & Biotechnology, Shahid Beheshti University, Tehran, Iran*
[*]*E-mail: m.safae2010@gmail.com*

ARTICLE INFO

Keywords:
Arabidopsis thaliana biological stress Pseudomonas aeruginosa bacteria hormones

ABSTRACT

The research of the last twenty years has shown the similarity between Arabidopsis and agricultural species. The ability to sequence whole genomes in the Arabidopsis plant has changed life in biology. Arabidopsis plant was one of the first eukaryotes whose genome was sequenced. For this reason, it is a good option for checking tension. Also, Arabidopsis plant is a model plant and is of great importance in research. With microbial attack, plants can identify the invaders and activate the plant's innate immune system. To detect pathogen molecules or cell wall damage, plants use receptors that activate defense responses. Here, the changes of 9 hormones including Abscisic acid, Melatonin, Indole-3-butyric acid, Salicylic acid, Gibberellic acid, Kinetin, Indole-3-acetic acid, Trans-Zeatin and Jasmonic acid were studied under the biological stress of Pseudomonas aeruginosa bacteria. Pseudomonas aeruginosa bacterium was isolated from oil, cultured in a laboratory environment, and then sprayed on Arabidopsis plants for stress. 24 hours after applying stress, hormones were measured by HPLC. According to the obtained results, all the hormones involved in the plant's immune system were changed. In response to the stress of Pseudomonas aeruginosa bacteria, the amount of hormones increased. Salicylic acid, Gibberellic acid and Jasmonic acid hormones had the highest increase. The results proved that Arabidopsis thaliana plants show resistance against bacteria. It was also found that this plant can be used as a plant vaccine.

References

1. Li-Na D, Yue-Tao L, Yuan-Zhen W, Teng L, Rui G, Jun C, Wei Z, Xiao-Li T (2022) Plant Disease Resistance-Related Signaling Pathways: Recent Progress and Future Prospects. *International Journal of Molecular Science.* 23: 16200. https://doi.org/10.3390/ijms232416200.

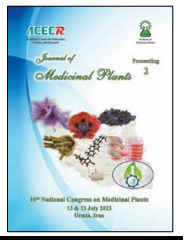
2. Roger WI, Yangnan G, Dan K, Dorothea T (2022) Exciting times in plant biotic interactions. *Plant Cell* 34(5): 1421–1424.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 281

Investigating the morphological effect of salicylic acid treatment on resistance to pathogenic bacteria in *Nicotiana Rustica*

Mehdi Safaeizadeh*, Atefeh Amini Neisiani, Mohammad Abbasi, Abbas Saidi

Department of Cell & Molecular Biology, Faculty of Life Sciences & Biotechnology, Shahid Beheshti University, Tehran, Iran
E-mail: m.safae2010@gmail.com

ARTICLE INFO

Keywords:
B. subtilis
P. aeruginosa
P. syringae
SA treatment
Tobacco

ABSTRACT

As a model plant (due to certain characteristics), tobacco has been widely used to study plant-pathogen interaction at the molecular and morphological levels. Annual bacterial diseases cause the loss of a large number of tobacco plants and cause significant damage. Inducing the expression of genes related to disease resistance can be effective in reducing the severity of damage. Studies have shown that plant hormones play a role in the regulation of induced resistance by activating the transcription of genes related to the plant's defense mechanism, which increases the production of secondary metabolites. In this research, the effect of salicylic acid treatment on resistance to *Pseudomonas syringae*, *Pseudomonas aeruginosa*, and *Bacillus subtilis* in tobacco plants was investigated. 72 hours after the treatment of 5 mM salicylic acid solution spray on the leaves of two-month-old tobacco plants, respectively, bacteria were sprayed on the leaves with the same concentration. After 48 hours, the morphology of the plants was compared with the control plants. This experiment was performed with 8 repetitions. The results showed that in the plants treated with salicylic acid against pathogenic bacteria, the surface of the leaves remained smooth and the color of the leaves remained green, while the plants without salicylic acid treatment against the bacteria started to turn yellow and brown spots appeared. Among the examined bacteria, salicylic acid treatment with a concentration of 5 mM showed the highest resistance against *Pseudomonas aeruginosa* and then *Bacillus subtilis*. The results of this research showed that tobacco can be used as a plant vaccine in the future.

References

1. Li-Na D, Yue-Tao L, Yuan-Zhen W, Teng L, Rui G, Jun C, Wei Z, Xiao-Li T (2022) Plant Disease Resistance-Related Signaling Pathways: Recent Progress and Future Prospects. *International Journal of Molecular Science.* 23: 16200. https://doi.org/10.3390/ijms232416200.

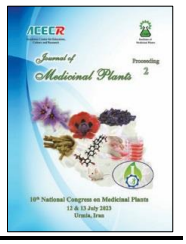
2. Roger WI, Yangnan G, Dan K, Dorothea T (2022) Exciting times in plant biotic interactions. *Plant Cell* 34(5): 1421-1424.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 282

Synergistic cytotoxicity of peptides isolated from *Lucilia sericata* larvae and *Apis mellifera* honey on *Leishmania major* cells

Jila Sherafati[1], Mohammad Saaid Dayer[1, *], Fatemeh Ghaffarifar[1]

[1]*Department of Parasitology and Medical Entomology, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran*
E-mail: dayer@modares.ac.ir

ARTICLE INFO

Keywords:
Leishmaniasis
Lucilia sericata
Honey
Natural medicine
Maggot Therapy

ABSTRACT

Leishmaniasis is an endemic vector-borne disease in Iran that manifests in three clinical forms, of which Zoonotic Cutaneous Leishmaniasis (ZCL) is caused by *Leishmania major*. Since 2019, ZCL has spread at an incidence rate of 15.8 cases per 100,000 into new areas despite control measures (1). Drug resistance and/or host factors were the main reasons behind many failure reports on ZCL chemotherapy using antimonials (2). Therefore, alternative medicines are being assessed particularly of natural origin. This study evaluated leishmanicidal effects of *Lucilia sericata* larval excretion/secretion (ES) combined with honey against *L. major*. Two ES products, both crude and fractionated, as well as honey were prepared at serial dilutions and tested, as standalone and/or combined, against promastigotes and amastigotes engulfed by J774A.1 macrophage. The cytotoxicity was determined by direct counting method and MTT assay. The toxicity against amastigotes was measured as macrophage infection rate and amastigote counts per infected macrophages. The IC_{50} values for crude ES plus honey, ES fraction >10 kDa plus honey, ES fraction <10 kDa plus honey, and honey alone were 21.66 µg/ml, 43.25 60 µg/ml, 52.58 µg/ml, and 70.38 µg/ml respectively. The IC_{50} for glucantime was 27.03 µg/ml. The viability rates were significantly lower for promastigotes exposed to tested doses of biocides compared to negative control ($P \leq 0.0001$). The biocides applied at 150 to 300 µg/ml significantly reduced the infection rate and amastigote counts in infected macrophages without harming them. The isolated larval peptides in combination with honey reacted synergistically against *L. major* cells (3).

References

1. Charrahy Z, Yaghoobi-Ershadi MR, Shirzadi MR, Akhavan AA, Rassi Y, Hosseini SZ, Webb NJ, Haque U, Bozorg Omid F, Hanafi-Bojd AA. Climate change and its effect on the vulnerability to zoonotic cutaneous leishmaniasis in Iran. *Transbound Emerg Dis.* 2022; 69(3):1506-1520. doi: 10.1111/tbed.14115.

2. Soleimanifard S, Arjmand R, Saberi S, Salehi M, Hejazi SH. Treatment Outcome of the Drug-resistant Zoonotic Cutaneous Leishmaniasis by Glucantime. *Adv Biomed Res*. 2017; 6:17. doi: 10.4103/2277-9175.201329.

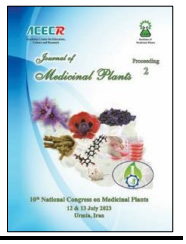
3. Sherafati J, Dayer MS, Ghaffarifar F. Therapeutic effects of *Lucilia sericata* larval excretion/secretion products on *Leishmania major* under in vitro and in vivo conditions. *Parasites & Vectors*. 2022; 15(1):1-12. doi: 10.1186/s13071-022-05322-7.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 283

Bioinformatic investigation of protein stability Calmodulin-binding Protein 60 g (CBP60g)

Mehdi Safaeizadeh*[1], Masoumeh Fallah Ziarani[1], Yeganeh Altafi[1], Ali Akbar Ghotbi-Ravandi[2]

[1]*Department of Cell & Molecular Biology, Faculty of Life Sciences & Biotechnology, Shahid Beheshti University, Tehran, Iran*
[2]*Department of Plant Biology, Faculty of Life Sciences & Biotechnology, Shahid Beheshti University, Tehran, Iran*
E-mail: m.safae2010@gmail.com

ARTICLE INFO

Keywords:
Stability
CBP60g
GRAVY

ABSTRACT

In nature, plants are frequently exposed to drought and bacterial pathogens simultaneously. Calmodulin-binding Protein 60 g (CBP60g) is transcription factor. under combined stress, drought through the ABA pathway downregulates the induction of Calmodulin-binding Protein 60 g (CBP60g) and Systemic Acquired Resistance Deficient 1 (SARD1), two transcription factors crucial for SA production upon bacterial infection. In this research, bioinformatic analysis of CBP60g protein was performed to check the stability of this important protein. The theoretical pI of the investigated protein was 8.65. In this range, the target protein is not precipitated. Also, the instability index and aliphatic index for CBP60g in the studied 46.44 and 71.99, respectively. Average GRAVY (hydrophobic property of protein) calculated for proteins is obtained by dividing the sum of hydropathy calculated for all amino acids in the protein by the total number of amino acids of that protein. In this research, Grand average of hydropathicity (GRAVY) -0.47 was obtained, which indicates the non-polarity of the investigated protein. The results of bioinformatic analysis showed that this protein is not among the stable proteins and is not able to maintain its structure completely at high temperatures.

References

1. Li-Na D, Yue-Tao L, Yuan-Zhen W, Teng L, Rui G, Jun C, Wei Z, Xiao-Li T (2022) Plant Disease Resistance-Related Signaling Pathways: Recent Progress and Future Prospects. *International Journal of Molecular Science.* 23: 16200. https://doi.org/10.3390/ijms232416200.

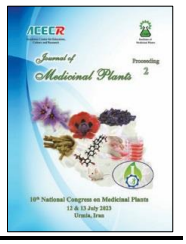
2. Roger WI, Yangnan G, Dan K, Dorothea T (2022) Exciting times in plant biotic interactions. *Plant Cell* 34(5): 1421–1424.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 285

Melissa officinalis aqueous extract inhibits depressive-like behaviors in reserpinised-mice through prevention of brain oxidative stress

Sedighe Talebi[1], Batool Rahmati[2]*, Fatemeh Emadi[1,3], Mohsen Naseri[1,3], Masoumeh Jorjani[4]

[1] *Department of Traditional Persian Medicine, School of Persian Medicine, Shahed University, Tehran, Iran*
[2] *Neurophysiology Research Center, Department of Physiology, School of Medicine, Shahed University, Tehran, Iran*
[3] *Traditional Iranian Medicine, Clinical Trial Research Center, Shahed University, Tehran, Iran*
[4] *Department of Nanomedicine and Tissue Engineering, Department of Pharmacology & Neuroscience Research Center, Shaheed Beheshti Medical University, Tehran, Iran.*
E-mail: batrahmati@yahoo.com

Keywords

Keywords:
Melissa officinalis
Depression
Reserpine
Catalase activity
Antidepressant

ABSTRACT

Melissa officinalis is an old and traditional medicinal herb which is used in neurological disorders including depression. This study was designed to search the effects of *M. officinalis* aqueous extract (MO) pretreatment on reserpine-induced depression in mice. Different doses of MO (150, 350, 550, 750 mg/kg) were administered orally daily for 7 days and depressive-like behaviors in mice were assessed 24 hours after subcutaneous injection of reserpine (4 mg/kg) in the sequence of forced-swimming test, suspension tail test and open-field test (8th day). Normal Saline (10 ml/kg), Fluoxetine (20 mg/kg) and Imipramine (10 mg/kg) were control groups of the study. Reserpine enhanced immobility time in compared to normal saline while MO pretreatment were declined immobility time in a dose dependent manner (350 mg/kg and 550 mg/kg). MO reduced immobility time dose dependently in tail suspension test and increased the total distance traveled in the open-field test ($p<0.05$) [1]. The amounts of active components in the extract and catalase as a brain oxidative stress were measured with ELISA. Data showed that MO 550 mg/kg produced an antidepressant action and a significant increase in brain catalase activity ($p<0.05$) [2]. HPLC results showed that rosmarinic acid contents in MO was 6.42±1.1 mg/g of dried extract, respectively. Pretreatment with MO could prevent of depression-like behavior in reserpine-induced mice better than fluoxetine and imipramine.

References

1. Emamghoreishi, M., & Talebianpour, M. Antidepressant effect of Melissa officinalis in the forced swimming test. *DARU Journal of Pharmaceutical Sciences*. 2015; 17(1): 42-47.

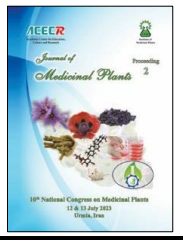
2. Tian, J.-S., Cui, Y.-L., Hu, L.-M., Gao, S., Chi, W., Dong, T.-J., & Liu, L.-P. Antidepressant-like effect of genipin in mice. *Neuroscience letters*. 2010; 479(3), 236-239, doi: 10.1016/j.neulet.2010.05.069.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 286

Green synthesis of silver nanoparticles using *Ligularia persica* Boiss. leaves extract and their antioxidant and antibacterial activities

Shahab Ojani[1,*], Mohsen Mohammadi[2]

[1] *Young Researchers and Elite Club, Tonekabon Branch, Islamic Azad University, Tonekabon, Iran*
[2] *Department of Biology, Tonekabon Branch, Islamic Azad University, Tonekabon, Iran*
E-mail: Shahab_ojani@yahoo.com

ARTICLE INFO

Keywords:
Ligularia persica Boiss.
Silver nanoparticles
Antioxidant activity
Serratia marcescens
Biomedicine

ABSTRACT

Nanotechnology associated with metal nanoparticles emerges as a rapidly growing field in the realm of science and technology, principally in biomedical sciences due to its unique optical catalytic, electronic, magnetic, and thermal characteristics. Metallic nanoparticles have several biomedical applications including anti-oxidant, anti-microbial, anti-cancer, anti-coagulant and anti-diabetic activities [1-2]. *Ligularia persica* Boiss. (*L. persica*) is an important species of compositae family. *Ligularia* species are used in traditional medicines such as treatment of coughs, inflammations, jaundice, scarlet fever rheumatoid arthritis, and hepatic diseases. The aim of this project, green synthesis of silver nanoparticles using leaves of (*L. persica*) aqueous of extract and their antioxidant and antibacterial activities. The Ag-NPs formation was confirmed by Ultraviolet-Visible spectrophotometer (UV-Vis). The synthesized Ag-NPs in solution have shown maximum absorption at 445 nm. The Fourier-Transform Infrared (FT-IR) Spectroscopy was used to confirm the existence of various functional groups responsible for reducing and stabilizing during the biosynthesis process. The X-Ray Diffraction (XRD) analysis confirmed the structure, crystal size and nature of the Ag-NPs. The synthesized Ag-NPs showed antibacterial gram positive bacteria and gram negative bacteria. Based on the results, the zone of inhibition of these nanoparticles and aqueous extracts of leaves of (*L. persica*) for *Bacillus cereus*, *Staphylococcus epidermidis*, and *Shigella dysenteriae* and *Serratia marcescens* was (25, 20 and 18, 12) mm, respectively. Also, the zone of inhibition of antibiotic ampicillin 6 mm. Then antioxidant activity by (2,2-diphenyl-1-picryl-hydrazyl ($DPPH^0$) radical scavenging method. The radical scavenging activity (%) and IC_{50} of Ag-NPs using aqueous extracts of leaves of (*L. persica*) and aqueous extracts of leaves of (*L. persica*) were (84.65% - 0.42 and 54.73% - 0.68) µg/ml respectively. The developed method for the Ag-NPs synthesis using (L. persica) is an eco-friendly and convenient method. In near future, the synthesized Ag-NPs could be used in the fields of biomedicine and nanotechnology.

References

1. Vanlalveni C, Rajkumari K, *et al*., Green synthesis of silver Nanoparticles using *Nostoc Linckia* and its antimicrobial activity: A novel biological approach. *Bionanoscience.* 2018; 8: 624-631. doi: 10.1007/s12668-018-0520-9.

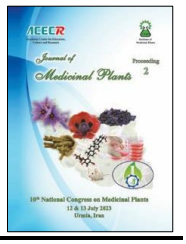
2. Khane Y, Benouis K. *et al*., Green synthesis of silver nanoparticles using aqueous *Citrus limon* Zest extract: characterization and evaluation of their antioxidant and antimicrobial properties. *Nanomaterials.* 2022; 12: 2013. doi: 10.3390/nano12122013.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 287

Phytosynthesis of copper nanoparticles using aqueous *Acroptilon repens* (L.) DC and investigation of its antibacterial activity

Shahab Ojani[1,*], Mohsen Mohammadi[2]

[1] *Young Researchers and Elite Club, Tonekabon Branch, Islamic Azad University, Tonekabon, Iran*
[2] *Department of Biology, Tonekabon Branch, Islamic Azad University, Tonekabon, Iran*
E-mail: Shahab_ojani@yahoo.com

ARTICLE INFO

Keywords:
Acroptilon repens (L.) DC
Cu-NPs
Microdilution method
XRD
Therapeutic applications

ABSTRACT

In recent years, the green synthesis of nanoparticles has received much attention. Green synthesis has several advantages over other methods: cost-effectiveness, simplicity, and non-toxicity [1-2]. *Acroptilon repens* (L.) DC is a perennial weed in the family of Asteraceae and common name Russian knapweed, is a bushy rhizomatous, up to 80 cm tall. In the present project, we obtained the aqueous extract of *Acroptilon repens* (L.) DC, biosynthesized the copper nanoparticles (Cu-NPs), and evaluated the antibacterial activity. Ultraviolet-Visible spectrophotometer (UV-Vis), Transmission Electron Microscope (TEM), X-Ray Diffraction (XRD) and Fourier-Transform Infrared (FT-IR), were used to identify the synthesized nanoparticles. The antibacterial activity of the synthesized (Cu-NPs) was evaluated using the micro-dilution method. After adding the extract to the copper sulfate solution, the solution color changed from light blue to yellowish-green. A maximum peak at the wavelength of 410 nm confirmed the (Cu-NPs) formation. The FT-IR studies show the presence of various functional groups such as NH_2, OH, C=O groups, which are responsible for the reduction process. The XRD analysis confirmed the structure, crystal size and nature of the (Cu-NPs). TEM demonstrated the particle size ranging from 50 nm to 100 nm. The MIC and MBC method of (Cu-NPs) and aqueous extract of leaves of *Acroptilon repens* (L.) DC for *Staphylococcus aureus* and *Escherichia coli* (6.25 – 12.5) and (3.12 – 6.25) mg/ml, respectively. Our findings demonstrated that *Acroptilon repens* (L.) DC aqueous extract acts as a reducer and stabilizer factor. The involved reducing agents include the various plant metabolites (e.g. Flavonoids, Phenolic compounds, Alkaloids, Terpenoids and etc). We successfully synthesized Cu-NPs from copper sulfate using *Acroptilon repens* (L.) DC aqueous extracts. This research was the first report of (Cu-NPs) synthesized from an aqueous *Acroptilon repens* (L.) DC extracts. Our simple, quick, and inexpensive method for biosynthesis of a nanoparticle, which showed antibacterial activity, provides a new potential antibacterial agent for therapeutic applications.

References

1. Saranya S, Agneeswaran R, Deepa P.N. Green-synthesized rice-shaped copper oxide nanoparticles using *Caesalpinia bonducella* seed extract and their applications. *ACS Omega.* 2020; 5(2): 1040-1051. doi: 10.1021/acsomega.9b02857.

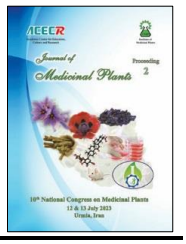
2. Pannerselvam B, Thiyagarajan D, *et al*., Copperpod plant synthesized AgNPs enhance cytotoxic and apoptotic effect in cancer cell lines. *Processes*. 2021; 9(5): 888. doi: 10.3390/pr9050888.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 288

Introduction of the most common medicinal plants in remedy of human diseases in elevated parts of Alborz mountains in mazandaran province

Majid Ghorbani Nohooji [1*] , **Abbas Gholipour**[2], **Pooyan Mehrabanjoubani**[3]

[1] *Medicinal Plants Research Center, Institute of Medicinal Plants, ACECR, Karaj, Iran*
[2] *Biology Department, Payame Noor University, Tehran, Iran*
[3] *Department of Basic Sciences, Sari Agricultural Sciences and Natural Resources University, Sari, Iran*
Email: m.gh.nahooji@gmail.com

ARTICLE INFO

Keywords:
Ethnobotany
Traditional medicine
Iran

ABSTRACT

Medicinal plants are important elements in medical system. Mazandaran Province located in North of Iran and has been known by different ecological conditions. In the south Parts, the province is consisting of high elevated areas of Alborz Mountain. This region is known by rich plant biodiversity and culture of traditional usage of plant species in remedy of human illnesses. Ethnobotany is at once a vital key to preserving the diversity of plants as well as to understanding and interpreting the knowledge by which we are, and will be, enabled to deal with them effectively and sustainably throughout the world. Thus ethnobotany is the science of survival [1, 2]. An ethnobotanical study of plant used for the treatment of human diseases was carried out in the studied area. The study revealed 29 plant species that are the most common medicinal species in the region. These plants belong to 24 genera and 16 families. Apiaceae and Lamiaceae with 5 species along with amaryllidaceae with 4 and Asteraceae with 3 species are the most abundant and important families in the region respectively. 14% of the plants were used as edible plants, 21% as medicinal and 65% of them were used in both edible and medicinal usages. The present paper represents significant ethnobotanical information on medical plants which provides baseline data for future pharmacological and phytochemical studies. According to our research, the significance reduction of ethnobotanical information have been observed in the area studied. Therefore, the necessity of preserving plant species and documenting the knowledge of the traditional use of plants in this region seems necessary.

References

1. Gholipour A, Ghorbani Nohooji M, Rasuli N, Habibi M. An Ethnobotanical Study on the Medicinal Plants of Zarm-rood Rural District of Neka (Mazandaran Province). *J. Med. Plants* 2014; 13 (52): 101-121

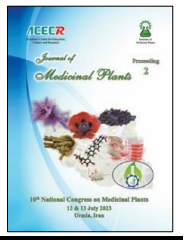
2. Mosaddegh, M., Naghibi, F., Moazzeni, H., Pirani, A., Esmaeili, S. *J. Ethnopharmacol*. **2012**, 7; 141(1): 80-95.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 289

Study of metabolic compounds profile in aquatic plants of *Hydrilla verticillata* (L.f.) Royle *and Ceratophyllum demersum* L.

Pooyan Mehrabanjoubani[1], Majid Ghorbani Nohooji[*,2], Nasim Rasouli[3]

[1] *Department of Basic Sciences, Sari Agricultural Sciences and Natural Resources University, Sari, Iran*
[2] *Medicinal Plants Research Center, Institute of medicinal Plants, ACECR, Karaj, Iran*
[3] *Department of Plant Science and Biotechnology, Faculty of Biological Sciences and Technology, Shahid Beheshti University, Tehran, Iran.*
E-mail: m.gh.nahooji@gmail.com

ARTICLE INFO

Keywords:
Medicinal plants
Phytochemicals
Wetlands
Native Plants

ABSTRACT

Freshwater macrophytes, have wide-ranging applications such as bioindicators, biofuels, food production, the production of secondary metabolites and etc. [1, 2]. The ethanol extract of dried powder of two aquatic plants, *Hydrilla verticillata* and *Ceratophyllum demersum* were investigated here using gas chromatography. The plant samples were collected, transferred in plastic bags to the Sari Agricultural University, and washed with distiled water. Subsequently, they were dried in a shade for 5 days and then dried in an oven at a temperature of 40°C for 48 hours. The dried samples were powdered using a mechanical mill and stored in sealed containers. To evaluate the metabolic compounds of them, ethanol extracts were prepared and assessed using GC-MS. The results of the metabolic compounds of *H.verticillata* indicated approximately 66% of the compounds present in the plant, while for *C.demersum*, it was about 85%. The predominant compounds of *H.verticillata* were hexadecanoic acid, octadecatrienoate, and phytol, accounting for 21%, 15%, and 13% respectively. The major compounds present in *C.demersum* were the valuable compounds linoleic acid and hexadecanoic acid, constituting 43% and 29% respectively. Linoleic acid is an essential unsaturated fatty acid predominantly found in plant oils. It is known as an omega-6 fatty acid and is essential for human nutrition. Also, linoleic acid is an essential component of cell membranes and influences cell membrane properties such as fluidity, flexibility, and permeability. The present study demonstrates the potential of *H.verticillata* and *C.demersum* plant extracts not only for use in the food and pharmaceutical industries but also as biostimulants. The use of macrophytes as biofertilizers in agriculture has environmental benefits, leading to economic development through their rapid growth and the need for removal of these plants from various ecosystems. Thus they are economically and qualitatively efficient for sustainable agriculture.

References

1. Salam, U.; Ullah, S.; Tang, Z.-H.; Elateeq, A.A.; Khan, Y.; Khan, J.; Khan, A.; Ali, S. Plant Metabolomics: An Overview of the Role of Primary and Secondary Metabolites against Different Environmental Stress Factors. *Life;* 2023, 13, 706. https://doi.org/10.3390/life13030706

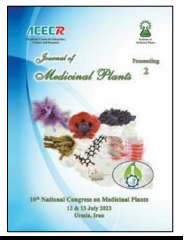
2. Wahman R, Cruzeiro C, Graßmann J, Schröder P, Letzel T. The changes in Lemna minor metabolomic profile: A response to diclofenac incubation. *Chemosphere*, 2022, Vol: 287,https://doi.org/10.1016/j.chemosphere.2021.132078

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 290

Phytochemical study of *Salvia abrotanoides* (Kar.) Systema in the natural habitat of Golestan province (Vamenan village)

Mohammad Hadi Masoumi[1], Mattia Sadat Borhani[1], Mahmoud Salehi[1], Meysam Habibi[1,*], Sohrab Bozarpour[1]

[1]*Department of Biology, Faculty of Basic Sciences and engineering, Gonbad Kavous University, Gonbad, Iran*
E-mail: meisam.habibi@gmail.com

ARTICLE INFO

Keywords:
Essential oil
Golestan
GC-MS

ABSTRACT

The *Salvia abrotanoides* (Kar) Systema. is one of the members of Lamiaceae family, which is distributed in the provinces of Golestan, Semnan, Khorasan, Sistan & Baluchistan, and Isfahan. This species has lots triterpenoids that is effective in some biological activities including effects on cardiac function, antioxidant activity [1, 2]. In this research, two plant organs, leaf and flower of *S. abrotanoides* were collected from the natural habit in Golestan Province (Vamenan village). The experiment was arranged in a completely randomized design with three replications for the essential oil contents. Then essential oil content and composition were analyzed by Gas chromatography-mass spectrometry (GC-MS). Essential oil contents of leaf and flower were 2% (w/w). The total number of compounds identified and quantified was thirty-nine in leaf, forty-one in flower, representing 93.4, 95.24 % of the total essential oil, respectively. The major compounds of the essential oil were camphor (20.6-31.66 %), 1, 8-cineole (18.48-20.57 %), β-myrecene (1.49-7.51 %), α-bisabolol (4.63-6.67 %), and α-pinene (4.39-5.12 %). Results showed that leaf essential oils of the plant characterized with high content of oxygenated monoterpenes 47.69 to 58.65 in leaf and flower, respectively. The main volatile compound identified in the leave and flower was camphor, which reached a concentration of 20.60%. to 31.66%. In general, the content percentage and main composition in these two organs have been somewhat different. Chemical variation in the essential oils of different plant parts of *S. abrotanoides* is important for conservation and breeding programs, which can be considered by medicinal plants breeders and pharmaceutical industries for breeding and processing uses.

References

1. Pourhosseini S. H, Mirjalili M. H, Nejad Ebrahimi S, Sonboli A. Essential oil quantity and quality of different plant organs from *Perovskia abrotanoides* Karel in natural habitat of Northern Khorasan province, *Plant Production* 2018; 40 (4): 53-462.

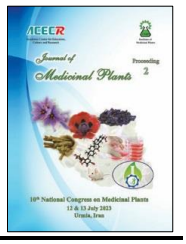
2. Arvin P., Firouaeh R. Study of phenolic and flavonoid compounds and essential oil content of medicinal plant of Proveskia abrotanoides Karel in three natural habitats of Raz and Jargalan county. *Plant Process and Function*, 2022; 11 (47): 62-89.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 292

Grape molasses effect in women with iron deficiency anemia: a randomized, placebo controlled, clinical trial

Rasul Pourhakim[1], Fatemeh Emadi[1,2*], Saeed RazaviDizaji[3], SayedSaeed EsmaeiliSaber[1], Daryush Talei[4], Maryam Iranzadasl[1], SeyedAbbas Hasheminejad[1]

[1]*Department of Traditional Persian Medicine, School of Persian Medicine, Shahed University, Tehran, Iran)*
[2]*Traditional Medicine Clinical Trial Research Center, Shahed University, Tehran, Iran*
[3]*Hematology, Immune Cell Therapy, and Stem Cells Transplantation Research Center, Clinical Research Institute, Urmia University of Medical Sciences, Urmia, Iran*
[4]*Medicinal Plants Research Center, Shahed University, Tehran, Iran*
E-mail: f.emadi@shahed.ac.ir.com

ARTICLE INFO

Keywords:
Iron deficiency anemia
Grape molasses
Persian Medicine

ABSTRACT

Grape molasses is a healthy and nutraceutical food in Persian Medicine which recommended for treatment of anemia [1]. Grape molasses is a good source of energy due to its high carbohydrate level and its mineral compounds, phenolic, organic acids, etc. Fe in molasses is absorbed easily by digestive system [2,3]. The aim of this randomized double-blind clinical trial study was to evaluate the efficacy of GM on iron deficiency anemia (IDA) in 80 women aged 15 to 49 years. One group used ferrous sulfate tablet (50 mg orally) with GM (10 ml) and the other group used ferrous sulfate tablet (50 mg orally) with placebo syrup 3 times a day for 4 weeks. Hematological parameters were detected and quality of life assessed by using General Health Questionnaire–28 (GHQ 28). After the intervention, there was a very significant difference in hemoglobin (Hb) and hematocrit (Hct) between two groups (0.0001), and these variables was significantly higher in the GM group. In addition, mean differences of red blood cell count (RBC) and mean corpuscular volume (MCV) were significantly higher in GM group (p=0.003, p=0.002 respectively). Also GHQ 28 mean difference was improved statistically significantly in the GM group (p = 0.001). This study showed grape molasses as a food, with iron tablets have a better effect than iron tablets alone on hematological parameters and also may helpful in enhancing mood and body health can be considered as a complementary therapy for the management of IDA.

References

1. Tonekaboni Deilami M. Tohfe Momenin (Persian). Qom, Iran: Noore Vahy; 2011.

2. Aşcı ÖA, Baydar NG. Exchange of total carbohydrate, minerals, and phenolics in grape and grape products. *Turkish J. Agric. Food Sci. Technol.* 2021;9:1106-13. doi: https://doi.org/10.24925/turjaf.v9i6.1106-1113.4302.

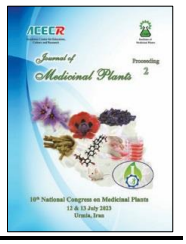
3. Araman S, Yilmaz MT, Ozturk G, Yuksel F, Toker ÖS, Dogan M. Characterization of grape molasses/sesame paste/honey blends: Multiple response optimization of some physicochemical, bioactive, viscoelastic and sensory properties. *J. Food Process Eng.* 2017;40:e12406. doi:10.1111/jfpe.12406.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 292

Phytosynthesis of silver nanoparticles using extract of *Allium ampeloprasum* L. subsp. iranicum leaves and cytotoxicity activity against breast cancer cell line

Samin Amirkhani[1,*], Shahab Ojani[2]

[1] *Department of Midwifery, Tonekabon Branch, Islamic Azad University, Tonekabon, Iran*
[2] *Young Researchers and Elite Club, Tonekabon Branch, Islamic Azad University, Tonekabon, Iran*
E-mail: Samin.amirkhani@yahoo.com

ARTICLE INFO

Keywords:
Allium ampeloprasum L.
MCF-7 cell line
Ag-NPs
Cytotoxicity activity
TEM

ABSTRACT

Cancer is the second leading cause of death all over the world and breast cancer is the second common member of cancers worldwide [1-2]. Persian leek (*Allium ampeloprasum* L. subsp. iranicum) - a cultivated allium native to the middle east and Iran, grown for culinary purposes and is called *tareh* in Persian. The linear green leaves have a mild onion flavor and are eaten raw, either alone, or in food combinations. In this project, silver nanoparticles (Ag-NPs) were synthesized; using aqueous extract of *Allium ampeloprasum* L. subsp. iranicum leaves and evaluated cytotoxicity activities against MCF-7 cell line. Ag-NPs formation was characterized by ultraviolet-visible spectroscopy (UV-Vis), X-Ray Diffraction (XRD), Transmission Electron Microscope (TEM), scanning electron microscopy (SEM), and Fourier transforms infrared (FT-IR) spectroscopy. Cytotoxicity was evaluated by 3-[4,5-dimethylthiazole-2-yl]-2,5-diphenyltetrazolium bromide (MTT) assay. Our results demonstrated the formation of Ag-NPs by *Allium ampeloprasum* L. subsp. iranicum leaves extract discoloration to dark brown. UV-Vis spectrum exhibit an absorption band at 435 nm suggesting the formation of biological Ag-NPs. The FT-IR technique showed presence of -OH, -CH, -NH, -COOH etc. The involved reducing agents include the various water soluble plant metabolites (e.g. Flavonoids, phenolic compounds and terpenoids). XRD analysis confirmed the structure, crystal size and nature of the silver nanoparticles. This transformation revealed their slightly aggregated shapes to quasi-spherical form with a mean diameter of 90 nm. MTT results showed that Ag-NPs significantly decreased the viability MCF-7 cells in a dose-dependent manner; especially at concentration of 50 µg/mL. In conclusion, the plant extract based synthesis can provide nanoparticles of a controlled size and morphology. We have demonstrated an eco-friendly, rapid green chemistry approach for the synthesis of Ag-NPs by using *Allium ampeloprasum* L. subsp. iranicum, which provides a simple, cost effective and efficient way for the synthesis of Ag-NPs.

References

1. Erdogan O, Abbak M, *et al*., Green synthesis of silver nanoparticles via *Cynara scolymus* leaf extracts: The characterization, anticancer potential with photodynamic therapy in MCF7 cells. *PLoS One*. 2019; 14(6): doi: 10.1371/journal.pone.0216496 PMID: 31220110.

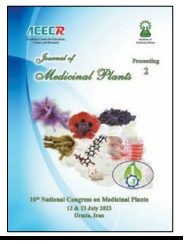
2. Mathur P, Jha S, *et al*., . Pharmaceutical aspects of silver nanoparticles. *Artif Cells Nanomed Biotechnol*. 2018; 46(1): 115-26.doi: 10.1080/21691401.2017.1414825 PMID: 29231755.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 294

Green synthesis of silver nanoparticles mediated by *Gundelia tournefortii* and their biological applications (antioxidant, antibacterial and cytotoxicity activity)

Sanaz Nikoumanesh[1,*], Shahab Ojani[2], Mohammad Nikoumanesh[3]

[1] *Department of Biology, Tonekabon Branch, Islamic Azad University, Tonekabon, Iran*
[2] *Young Researchers and Elite Club, Tonekabon Branch, Islamic Azad University, Tonekabon, Iran*
[3] *Department of Biology, Central Tehran Branch, Islamic Azad University, Tehran, Iran*
E-mail: Sanaz_nikoomanesh@yahoo.com

ARTICLE INFO

Keywords:
Gundelia tournefortii
Ag - NPs
MCF-7 cancer cell line
DPPH^0
Staphylococcus aureus

ABSTRACT

Metal nanoparticles have piqued researchers' interest in recent years due to their potential uses in a variety of fields, including cancer therapy, drug delivery and medicine. Green synthesis of silver nanoparticles (Ag-NPs) using medicinal plant extract is an emerging area of research due to their applicability in nano-medicines [1]. In this project, aqueous extract prepared from leaves of *Gundelia tournefortii* which are important medicinally have been utilized for the synthesis of Ag-NPs. Various analytical techniques were utilized to characterize the synthesized Ag-NPs. The synthesized Ag-NPs were investigated for their biological properties such as antioxidant activity using the DPPH^0 model, cytotoxicity against MCF-7 (breast) cancer cell line, and antibacterial activity against two bacterial strains *viz. Escherichia coli* and *Staphylococcus aureus.* The absorption peak of the Ag-NPs is observed at 450 nm using UV–Visible spectroscopy. The TEM images showed spherical shape Ag-NPs and their average sizes were ranging from 35 - 50 nm. The XRD peaks 38°, 44°, 64°, and 77° for leaves extract can be assigned the plane of silver crystals (111), (200), (220), and (311), respectively. FT-IR revealed that water-soluble biomolecules from the aqueous extracts of the *Gundelia tournefortii* played a crucial role in the formation of Ag-NPs. The synthesized Ag-NPs exhibited considerable cytotoxicity with IC_{50} values 49.36 µg/ml against the MCF-7 cancer cell line. Furthermore, Ag-NPs have been synthesized using a simple green approach. The synthesized Ag-NPs demonstrated promising cytotoxicity, antioxidant, and antibacterial properties.

References

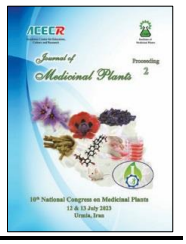
1. Balashanmugam P, Prabhu D, *et al*., Facile synthesis of silver nanoparticles using *Asian spider* flower and it's *in vitro* cytotoxic activity against human breast carcinoma cells. *Processes.* 2020; 8(4): 430. doi: 10.3390/pr8040430.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 295

Green synthesis of silver nanoparticles mediated by *Physalis alkekengi* leaves extract and its cytotoxic activity in human colon cancer cell line (HT-29)

Sanaz Nikoumanesh[1,*], Shahab Ojani[2], Mohammad Nikoumanesh[3]

[1] *Department of Biology, Tonekabon Branch, Islamic Azad University, Tonekabon, Iran*
[2] *Young Researchers and Elite Club, Tonekabon Branch, Islamic Azad University, Tonekabon, Iran*
[3] *Department of Biology, Central Tehran Branch, Islamic Azad University, Tehran, Iran*
E-mail: Sanaz_nikoomanesh@yahoo.com

ARTICLE INFO

Keywords:
Physalis alkekengi
Green synthesis
HT29
Reactive oxygen species
Nano-medicines

ABSTRACT

Green synthesis is a new paradigm for the preparation of silver nanoparticles (Ag-NPs) due to its cost-effectiveness and favorable environmental impact [1-2]. This study presented a simple biosynthesis process for the preparation of Ag-NPs utilizing the aqueous leaves extract of *Physalis alkekengi* as both a reducing and stabilizing agent. A visual color change from green to brown during the reaction implied the successful formation of Ag-NPs, which was confirmed by UV–Vis spectroscopy. Transmission electron microscopy (TEM) images indicated that the Ag-NPs were predominantly spherical with a mean size of 60 nm, and were comprised of crystalline Ag, as indicated by X-ray diffraction. In terms of their potential application, Ag-NPs exhibit significant cytotoxic activity in a dose and time dependent manner to HT-29 colon cancer cells. The treatment of HT-29 cells with Ag-NPs increased the production of intracellular reactive oxygen species (ROS). Accordingly, the treatment of HT-29 cancer cell line over 24 hours revealed that the cytotoxicity of the aqueous extract and synthesized nanoparticles are dose-dependent, with the greatest cytotoxic effect at a concentration of 50 and 40 µg/ml where the IC_{50} value was equal to 48.27±0.05 and 50.65±0.2 µg/ml respectively. Herein, the findings highlight the potential contribution of biosynthesized Ag-NPs to the development of novel nano-medicines for cancer treatment.

References

1. De Matteis V, Cascione M, *et al*., Silver Nanoparticles: Synthetic Routes, In Vitro Toxicity and Theranostic Applications for Cancer Disease. *Nanomaterials.* 2018; 8(5): 319. doi: 10.3390/nano8050319.

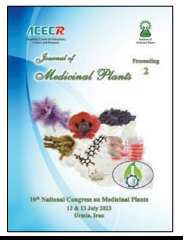
2. Yuan Y.G, Peng Q.L, Gurunathan S. Silver nanoparticles enhance the apoptotic potential of gemcitabine in human ovarian cancer cells: Combination therapy for effective cancer treatment. *Int. J. Nanomed.* 2017; 12: 6487-6502. doi: 10.2147/IJN.S135482.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 296

Effect of Various Phytohormones, Explant Origin and Light Regime on In-vitro Callus Production in *Zataria multiflora* Boiss (Shirazi Thyme)

Saeideh Tousizadeh[1], Saeed Tarkesh Esfahani[1,*], Marzieh Taghizadeh[2]

[1] *Department of Arid Land and Desert Management, School of Natural Resources and Desert Studies, Yazd University, Yazd, Iran*
[2] *Department of Plant and Animal Biology, Faculty of Biological Science and Technology, University of Isfahan, Isfahan, Iran*
E-mail: s.tarkesh@yazd.ac.ir

ARTICLE INFO

Keywords:
Zataria
Lamiaceae
Tissue culture
Benzylaminopurine
2,4-D

ABSTRACT

Shirazi thyme, *Zataria multiflora* Boiss, is one of the medicinal plants of the Lamiaceae family. This plant contains valuable secondary metabolites such as thymol, carvacrol, rosmarinic acid, etc. and is used in various pharmaceutical, food and health industries. Calluses prepared from different medicinal plants can be used to increase production of pharmaceutically important natural compounds through cell suspension culture and gene transformation programs. The purpose of this study was to investigate the effect of three main factors, including 1- phytohormones at four levels [benzylaminopurine (BAP), kinetin (KIN), 2,4-Dichlorophenoxyacetic acid (2,4-D) and Naphthaleneacetic acid (NAA) alone or in combination with each other], 2- the origin of the explant at three levels (leave, shoot and root) and 3- light regime at two levels (absolute darkness and 16 h light /8 h darkness) on the in-vitro callus formation in Z. multiflora plants. The explants were cultured in MS medium in the form of a factorial experiment based on a completely randomized design. After 30 days, the highest percentage of callus formation (83.33%), callus fresh weight (0.167 g) and callus diameter (12.32 mm) were observed in the leaf explant treatment under hormone treatment of 2 mg l^{-1} 2,4-D with 1 mg l^{-1} of BAP under light/dark conditions. The results of this research can be useful in optimizing the production and processing of Shirazi thyme plant and planning to extract more of its valuable medicinal metabolites, especially through cell suspension culture.

References

1. Hadian J., Ebrahimi S.N., Mirjalili M.H., Azizi A., Ranjbar H., Friedt W. Chemical and genetic diversity of *Zataria multiflora* Boiss. accessions growing wild in Iran. *Chemistry and Biodiversity*, 2011; 8(1):176-88.

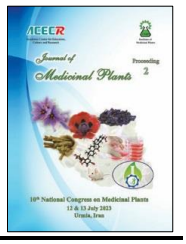
2. Isah T., Umar S., Mujib A., Sharma M.P., Rajasekharan P.E., Zafar N, Frukh A. Secondary metabolism of pharmaceuticals in the plant in vitro cultures: strategies, approaches, and limitations to achieving higher yield. *Plant Cell, Tissue and Organ Culture*, 2018; 132:239-65.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 298

Isolation and Identification of Two Main Genes Involved in Rosmarinic Acid Biosynthesis in Iranian native *Origanum vulgar* and *Origanum majorana*

Soghra Zaerinejad[1], Saeed Tarkesh Esfahani[1*], Asghar Mosleh Arani[2]

[1] *Department of Arid Land and Desert Management, School of Natural Resources and Desert Studies, Yazd University, Yazd, Iran*
[2] *Department of Environmental Science, School of Natural Resources and Desert Studies, Yazd University, Yazd, Iran*
E-mail: s.tarkesh@yazd.ac.ir

ARTICLE INFO

Keywords:
Oregano
Majoram
RAS
HPPR
BLAST

ABSTRACT

The *Origanum* spp. from the Lamiaceae family is one of the important medicinal and plants in the world. The high anticancer and antioxidant capacity of this plant is due to phenolic compounds, including rosmarinic acid. In this study, the sequence of rosmarinic acid synthase (RAS) and hydroxyphenylpyruvate reductase (HPPR) genes involved in the biosynthesis pathway of rosmarinic acid, were determined for the first time, in two important species of *Origanum vulgare* and *O. majorana*, using primers designed based on the conserved regions in previously identified sequences available in the GenBank database. The sequences were obtained through ordinary PCR with DNA extracted from the two studied species. Then the PCR product was used for sequencing of the corresponding gene. The sequencing results were assembled and edited by BioEdit software. Ultimately, a partial sequence of the RAS gene in *O. vulgar* and *O. majorana* with a length of 1322 and 1319 bp, respectively, and a partial sequence of the HPPR with a length of 2217 and 2203 bp, respectively, were identified. The BLAST results showed that the sequence of RAS (97.20%) and HPPR (98.63%) in two species are highly similar. Also, the results showed that the HPPR gene in both *O. vulgar* and *O. majorana* carries an additional region of 1820 and 1806 base pairs, respectively. This newly identified region should be considered an insertion type mutation in *Origanum* spp. species. These results have a significant role in identifying *Origanum* plants and phylogenetic relationships between different species of this genus.

References

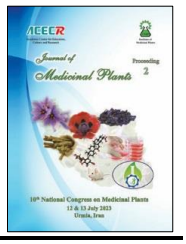
1. Hücherig S., Petersen M. RNAi suppression and overexpression studies of hydroxyphenylpyruvate reductase (HPPR) and rosmarinic acid synthase (RAS) genes related to rosmarinic acid biosynthesis in hairy root cultures of *Coleus blumei*. *Plant Cell, Tissue and Organ Culture*, 2013; 113:375-85.
2. Petersen M., Abdullah Y., Benner J., Eberle D., Gehlen K., Hücherig S., Janiak V., Kim K.H., Sander M., Weitzel C., Wolters S. Evolution of rosmarinic acid biosynthesis. *Phytochemistry*, 2009; 70:1663-1679.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 300

The Hydroalcoholic Extract of Sumac Fruits Mediate Inflammatory Cytokines in Acetic-Acid Induced Ulcerative Colitis Model

Saeideh Momtaz [1,2,3]*, Amir Hossein Abdolghaffari [4,3]*, Fateme Rouhi [4], Reza Hajiaghaei [1]

1 Medicinal Plants Research Center, Institute of Medicinal Plants, ACECR, Karaj, Iran
2 Toxicology and Diseases Group (TDG), Pharmaceutical Sciences Research Center (PSRC), The Institute of Pharmaceutical Sciences (TIPS), and Department of Toxicology and Pharmacology, School of Pharmacy, Tehran University of Medical Sciences, Tehran, Iran
3 Gastrointestinal Pharmacology Interest Group (GPIG), Universal Scientific Education and Research Network (USERN), Tehran, Iran
4 Department of Toxicology & Pharmacology, Faculty of Pharmacy, Tehran Medical Sciences, Islamic Azad University, Tehran, Iran
E-mail: momtaz@imp.ac.ir & amirhosein172@hotmail.com

ARTICLE INFO

Keywords:
Sumac
Inflammatoryboweldisease (IBD)
Tumor necrosisfactor-alpha (TNF-α)
Myeloperoxidase (MPO)
Interleukin (IL)-β

ABSTRACT

Inflammatory bowel disease (IBD) is a recurrent chronic disease of the gastrointestinal tract including Ulcerative colitis and Crohn's disease. Studies have shown that *Rhus coriaria* or sumac has a broad pharmacological action such as antioxidant and anti-inflammatory effects, and is a part of daily diet in many cultures. For the first time, the anti-inflammatory effect of sumac fruit extract was investigated in animal model of ulcerative colitis. Fruits were extracted twice with 50% ethanol. Colitis was induced in all animals, except in sham group, using acetic acid (4%). Following colitis induction, in 3 groups, sumac was administrated at 100 mg/kg, 200 mg/kg and 400 mg/kg by oral gavage for 2 days (once a day). Other groups were defined as the control (only treated with acetic acid), sham group (normal saline), and a standard group (Dexamethasone). To evaluate the inflammation sites, macroscopic and microscopic markers were assessed. The gene expression levels of interleukin (IL)-β and tumor necrosis factor-alpha (TNF)-α, were assessed by Real time-PCR, while myeloperoxidase (MPO) was measured spectrophotometrically. Sumac at 400 mg/kg/day significantly improved microscopic and macroscopic manifestations of colitis tissues. Sumac at 400 mg/kg/day significantly downregulated the gene expression of TNF-α, MPO, and IL- β levels ($P < 0.001$). Sumac at 400 mg/kg/day attenuated experimental colitis by means of colitis symptoms, reduction in inflammation cytokines, and decline of neutrophil infiltration in acetic acid-induced colitis. The fruit of the sumac plant is suggested as a possible treatment in IBD for further investigation in animal studies and clinical trials.

References

1. Khor, B., A. Gardet, and R.J. Xavier, Genetics and pathogenesis of inflammatory bowel disease. *Nature*, 2011. 474(7351): p. 307-317.

2. Perrone, A., et al., Phytochemical, Antioxidant, Anti-Microbial, and Pharmaceutical Properties of Sumac (Rhus coriaria L.) and Its Genetic Diversity. *Horticulturae*, 2022. 8(12): p. 1168.

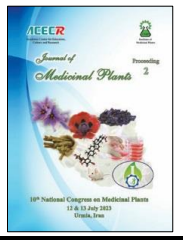
3. Khalilpour, S., et al., Neuroprotective and anti-inflammatory effects of Rhus coriaria extract in a mouse model of ischemic optic neuropathy. *Biomedicines*, 2018. 6(2): p. 48.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 301

Comparison of morphological traits of *Centella asiatica* L. in natural habitat and greenhouse

Yasamin Madadi[1], Ghasem Eghlima[1,*], Mohsen Farzane[1]

[1]*Department of Agriculture, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*
E-mail: gh_eghlima@sbu.ac.ir

ARTICLE INFO

Keywords:
Gotu-kola
Morphological traits
Greenhouse
Habitat

ABSTRACT

Centella asiatica (L.) Urban (Apiaceae) is a commercial medicinal plant, which is rich in pentacyclic triterpenes named centellosides including asiaticoside and madecassoside as triterpene saponins in addition to their corresponding sapogenins (asiatic acid and madecassic acid) [1]. These are well-known bioactive compounds in *C. asiatica* due to their extensive applications in medicinal and cosmetic industries. This vulnerable plant grows in the Anzali Wetland and it is suitable for the treatment of venous insufficiency, high blood pressure, memory enhancement and wound healing [2]. In this study *C. aciatica* were collected from natural habitats of Guilan province. Also, rhizomes of habitat samples were cultivated in research greenhouse of Shahid Beheshti university in the same year, and the morphological traits of this plant were investigated in two different environments. The results showed that the amount of leaf width (26.15 mm), petiole length (2.94 cm), petiole diameter (1.41mm), internode length (7.73 cm), and internode diameter (1.2 mm) in the greenhouse was more than the natural habitat, but the amount of leaf length (22.80 mm) in the natural habitat was more than the greenhouse. Given that the higher level of these characteristics ultimately results in a rise in yield, the cultivation of plants under controlled conditions has the potential to increase plant productivity and generate premium raw materials for utilization in the pharmaceutical and cosmetic sectors.

References

1. Nouri Nav SH, Nejad Ebrahimi S, Sonboli A, Mirjalili M.H. Variability, association and path analysis of centellosides and agromorphological characteristics in Iranian *Centella asiatica* (L.) Urban ecotypes. *S. Afr. J. Bot*., 2021; 139, 254-266.

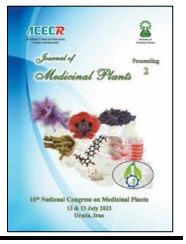
2. Mishra A, Singh Y, Singh R, Kumar R, Shukla S. Ethano-pharmacology activity & Antioxidant activity of *Centella asiatica* Plant Parts. *NeuroQuantology*, 2022; 20 (11): 7562-7572.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 302

Effects of γ-aminobutyric acid on polyphenolic contents and antioxidant activity of *Catharanthus roseus* (l.) Blush under *in vivo* conditions

Zahra Najjari[1], Abolfazl Alirezalu[2,*], Ahad Hedayati[3]

[1] *Department of Horticultural Sciences, Faculty of Agriculture, Urmia University, Urmia, Iran*
[2] *Academic Center for Education, Culture, and Research (ACECR): Urmia, Iran*
E-mail: a.alirezalu@urmia.ac.ir

ARTICLE INFO

Keywords:
Alkaloids
Polyphenolic contents
GABA

ABSTRACT

In this study, A pot experiment was used in order to evaluate the effects of foliar application GABA on total phenol and flavonoids and antioxidant activity in different organs (flowers, leaves and roots) of Catharanthus roseus, based on factorial completely randomized design (FCRD) in 4 levels of 0, 10, 20 and 40 µM, with three replications. The foliar application of the different concentrations of GABA was performed in three stages; in the pre-flowering stage, the aerial parts of plants were sprayed with different concentrations (0, 10, 20 and 40 mM) of GABA. Hydroalcoholic extraction of plants samples were performed by ultrasonic technique and phytochemical indices were evaluated in terms of total phenol and flavonoid contents and antioxidant activity (DPPH assay). The results obtained showed that total phenol and flavonoid contents and antioxidant activity were significantly increased ($p<0.01$) by 20 mM GABA concentration. The highest content of total phenols and flavonoids (39.19 mg/g FW and 22.26 mg/g FW, respectively) were recorded in the leaf organ and concentration of 20 mM. Also, the lowest content of phenols (15.38 mg/g FW) and flavonoid (9.25 mg/g FW) were obtained in the root organ and control samples. The considerable variations in the antioxidant activity of different organs were demonstrated by different treatments. The highest amount of antioxidant activity was obtained in the leaf organ and concentration of 20 mM. Therefore, application of appropriate concentrations of GABA can improve the polyphenolic contents and antioxidant activity of C. roseus.

References

1. Almagro L, Fernández-Pérez F, Pedreño MA. Indole Alkaloids from Catharanthus roseus: Bioproduction and Their Effect on Human Health. *Molecules*. 2015; 20(2):2973-3000. https://doi.org/10.3390

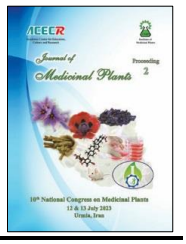
2. Koul M, Lakra NS, Chandra R, Chandra, S. Catharanthus roseus and prospects of its endophytes: A new avenue for production of bioactive metabolites. *International Journal of Pharmaceutical Sciences and Research*. 2013; 4(7), 2705.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 303

Investigation of phenolic compounds and antioxidant activity of the aqueous extract in cistanche (*Cistanche tubulosa*) by decoction and soxhlet methods

Nastaran Ebrahimpoor[1], Nasim Navabpoor[1], S. Ebrahim Seifati[1*], Habib Nikukar[2], Marzieh Lotfi[3]

[1] *Department of Arid Land and Desert Management, School of Natural Resources and Desert Studies, Yazd University, Yazd, Iran*
[2] *Medical Nanotechnology and Tissue Engineering Research Center, Yazd Reproductive Science, Yazd, Iran*
[3] *Abortion Research Centre, Yazd reproductive sciences institute, Shahid Sadoughi University of Medical Sciences, Yazd, Iran*
E-mail: Seifati@yazd.ac.ir

ARTICLE INFO

Keywords:
Hot extraction
Cistanche
Phenolic content
Orobanchaceae

ABSTRACT

Given the current exponential changes in human lifestyle and the side effects of using chemical drugs in treating diseases, the use of medicinal plants has incremented and further studies were conducted on their properties in order to prevent, improve, and treat diseases [1]. *Cistanche tubulosa*, one of the genera of the Orobanchaceae family (in traditional Chinese medicine called desert ginseng) is used to treat chronic kidney disease, male fertility disorder, female infertility, severe leucorrhoea, abnormal uterine bleeding, and constipation in aging [2]. The present study aimed to investigate the effect of Soxhlet and decoction methods with aqueous solvent extraction on phenolic, flavonoid contents, reducing power, and free radical scavenging activity at different concentrations (100, 200, 400, 600, and 800 µg/ml) of Cistanche stem extract. Based on the findings, the highest reducing power (0.83) and phenolic content (43.38) were related to the decoction method at concentrations of 800 and 600 µg/ml, respectively. The highest DPPH free radical scavenging activity (94.62) and flavonoid content (620.60) were related to Soxhlet method at concentrations of 200 and 800 µg/ml. In general, scientists believe that extraction using Soxhlet at lower temperatures is the most effective method compared to other extraction methods since it requires less solvent, does not need to separate raw material from the extract, and has higher antioxidant content. Meanwhile, according to the present results, the content of phenolic compounds and antioxidant activity can be different in these two methods depending on the type of plant and the temperature conditions of extraction [3].

References

1. Punab, M., Poolamets, O., Paju, P., Vihljajev, V., Pomm, K., Ladva, R., Korrovits, P. and Laan, M., 2017. Causes of male infertility: a 9-year prospective monocentre study on 1737 patients with reduced total sperm counts. *Human reproduction*, *32*(1), pp.18-31.

2. Al-Snafi, A.E., 2020. Bioactive metabolites and pharmacology of Cistanche tubulosa-A review. *IOSR Journal of Pharmacy*, *10*(1), pp.37-46.

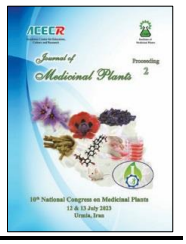
3. Konan, P.A.K., N'Gaman-Kouassi, K.C.C., Mamyrbekova-Békro, J.A. and Békro, Y.A., 2022. Study of the Effect of Three Extraction Processes on the Phytoactives of *Alchornea cordifolia* (Schumach. & Thonn.) Müll. Arg. (Euphorbiaceae) and Evaluation of their Antioxidant and Analgesic Activities. *International Journal of Biochemistry Research & Review*, *31*(7), pp.28-37.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 304

Evaluation of phytochemicals and antioxidant activity of two quinoa (*Chenopodium quinoa*) cultivars: Roots and Sprouts

Fatemeh Shirali[1], Ebrahim Seifati[1*], Nasrin Heydari khormizi[2], Somayeh Ghasemi[1]

[1] *Department of Arid Land and Desert Management, School of Natural Resources and Desert Studies, Yazd University, Yazd, Iran*
[2] *Department of Agricultural Biotechnology, Shahid Bahonar University of Kerman, Kerman, Iran*
E-mail: Seifati@yazd.ac.ir

ARTICLE INFO

Keywords:
Antioxidant activity
Multi Headbulk
Quinoa
Soxhlet
Titicaca

ABSTRACT

Quinoa (*Chenopodium quinoa*), a pseudocereal from the Chenopodiaceae family, has high nutritional value due to its large amounts of minerals, vitamins, protein, essential amino acids, high-quality fatty acids, and antioxidant compounds [1]. According to the literature, the content of quinoa antioxidants increases during germination and its root is a rich source of bioactive constituents and various medicinal compounds [2]. The present study aimed to investigate the total phenol and flavonoid content, reducing power, and free radical scavenging activity on hydroethanolic extract (80:20) in the roots and sprouts of two commercial cultivars of Quinoa (Titicaca and Multi Headbulk) cultivated in Yazd University research farm in 2018-2019 crop year. To this end, sprout and root samples of the cultivars were extracted and evaluated using the Soxhlet method at concentrations of 100, 250, 500, and 1000 µg/ml by a spectrophotometer (AnalytikJena specord 210) at wavelengths of 725, 507, 700, and 517 nm, respectively. Considering the results, although the phenolic and DPPH free radical scavenging activity of the Titicaca root was significantly higher than that of Multi Headbulk, the sprout of Titicaca had significantly higher qualities ($P<0.01$) compared to the root of the same cultivar as well as the sprout and root of Multi Headbulk. In other words, the highest amounts of total phenol (119.68), total flavonoid (100.75), reducing power (0.286), and free radical scavenging activity by DPPH (96.75) were observed in the hydroethanolic extract of the Titicaca quinoa cultivar.

References

1. Stikić, R.I., Milinčić, D.D., Kostić, A.Ž., Jovanović, Z.B., Gašić, U.M., Tešić, Ž.L., Djordjević, N.Z., Savić, S.K., Czekus, B.G. and Pešić, M.B., 2020. Polyphenolic profiles, antioxidant, and in vitro anticancer activities of the seeds of Puno and Titicaca quinoa cultivars. *Cereal Chemistry*, *97*(3), pp.626-633.

2. Khan, I.H., Javaid, A., Ahmed, D. and Khan, U., 2020. Identification of volatile constituents of ethyl acetate fraction of Chenopodium quinoa roots extract by GC-MS. *Int. J. Biol. Biotechnol*, *17*(1), pp.17-21.

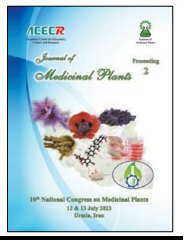
3. Al-Qabba, M.M., El-Mowafy, M.A., Althwab, S.A., Alfheeaid, H.A., Aljutaily, T. and Barakat, H., 2020. Phenolic profile, antioxidant activity, and ameliorating efficacy of chenopodium quinoa sprouts against CCl4-induced oxidative stress in rats. *Nutrients*, *12*(10), p.2904.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 305

Effect of salicylic acid spraying on some biochemical properties of medicinal pumpkin plant (*Cucurbita pepo* var. styriaca)

Jaber Panahandeh[1*], Sahebali Bolandnazar[2], Ali Ahangaran[3], Mohammadreza Darparesh[4], Saman Siyahi[5]

[1] *Department of Horticultural Engineering, Faculty of Agriculture, University of Tabriz, Tabriz, Iran*
[2] *Department of Horticultural Engineering, Faculty of Agriculture, University of Tabriz, Tabriz, Iran*
[3] *Department of Horticultural Engineering, Faculty of Agriculture, University of Tabriz, Tabriz, Iran*
[4] *Department of Organic Chemistry, Faculty of Chemistry, University of Tabriz, Tabriz, Iran*
[5] *Department of Biosystems Engineering, Faculty of Agriculture, University of Tabriz, Tabriz, Iran*
E-mail: Ali.ahangaran1210@gmail.com

ARTICLE INFO

Keywords:
Salicylic acid
Biochemical
Phytochemical
Medicinal pumpkin
Photosynthesis

ABSTRACT

Lack of water and the methods of its use are considered to be the main factors limiting the development of the agricultural sector, especially in arid and semi-arid areas. This is because most of Iran's agricultural lands are in these areas and are facing the stress of water shortage, one of the most important consequences of drought stress is oxidative stress [1]. Salicylic acid is a phenolic compound that acts as a growth regulator in the induction of drought resistance [2]. In this study, it was conducted to investigate the effect of foliar spraying on some biochemical properties of medicinal pumpkin plant (*Cucurbita pepo* var. styriaca). The speed of photosynthesis, which is the main factor in production, and the simultaneous use of salicylic acid increased it compared to the control. In phytochemical properties, the use of salicylic acid increased the activity of antioxidant enzymes including ascorbate peroxidase, catalase, peroxidase, polyphenol oxidase and glutathione reductase and caused the accumulation of compatible metabolites including proline, proteins and soluble carbohydrates and increased oil percentage.

References

1. Najafi S, Nazari Nasi H, Tuncturk R, Tuncturk M, Sayyed R Z, Amirnia R. Biofertilizer application enhances drought stress tolerance and alters the antioxidant enzymes in medicinal pumpkin (*Cucurbita pepo* convar. pepo var. Styriaca). *Horticulturae*. 2021; 7(12), 588. doi.org/10.3390/horticulturae7120588.

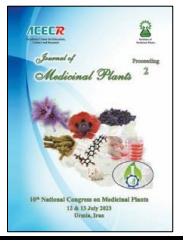
2. Kuhlmann H, Koetter, U, Theurer C. Sterol contents in medicinal pumpkin (*Cucurbita pepo* convar. citrullinina var. styriaca) depending on genotype and location. *International Symposium on Cucurbits*. 1997; 492, 175-178. doi.org/10.17660/ActaHortic.1999.492.21.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 306

Investigation of Secondary Metabolite's and Biological activity of *Artemisia marschaliana*

Yaser Sarvari[1], Saeed Jafarirad[2], Parina Asgharian[3*]

[1] *Department of Organic and Biochemistry, Faculty of Chemistry, University of Tabriz, Tabriz, Iran*
[2] *Department of Organic and Biochemistry, Faculty of Chemistry, University of Tabriz, Tabriz, Iran*
[3] *Department of Pharmacognosy, Faculty of Pharmacy, Tabriz University of medicinal sciences, Tabriz, Iran*
E-mail: Parina.asgharian@gmail.com

ARTICLE INFO

Keywords:
Artemisia marschaliana
Antimicrobial
Chemical composition

ABSTRACT

Artemisia species is one of the valuable species in Iranian folk medicine [1], which have pharmacological properties [2]. This paper aims to investigate the secondary metabolites and biological activity of *Artemisia marschaliana*. Gas chromatography-mass spectrometry (GC–MS) analysis of the extracted essential oils (ESO) was performed to study of chemical composition of different parts of the *A. marschaliana* plant in wet and dry form. More ever, Total Methanolic extract of various organs was prepared and then fractionated with solvents of N-hexane, Dichloromethane, Ethyl acetate, and Methanol. Furthermore, the antimicrobial effects of the essential oils, different extracts, and fractions were assessed against different microorganisms. The most frequent compounds were Monoterpenoid; Sesquiterpenoid; and fatty acids. All extracts except the Methanolic fraction showed the significant antimicrobial effects. Among the obtained fractions, 40% and 60% fractions of Dichloromethane extract and essential oils showed the higher inhibitory effect. The results of phytochemical tests and GC-MS analysis confirmed the presence of compounds with antimicrobial properties. Indeed, the results obtained in this work have allowed us to recommend the essential oil of *A. marschaliana* in the field of biotechnology as a natural antimicrobial.

References

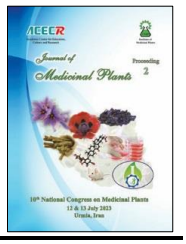
1. V. Mozaffarian, "A dictionary of Iranian plant names," *Tehran: Farhang Moaser*, vol. 396, 1996.
2. H. Ekiert, M. Klimek-Szczykutowicz, A. Rzepiela, P. Klin, and A. Szopa, "Artemisia species with high biological values as a potential source of medicinal and cosmetic raw materials," *Molecules*, vol. 27, no. 19, p. 6427, 2022.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 307

Biological effects of *Artemisia austeriaca* Secondary Metabolites; an *in vitro* study

Mahsa Jabraeili[1], Saeed jafarirad[2], Parina Asgharian[3*]

[1] *Department of Organic and Biochemistry, Faculty of Chemistry, University of Tabriz, Tabriz, Iran*
[2] *Department of Organic and Biochemistry, Faculty of Chemistry, University of Tabriz, Tabriz, Iran*
[3] *Department of Pharmacognosy, Faculty of Pharmacy, Tabriz University of medicinal sciences, Tabriz, Iran*
E-mail: Parina.asgharian@gmail.com

ARTICLE INFO

Keywords:
A. austeriaca
Essential oils
Antimicrobial activity

ABSTRACT

Artemisia austeriaca is an evergreen hardy herbaceous plant well known for the biological active chemical composition in its essential oils [1]. The biological property of *A. austeriaca* is due to its substantial chemical compound [2]. The current study focuses on the biological activity of *A. austeriaca* extracts, and its essential oils. Different extracts of the various organs (aerial part, flower, stem, and root) of *A. austeriaca* were performed by Soxhlet apparatus. Furthermore, Essential oils of mentioned parts in two states were obtained via Clevenger apparatus. Moreover, the essential oil contents were analyzed using GC-MS technique. On the other hand, for evaluating the antimicrobial activities of extracts, and essential oils, Disc diffusion, Minimum Inhibitory Concentration (MIC) along with Minimum Bactericidal Concentration (MBC) were used, correspondingly. The essential oil (EOs) results illustrated that whereas in aerial parts and flowers, terpenoids are in high amounts, fatty acids in stem and roots allocate a large amount. In the case of antimicrobial activity of EOs, although EOs demonstrated antimicrobial effects against gram negative and gram positive species, they had no effects on fungi. In terms of antimicrobial activity of extracts, although Methanol extract indicated low effects, other extracts showed significant activity ($p<0.05$) compared to negative control. Our findings indicated that *A. austeriaca* is a rich source of natural compounds and valuable volatile contents with significant antimicrobial activities. This plant has great potential for possible applications in the pharmaceutical use.

References

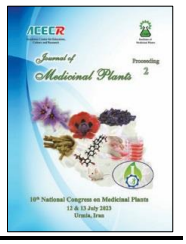
1. V. Mozaffarian, “A dictionary of Iranian plant names,” *Tehran: Farhang Moaser*, vol. 396, 1996.
2. D. Bisht, D. Kumar, D. Kumar, K. Dua, and D. K. Chellappan, “Phytochemistry and pharmacological activity of the genus artemisia,” *Arch. Pharm. Res.*, vol. 44, no. 5, pp. 439–474, 2021.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 308

Total Phenolic Content and Antioxidant Properties from hydroethanolic stem extract of cistanche (*Cistanche tubulosa*) by different extraction methods

Nasim Navabpoor[1], Nastaran Ebrahimpoor[1], S. Ebrahim Seifati[1*], Habib Nikukar[2], Marzieh Lotfi[3], Fahimeh Mazaheri[2]

[1] *Department of Arid Land and Desert Management, School of Natural Resources and Desert Studies, Yazd University, Yazd, Iran*
[2] *Medical Nanotechnology and Tissue Engineering Research Center, Yazd Reproductive Science, Shahid Sadoughi University of Medical Sciences, Yazd, Iran*
[3] *Abortion Research Centre, Yazd reproductive sciences institute, Shahid Sadoughi University of Medical Sciences, Yazd, Iran*
E-mail: Seifati@yazd.ac.ir

ARTICLE INFO

Keywords:
Decoction
Soxhlet
Cistanche
Free radicals

ABSTRACT

Considering important characteristics of reactive species, such as the inactivation of metabolic enzymes, oxidation of biomolecules, and cellular damage, medicinal plants have been advocated due to their high efficiency in maintaining health and preventing diseases by controlling oxidative damage [1] while causing rare complications as natural therapeutic sources. *Cistanche tubulosa* (Schenk) Wight, as a species of holoparasitic desert belonging to the Orobanchaceae family, contains phenylethanoid glycosides (PhGs), iridoids and iridoid glycosides, lignans, alditols, oligosaccharides, and polysaccharides [2]. Given its scavenging effects, *C. tubulosa* accelerates the aging of radicals so that the antioxidant activity of acteoside is five times greater than that of Vitamin C. In present study, the plant stem samples dried after collection in a dark room away from sunlight, and then aimed to compare the effects of decoction and Soxhlet extraction methods using hydroethanolic solvent (70%), the total phenol and flavonoid content, reducing power, and DPPH radical scavenging activities at different concentrations (100, 200, 400, 600, and 800 µg/ml) was evaluated. Although the highest phenolic content and reducing power were measured at concentrations of 400 and 200 µg/ml in the decoction method (16.03 and 0.69, respectively), the highest capacity to scavenge DPPH and flavonoid content (97.79 and 795.33, respectively) were measured at a concentration of 100 µg/ml using the Soxhlet method. According to the results of this research, it be concluded that extraction by Soxhlet method is superior to the other studied method (decoction) due to its greater ability to inhibit free radicals at a lower concentration.

References

1. Hassan, W., Noreen, H., Rehman, S., Gul, S., Amjad Kamal, M., Paul Kamdem, J., Zaman, B. and BT da Rocha, J., 2017. Oxidative stress and antioxidant potential of one hundred medicinal plants. *Current topics in medicinal chemistry*, *17*(12), pp.1336-1370.

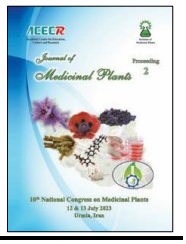
2. Al-Snafi, A.E., 2020. Bioactive metabolites and pharmacology of Cistanche tubulosa-A review. *IOSR Journal of Pharmacy*, *10*(1), pp.37-46.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 310

Seed Vigor Test of *Lallemantia* Species Using Elevated Partial Pressure of Oxygen

Saeideh Maleki Farahani*[1], Alireza Rezazadeh[1], Arezoo Paravar[1]

[1]*Department of Agricultural Sciences, Shahed University, Tehran, Iran*
E-mail: maleki@shahed.ac.ir

ARTICLE INFO

Keywords:
Lallemantia
Aging
Seed quality
Seed vigor

ABSTRACT

Plants belonging to genus *Lallemantia* are known because of their economic features. *Lallemantia iberica* and *Lallemantia royleana* are plant species that belong to *Lallemantia.* spp that their seed can be either served as food, industrial crop or medicinal plant. Prolonging their longevity is an issue for seed medicinal and industrial companies, since *Lallemnatia* is an oil crop which its oil content is higher than that of some oilseed commodities such as corn, cotton and soybean (Zlatanov *et al.*, 2012). To evaluate seed vigore, experimental seed ageing methods are used to mimic seed deterioration processes by applying higher seed moisture content and temperatures. In contrast there is another method which by storing of seeds under dry condition with high-pressure oxygen mimics seed deterioration (Groot, 2022). Present study investigated the effect of controlled deterioration and elevated partial pressure of oxygen (EPPO) storage treatments on *L. iberica* and *L. royleana* seeds. The results showed that increasing water deficit during seed filling had influence on reduction seed quality especially, seed longevity of both species. Germination, seedling quality, physiological and biochemical changes of *L. iberica* and *L. royleana* stored seeds were differenced under EPPO and CD storage treatments. Comparing with CD condition, our results reveal that dry storage EPPO causes a rapid loss of seed viability of *L. iberica* and *L. royleana* and caused to reduce germination, seedling quality, antioxidant activity increasing T50, MDA and H_2O_2 contents. Finally concluded that EPPO storage is a novel and relatively fast method to study the germination, physiology and biochemistry of seed ageing. Meanwhile *L.royleana* showed more tolerance at different storage treatment compared with *L. iberica*.

References

1. Zlatanov, M., G. Antova, M. Angelova-Romova, S. Momchilova, S. Taneva, and B. Nikolova-Damyanova. (2012) Lipid structure of Lallemantia seed oil: A potential source of omega-3 and omega-6 fatty acids for nutritional supplements. 89, 1393-1401. Mozaffarian V. A dictionary of Iranian plant names. Tehran: Farhang Moaser. *Journal of the American Oil Chemists' Society*. 2022, 361-363.

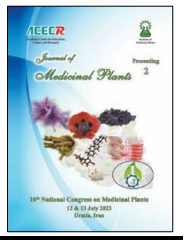
2. Groot, S. P.C. 2022. Seed maturation and its practical implications. *Seed Science and Technology*, 50, 1, Suppl., 141-151.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 311

Bioassay of *Tanacetum parthenium* extract against Housefly (*Musca domestica)*

Fatemeh Kouhestani[1], Hassan Vatandoost[2], Kourosh Arzamani[1], Hossein Kamali[3], Mehdi Imani[4], Ameneh Mohammadi[5], Mohammad Saaid Dayer[6]*

[1] *Vector-borne Diseases Research Center, North Khorasan University of Medical Sciences, Bojnurd, Iran*
[2] *Department of Medical Entomology and Vector Control, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran*
[3] *Department of pharmaceutics, school of pharmacy, Mashhad University of medical sciences, Mashhad, Iran*
[4] *Northern Khorasan Agricultural and Natural Resources Research Center, Bojnurd, Iran*
[5] *Natural Products and Medicinal Plants Research Center, North Khorasan University of Medical Sciences, Bojnurd, Iran*
[6] *Department of Parasitology and Medical Entomology, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran*
E-mail: dayer@modares.ac.ir

ARTICLE INFO

Keywords:
T. parthenium
Botanical insecticide
Pyrethrum
Musca domestica
Vector control

ABSTRACT

The plant Feverfew, *Tanacetum parthenium* (L.) Schultz Bip., is a member of Asteraceae family and traditionally known for its multifarious therapeutic uses [1]. In this study, we aimed at extracting and bioassaying active ingredients of the native species of *T. parthenium*, collected from wild flora in highland of North Khorasan province (Northeastern Iran) against housefly. The plant samples were collected from its natural habitat, dried and exposed to steps of maceration using chloroform as already described [2]. The extract was assayed for its insecticidal activity against housefly *Musca domestica* (L.),. The experimental housefly samples were collected from dairy farms at the outskirt of Bojnurd City and reared in mesh cages (30 x 30 x 30 cm). The fully grown larvae and adults of housefly were exposed to a series of concentrations of *T. parthenium* extracts using bioassay test fro toxicity. The larval and adult mortality both in treated samples and control were monitored for 24 and 48 hrs post-exposure and mortality was recorded. The percentage mortality in all treated samples were corrected using Abbott's formula beforeLC50 values were calculated by Probit analysis. *T. parthenium* extract showed lethal effects against both adult and larvae of housefly. The LC_{50} and LC_{90} values for adult fly were 5135 and 8840 ppm respectively after 48 h. whereas. for housefly larvae, these values were 329 and 551 ppm respectively after 24 h. We recommend the native feverfew, as a potent bio-insecticide against insect vectors, to be cultivated and exploited at industrial level.

References

1. Pareek A, Suthar M, Rathore GS, Bansal V. Feverfew (*Tanacetum parthenium* L.): A systematic review. Pharmacogn Rev. 2011; 5(9):103-10. doi: 10.4103/0973-7847.79105.

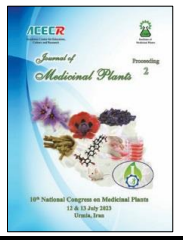
2. Kouhestani F, Dayer MS and Kamali H. Reversed-phase Liquid Chromatographic Quantification of Pyrethrins in the Extract of Wild Tanacetum parthenium (Feverfew) from Northern Khorasan Province (Iran). Journal of Medicinal Plants and By-products. 2018; 1: 99-104. doi: 10.22092/JMPB.2018.116740.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 312

Different methods of preparing nano-emulsion from melatonin using *Ferula gummosa* resin and essential oil

Zahra Behrad[1,*], Fatemeh Sefidkon[1], Hossein Ghasemzadeh[2], Razieh Azimi[1], Mina Koohjani Gorji[1], Kamkar Jaymand[1], Masoumeh Layeghhaghighi[1]

[1] *Research Institute of Forests and Rangelands, Agricultural Research, Education and Extension Organization (AREEO), Tehran, Iran*
[2] *Department of Chemistry, Imam Khomeini International University, Qazvin, Iran*
E-mail: Zahra.behrad77@gmail.com

ARTICLE INFO

Keywords:
Ferula gummosa
Formulation
Oleo-gum
Biphasic

ABSTRACT

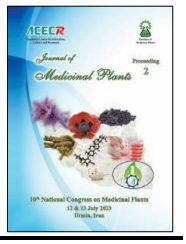
Ferula gumosa Boiss is a monocarp plant from the northern sections of Iran. Barijeh is the air-dried oleo-gum-resin exudation obtained by incising the stems close to the ground. In ancient Iranian medicine, the oleogum resin obtained from this plant had been used for digestive disorders and flatulence and topically as a wound-healing remedy. Some scientists have taken interest in polysaccharides extracted from Barijeh by alcoholic solution. They identified gum composition by chemical methods. Their analysis indicated presence of galactose, arabinose, rhamnose and uronic acids that galactoronic acid was major component. Also, their study indicated presence of protein, Ca and Mg. Emulsions are divided into micro (10 to 100 nm), mini or nano (100 to 1000 nm) and macro (0.5 to 100 micrometers) based on the size of the emulsion droplets. There are different techniques for the production of nano-emulsions, which lead to the production of nano-emulsions with different characteristics, advantages and disadvantages. Nano-emulsions are classified into three types based on the composition of oil and water parts: A: Oil-in-water nano-emulsions (oil droplets in the aqueous phase), B: Water-in-oil nano-emulsions (water droplets in the oil phase), C: micro droplets of oil and water inside the system. In this study, 7 samples of O/W nano-emulsion of melatonin were prepared using *Ferula gummosa* resin, tween, span, essential oil, CMC, PVA and sorbitol with different formulations that 4 prepared samples were stable and three samples became two phases. The nanostructure of two prepared samples was confirmed by FESEM, DLS and TEM. The nano-emulsion prepared with CMC (0.1%) and PVA (0.1%) was stable, while in the nano-emulsion prepared under the same conditions and with the only difference that CMC (0.4%) was used, stability was not observed and the solution became biphasic. In the formulation of prepared nano-emulsion, if essential oil is used, the presence of span was necessary for the stability of the emulsion.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 313

A phytochemical study of lichen species *Usnea articulata* in Iran with special attention to the biological potential of usnic acid compound

Atieh Salehnejad[1*], Mahdi Moridi Farimani[1], Mohammad Sohrabi[2]

[1] *Department of Phytochemistry, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Evin, Tehran, Iran*
[2] *Iranian Research Organization for science and technology (IROST), Tehran, Iran*
E-mail: atieh.saleh.70@gmail.com

ARTICLE INFO

Keywords:
Lichen
Usnea articulata
Usnic acid
Biological activity

ABSTRACT

Lichens are symbiotic organisms, some of them are called medicinal lichens due to the presence of various effective substances. Lichen synthesize a great variety of secondary metabolites, many of them are unique. Since synthetic drugs have few effects, the need for research and the emergence of natural bioactive compounds has expanded [1]. After 180 years since the first collection of lichen samples in Iran and 100 years since the development of chemistry and identification of lichen materials, no attention has been paid to investigate lichen compounds and phytochemical properties of Iranian lichens. The broad biological activities investigated on lichens so far are antimicrobial, anticancer, antioxidant, protective against intense radiation, herbicidal, chemical inhibitory, antitoxic, antipyretic, anti-inflammatory, etc. [2]. In this project, we focused on the lichen Usnea articulata, which belongs to the Parmeliaceae family, due to having a series of characteristics, such as greater abundance, availability, and having unique compounds such as usnic acid. Usnic acid is one of the common and abundant metabolites of lichens, which is known as an antibiotic, but it also has several other interesting properties. Some of the biological activities of this compound have been investigated in laboratory conditions, and its mechanism of action should be investigated in more detail to reach clinical trials and achieve more applications [3]. In this research, in order to separate, purify and identify the usnic acid and other metabolites, column chromatography, thin layer chromatography, spot test and X-ray analysis were used.

References

1. S. Dudani and G. Ecology, “Sahyadri Shilapushpa : Lichen Chemistry,” no. January. 2011.

2. M. P. Gómez-Serranillos, C. Fernández-Moriano, E. González-Burgos, P. K. Divakar, and A. Crespo, “Parmeliaceae family: Phytochemistry, pharmacological potential and phylogenetic features,” *RSC Adv.*, vol. 4, no. 103, pp. 59017–59047, 2014.

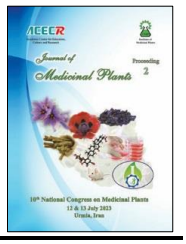
3. M. Cocchietto, N. Skert, P. Nimis, and G. Sava, “A review on usnic acid, an interesting natural compound,” *Naturwissenschaften*, vol. 89, no. 4. pp. 137–146, 2002.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 314

Enhancing Fruit Quality through the Development of a Carnauba Wax-Based Edible Coating

Sahar Moharrami[1], Samad Nejad Ebrahimi[1,*], Mohsen Farzaneh[1]

[1] *Department of Phytochemistry, Medicinal Plants and Drug Research Institute, Shahid Beheshti University, Tehran, Iran*
E-mail: S_ebrahimi@sbu.ac.ir

ARTICLE INFO

Keywords:
Postharvest quality
Edible coating
Carnauba wax
Arabic gum
Shelf life

ABSTRACT

After harvest, fruits undergo an extended postharvest journey, which frequently leads to a decline in quality [1]. Edible coatings serve as a protective layer applied to the surface of food products, ensuring both safety and consumability alongside the food itself the primary purpose of coatings is to safeguard the fruits from mechanical damage, contamination, and to prolong their shelf life [2]. This research focuses on the formulation of an edible coating using specific ingredients such as Carnauba wax (1%), Arabic gum (0.5%), Tween-80 (0.5%), span-80 (0.5%), and glycerol (0.2%) to improve the preservation of apricots. The coating was carefully applied to the apricots, and the coated fruits were evaluated after a two-week period to assess various characteristics. Multiple parameters were examined, including weight loss, color changes, tissue integrity, pH level, moisture content, antioxidant activity, O_2 and CO_2 migration, as well as firmness. The findings from this study highlight the significant potential of the developed edible coating in preserving the overall quality of apricots during storage. This innovative approach offers a sustainable and efficient solution to reduce post-harvest losses and extend the shelf life of apricots. The coating can be easily applied by spraying onto the fruit and can be stored at room temperature for up to one month.

References

1. Kumar, P., Sethi, S., Sharma, R. R., Srivastav, M., & Varghese, E. Effect of chitosan coating on postharvest life and quality of plum during storage at low temperature. *Scientia Horticulturae*, 2017; 226, 104-109. doi: 10.1016/j.scienta.2017.08.037

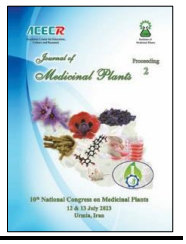
2. Miteluț, A. C., Popa, E. E., Drăghici, M. C., Popescu, P. A., Popa, V. I., Bujor, O. C., & Popa, M. E. Latest developments in edible coatings on minimally processed fruits and vegetables: A review. *Foods*, 2021; *10*(11), 2821. doi: 10.3390/foods10112821

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 315

Investigating the antimicrobial activity of *Satureja spicigera* essential oil

Mahdieh Jafari Ghoshchi[1], Bohloul Abbaszadeh[2]*, Mehdi Oraei[1], Razieh Azimi[2], Ali Faramarzi[1]

[1] *Department of Horticultural Sciences, Faculty of Agriculture, Miyaneh Branch, Islamic Azad University, Miyaneh, Iran*

[2] *Research Institute of Forests and Rangelands, Agricultural Research Education and Extension Organization (AREEO), Tehran, Iran*

E-mail: babaszadeh@rifr-ac.ir

ARTICLE INFO

Keywords:
Savory
Antiviral
Antibacterial
Antifungal
Essential oil

ABSTRACT

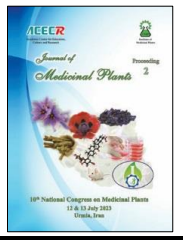
The use of new methods has made it possible to identify the effective therapeutic substances in plants, Therefore, in recent years, extensive research has been conducted to investigate and evaluate the antimicrobial effects of plant-based products, including essential oils. And the results show the strength and ability of these compounds in preventing the growth of a wide range of pathogenic and spoilage microorganisms. The purpose of this research was to investigate the antimicrobial effect (antibacterial, antifungal and antiviral) of *Stureja spicigera* essential oil. This research was carried out during 3 experiments at the Iranian Biological Resource Center and Pasteur Institute in 2019 to investigate the antimicrobial effect of essential oil by the well diffusion method and Broth dilution method on *Escherichia coli*, *Pseudomonas fluorescens* and *Staphylococcus aureus*, *Candida albicans* and *Aspergillus niger*. and evaluated the effect on the mouse-adapted human influenza virus A/PR/8/34 (H1N1). In the well diffusion method, the inhibitory effect of *Stureja spicigera* essential oil in all concentrations was observed on *Escherichia coli*, *Pseudomonas fluorescens* and *Staphylococcus aureus*, as well as *Candida albicans* and *Aspergillus niger*. The antimicrobial effect of the essential oil was dependent on the concentration, and with the increase in the concentration of the essential oil, the diameter of inhibition zone also increased. The diameter of the inhibition zone of all three bacteria, *Escherichia coli*, *Pseudomonas fluorescens* and *Staphylococcus aureus* showed a statistically significant difference at the 1% level. In the broth dilution method, concentrations of 50% and 80% had the minimum inhibitory concentration (MIC) and the minimum bactericidal concentration (MBC) for bacteria, respectively, and for fungus, 10^{-3} dilution equivalent to 0.05% concentration was determined as the minimum inhibitory concentration. The results of the MTT test for the antiviral assay of different concentrations of essential oil against influenza showed that the treatment of MDCK with essential oil did not significantly reduce the virus titer and cell viability. *Satureja spicigera* essential oil showed a significant effect on inhibiting the growth of bacteria, fungi and yeasts, but it was not effective on the virus. According to the wide range of these bacteria and fungi, the use of *Satureja spicigera* essential oil is suggested as an effective agent for destroying these microorganisms.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 316

The effect of girdling time on the biochemical indices of Proline and Carbohydrates in olive plants

Yahya Mansouri, Shohre Zivdar*, Esmael Khaleghi

Department of Horticultural Science, Faculty of Agriculture, Shahid Camran University of Ahvaz, Ahvaz, Iran
E-mail: Zivdar.s@gmail.com

Keywords:
Carbohydrates
Girdling
Proline

Olive belongs to the *oleaceae* family and is native to Lebanon, Syria and Asia Minor [1]. The main importance of olive is due to its oil. The oil of this plant contains antioxidants and unsaturated fatty acids that increase life expectancy and reduce diseases associated with the consumption of saturated oils [2]. The immediate effect of girdling is to stop the movement of photosynthetic materials produced by the leaves through the phloem. This work causes an increase in leaf carbohydrates and plant hormones in the upper parts of the ring, which causes an increase in flowering [3]. Soluble carbohydrates were measured by the method of Irigoyen et al 1992. This research was carried out among the cultivars of Conservalia, Roghani and Mission, and in three rounds of ringing on December, February and March, and three times of measurement in April, May and June. The highest amount of total carbohydrates for the Roghani variety was recorded in the sampling ring of June and the measurement time of June (23.22mg/gram of fresh weight). Proline was also measured based on the reaction method between ninhydrin reagent and amino acids. The highest amount of proline was recorded in Conservalia variety and in the control treatment (64.73 mg per gram of fresh weight). In general, the use of technique decreased the amount of proline in olive leaves.

References

1. Jalily Marandi, R. 2014. Fruit curry. 8th edition, Urmia Academic Jihad Publications, 251 pages

2. Marsilio.V, Campestre.C, Lanza.B, (2001) "Phenolic compounds change during California-style ripe olive processing". *Food Chemistry*.74: 55-60.

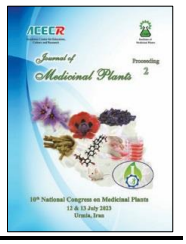
3. Grawankar, M.S., Haldankar, P.M., Salvi, B.R., Parulekar, Y.R., Dalvi, N.V., Kulkarni, M.M., Saitwal, Y.S., Nalage, N.A. 2019. Effect of girdling on induction of flowering and quality of fruits in horticultural crops- A review. *Advanced Agricultural Research and Technology Journal*. 3(2): 201-215.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 317

Effect of mulberry (*Morus alba*) leaf ethanoic extract on electrocardiographic parameters and Cardiac Index (RV/TV) in broilers with experimental ascites.

Zahra Amirajam [1], Aidin Azizpour [2,*]

[1] *Department of Cardiology, Ardabil University of Medical Sciences, Ardabil, Iran*
[2] *Department of Medicinal Plants, University of Mohaghegh Ardabili, Ardabil, Iran*
E-mail: Aidin_azizpour@uma.ac.ir

ARTICLE INFO

Keywords:
Mulberry
Broilers
Electrocardiogram
Ascites

ABSTRACT

The object of this study was to evaluate the effect of mulberry (*Morus alba*) leaf ethanoic extract on and electrocardiographic changes and cardiac Index (RV/TV) in the experimentally induced ascitis in broiler chickens using cold stress. 135 one-day-old (Ross308) male broiler chickens were chosen and randomly divided were randomly divided into 3 groups and each group included of 45 chicks with 3 replicates. Chicks were reared for six weeks. The first group was fed with the basal diet as a control, and the second and third groups were fed with basal diet and 0.1% of mulberry leaf ethanoic extract. Temperature was gradually decreased in experimental groups to 30% of the standard program from 2nd week until the end of the rearing period. Mortality caused by ascites were recorded weekly and At the end of 5 and 6 week, 5 chicks from each group were selected and electrocardiography recordings were performed. Also after autopsy right ventricle/total ventricular weight (RV/TV ratio) was measured and recorded. Incidence and mortality of ascites and RV/TV ratio in 0.1% mulberry leaf group (third group) were lower than second group ($P<0.05$). Heart rate in second group was lower than 0.1% mulberry leaf group and control group. There were significant decreased of S waves and elevation of T wave amplitudes in 0.1% mulberry leaf group compared to the second group. The present study showed that the addition of mulberry leaf ethanoic extract to broiler chickens diet improved electrocardiogram parameters and decreased RV/TV ratio and mortality, so can be effective in preventing ascite syndrome resulted from cold condition.

References

1. Katsube T, Imawaka N, Kawano Y, Yamazaki Y, Shiwaku K, Yaman Y. Antioxidant flavonol glycosides in mulberry (*Morus alba* L.) leaves isolated based on LDL antioxidant activity. *Food Chemistry*. 2006. 97: 25-31.

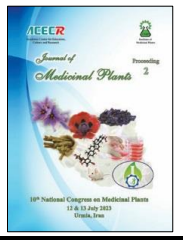
2. Mohebbi A, Khaki Z, Asadi F, Pourkabir M, Modirsanei M. Effect of mulberry (*Morus alba* L.) leaves extract on the secretion and content of triglyceride in the chicken hepatocytes primary culture. *Inter. J. Pharm*. 2007. 3: 116-119.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 318

Effects of Eucalyptus (*Eucalyptus globulus* L.), Chamomile (*Matricaria chammomilla* L.) and Garlic (*Allium sativum* L.) on immune response and serum lipids of broiler chickens

Aidin Azizpour [1*], Zahra Amirajam [2]

[1] *Department of Cardiology, Ardabil University of Medical Sciences, Ardabil, Iran*
[2] *Department of Medicinal Plants, University of Mohaghegh Ardabili, Ardabil, Iran*
E-mail: Aidin_azizpour@uma.ac.ir

ARTICLE INFO

Keywords:
Broilers
Medicinal plants
Immune system
Blood parameters

ABSTRACT

The study was conducted to evaluate the effects of medicinal plants extracts on immune system and serum lipids of broilers. In this study, 240 one-day-old (Ross 308) male broiler chicks were randomly allocated to four experimental groups, each with three replications and 20 birds in each replicate. The basal diet was consumed and the plant extracts of Eucalyptus (*Eucalyptus globulus* L.), Chamomile (*Matricaria chammomilla* L.) and Garlic (*Allium sativum* L.), at 0.1% in drinking water. The birds were vaccinated against Newcastle disease (ND) via drinking water at days 10 and 21. At days 28 and 42, three birds were selected from each experimental and blood samples were taken from to determine ND titer and humoral immune titer. At day 42, cholesterol, triglyceride, LDL and HDL were measured. At 28 days, there was no significant difference among the groups in terms of ND titer and antibody titer to SRBC. The highest ND titer and antibody titer to SRBC was measured in chamomile group and eucalyptus group ($p<0.05$), respectively on 42 days. The lowest levels of cholesterol and triglyceride were observed in garlic group ($p<0.05$). The lowest and highest levels of LDL was determined in eucalyptus group and chamomile group ($p<0.05$)), respectively. The highest and lowest levels of HDL was observed in eucalyptus group and chamomile group ($p<0.05$)), respectively. The results of the present study showed that the use of medicinal plants improves the immune system and blood parameters.

References

1. Sedghi M, Golian,A, Kermanshahi H, Ahmadi H. Effect of dietary supplementation of licorice extract and a prebiotic on performance and blood metabolites of broilers. *South. African. J. Anim. Sci*, 2010. 40(4): 371-380.

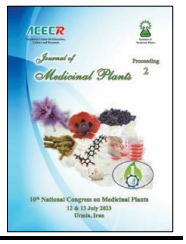
2. Yakhkeshi S, Rahimi S. Niknam A, Hoseinian H. Effects of yarrow (*Achillea millefolium*) levels on carcass characteristics, serum lipids and immune response of broilers. XIIIth European Poultry Conference, 2010. 10: 23-27.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 319

Ethnobotanical survey of medicinal plants in Boyer Ahmad region in Kohgiluyeh and Boyer - Ahmad province, Iran

Esfandiar Jahantab[1,*], **Hamed Ahmadpour**[2]

[1] *Department of Range and Watershed Management (Nature Engineering), Faculty of Agriculture, Fasa University, Fasa, Iran*

[2] *Ph.D. in Watershed Management, Natural Resources Engineering, Faculty of Agriculture and Natural Resources Engineering, University of Hormozgan, Bandar-Abbas, Iran*

E-mail: Corresponding e.jahantab@fasau.ac.ir

ARTICLE INFO

Keywords:
Medicinal plants
Boyer Ahmad region

ABSTRACT

Ethnobotany deals with the collection of valuable medicinal plants by a group of people and describes their different uses [1]. People use medicinal plants as curatives or palliatives of main health problems according to their cultural background [2]. The current paper aimed to gather the information about medicinal plants of Boyer Ahmad region and their applications by native inhabitants and traditional practitioners. The field surveys were carried out under supervisors of local people. Collected plants were identified to species level using different Floras and references. Subsequently, information including scientific names, local names, parts used, method of preparation, medicinal effects, growth forms, and Chorotypes for 71 species were recorded. Results showed that plant species belonged to 62 genera and 29 families. Apiaceae (14/08 %) and (14/08 %) Lamiaceae had the most number of species. Based on Raunkier method, Hemicryptophytes with 42/25 % is the highest growth form and the most common chorotype was Irano-Turanian type (70/42 %). The most used parts are aerial parts (40/85 %), and the most common mode of preparation was Infusion (24 %). The results of this study indicate that local people in Boyer Ahmad region have had a variety of medicinal, food and sanitary uses from all collected plants and their knowledge about identification of plants, habitats, medicinal and edible properties are extensive. So that, native knowledge leads to obtain valuable information including medicinal properties of plants, usable organs, time of growth, best time for harvesting and areas which have growing potential. So, it is vital to investigate the native knowledge of medicinal plants in various regions of Iran. As a result of the rich flora of this region, medicinal plants are the most important means of health care. Due to the lack of modern medicine, difficult geography of the district as well as traditional culture cured by plants, serves as a usual way in this region particularly in elders. So, traditional usage of medicinal plants is more accepted among people of the area. Further studies may be more effective from pharmacological view of point.

References

1. Safa, O.; Soltanipoor, M.A.; Rastegar, S.; Kazemi, M; Nourbakhsh Dehkordi, Kh; Ghannadi, A. *Avicenna Journal of Phytomedicine*, **2013**, 3, 64–81.

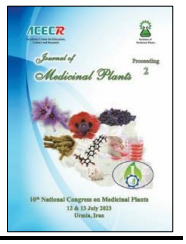
2. Yirga G. *Northern Ethiopia African Journal of Plant Science*, **2010,** Vol. 4(7), pp. 255-260.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 327

Isolation and characterization postbiotics of *Lactobacillus* bacteria from cheese by using various chemical analysis techniques

Somayeh Aghabeyk[1,2*], Mahdi Moridi Farimani[1], Atousa Aliahmadi[2], Alireza Sadeghi[3]

[1] *Department of phytochemistry, Medicinal Plants and Drugs Research Institute, Shahid Beheshti, Tehran, Iran*
[2] *Department of Biology, Medicinal Plants and Drugs Research Institute, Shahid Beheshti, Tehran, Iran*
[3] *Department of Food Science and Technology, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Iran*
E-mail: s.aghabeyik@gmail.com

ARTICLE INFO

Keywords:
Lactic acid
Postbiotic

ABSTRACT

Interest in probiotics and probiotic-based functional foods has grown enormously during the last few years. The internationally endorsed definition of probiotics is live microorganisms that, when administered in adequate amounts, confer a health benefit on the host [1]. *Lactic acid* bacteria (LAB) as Gram-positive, catalase-negative, and non-spore forming bacteria are the major group of probiotic technologically suitable microorganisms. Probiotics mainly the strains of *Lactic acid* bacteria, in particular *Lactobacillus* and *Bifidobacterium* genera, show various health effects. Postbiotics are the inactive bacteria and/or metabolites of beneficial microbes which have been recently found to be as effective as their live probiotic [2]. The aim of the present study was to characterize Postbiotic of *Lactobacillus* bacteria isolated from cheese by using various chemical analysis techniques. Primarily, the cheese sample was prepared from East Azerbaijan province. Isolation of *Lactobacillus* bacteria was performed. Sequencing results led to the identification of *Lactobacillus plantarum* as the selected LAB isolate. A cell-free supernatant was prepared. The samples were passed through a Sephadex column, and 260 fractions were collected. Some of them were analyzed by HPLC. Two pure compounds from the column were obtained. Also, several compounds by GC-MS were identified.

References

1. S. Patil, S. Sawant, K. Hauff, and G. Hampp, ‘Validated Postbiotic Screening Confirms Presence of Physiologically-Active Metabolites, Such as Short-Chain Fatty Acids, Amino Acids and Vitamins in Hylak® Forte’, *Probiotics Antimicrob Proteins*, vol. 11, no. 4, pp. 1124-1131, 2019, doi: 10.1007/s12602-018-9497-5.

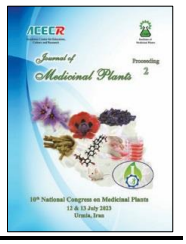
2. C. H. Kang, J. S. Kim, H. M. Park, S. Kim, and N. S. Paek, ‘Antioxidant activity and short-chain fatty acid production of lactic acid bacteria isolated from Korean individuals and fermented foods’, *3 Biotech*, vol. 11, no. 5, 2021, doi: 10.1007/s13205-021-02767-y.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 328

Comparison of some common oilseeds fatty acid methyl ester used in pharmaceutical industry

Aysan rafipour[1, *], Reza hosseinzadeh[1], Rahele tahmasebi[1], Mohammad gheshlagi[1]

[1] *Academic Center for Education, Culture and Research, Urmia University, Urmia Branch, Urmia, Iran*
E-mail: Aysan.rafipour@gmail.com

ARTICLE INFO

Keywords:
Seed oils
Fatty acid
Gas chromatography

ABSTRACT

Medicinal and aromatic plants are widely used around the world. Nowadays, *linum usitatissimum*, *sesamum indicum*, and *nigella sativa* plants are among the most popular medicinal plants that have countless benefits for humans and have been used to treat asthma, hypertension, cancer, rheumatism and headaches over the course of many years [1]. The biological activity of fatty acids is significant as they are often isolated following bioassay-guided fractionation of plant extracts [2]. In this study, the oil contained of three oilseeds was extracted and their essential fatty acids, like palmitic (C16:0), stearic (C18:0), oleic (C18:1) and linoleic acid (C18:2) were compared. Fatty acids of extracted oils were prepared by esterification method and analyzed by gas chromatography with silica capillary column. The major fatty acids in these seeds are linoleic, oleic, palmitic, and stearic acids. Linoleic acid (C18:2) was the principal unsaturated fatty acid in all seeds included in the present study ranging from 63.7 to 76.8%. Oleic acid (C18:1) was the second major unsaturated fatty acid accounting for 2.7 to 6.8% of the total fatty acids. Palmitic acid (C16:0) and stearic acid (C18:0) were the major saturated fatty acids accounting for 4.6 to 9.3% and from 5.1 to 9.1% of the total fatty acids, respectively. These simple compounds play multiple crucial roles in plans and human bodies. Therefore, plant seeds are a very good option for making herbal medicines based on the amount of fatty acids available.

References

1. Kohli K, Ali B. A study of the chemical composition of black cumin oil and its effect on penetration enhancement from transdermal formulations. *Natural Product Research*. 2010, 20; 24(12): 1151-7.

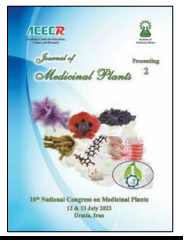
2. Tundis R, Frattaruolo L. An ancient remedial repurposing: Synthesis of new pinocembrin fatty acid acyl derivatives as potential antimicrobial/anti-inflammatory agents. *Natural Product Research*. 2019, 17; 33(2):162-8.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 331

Foliar application of ammonium nitrate and asparagine on some morphological and physiological traits of *Nepeta crispa* Willd.

Parya Shokri[1], Mahdi Ayyari[1,*], Ali Mokhtasi[1], Mohammad-Taghi Ebadi[1], Mazyar Ghaderi[1]

[1] *Department of Horticultural Science, Tarbiat Modares University, Tehran, Iran*
E-mail: parya.shokri76@gmail.com

ARTICLE INFO

Keywords:
Mofarrah
Foliar application
Ammonium nitrate
Asparagine

ABSTRACT

Mofarrah (*Nepeta crispa* Willd.) is an endemic and perennial plant from Lamiaceae family which is distributed in Alvand mountain, Hamedan, Iran [1]. Nutrition investigation by chemical or bio-fertilizer is a key steps toward domestication of a medicinal plant [2]. Here, we evaluate the foliar application of amino acid asparagine (Asp) and ammonium nitrate (Amn) on Mofarrah. This study performed in the research greenhouse of Faculty of Agriculture, Tarbiat Modares University at 2022. Analysis of variance (ANOVA) was performed on a completely randomized design and means were compared using the LSD test with the significance level of $p<0.05$ in three treatments. The morphological and physiological traits of control and treatments including height, chlorophyll content, fresh weight and dried weight were assessed. Results showed that Asp an Amn increased the plant height (22 and 29%), chlorophyll content (12.5 and 3.5%), fresh weight (3.5 and 9%) dried weight (0.5 and 3.8%), respectively. There was also a significant difference in plant height while ammonium nitrate treatment had the highest height (68.86 cm) and the lowest height was the control treatment (49.16 cm).Foliar application with ammonium nitrate fertilizer increased the morphological and physiological traits of the Mofarrah, and it should be considered in future studies to evaluate the effect of this fertilizer treatment on the biochemical characteristics of Mofarrah plant. The optimum of biomass production and phytochemical is a high demand of domestication and breeding of medicinal plants which should be evaluated in different aspects.

References

1. Karami, M., Ebadi, M. T., & Ayyari, M. Study of qualitative and quantitative changes in *Nepeta crispa* Willd. essential oil in natural habitats and agronomical conditions. *Eco-phytochemical Journal of Medicinal Plants*, 2020; 8(2): 1-12.

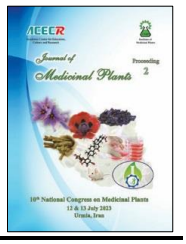
2. Alizadeh, A., Khoshkhui, M., Javidnia, K., Firuzi, O., Tafazoli, E., & Khalighi, A. Effects of fertilizer on yield, essential oil composition, total phenolic content and antioxidant activity in *Satureja hortensis* L. (Lamiaceae) cultivated in Iran. *Journal of Medicinal Plants Research*, 2010; 4(1): 33-40.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 333

Extraction and isolation of effective ingredients from *Anabasis setifera* plant extract and their biological activity

Mina shriati[1,2], Fazileh esmaeili[1], Ali Izadi-Darbandi[2], Mohsen Farhadpouri[1,*]

[1] *Department of Agricultural Biotechnology, National Institute of Genetic Engineering and Biotechnology (NIGEB), Tehran, Iran*

[2] *Department of Agronomy and Plant Breeding Sciences, College of Aburaihan, University of Tehran, Iran*

E-mail: m.farhadpour2005@yahoo.com

ARTICLE INFO

Keywords:
Extraction
Effective ingredients
Anabasis setifera
Biological activity
Cancer

ABSTRACT

The effective compounds are secondary metabolites of natural glycosides, which are mainly found in monocotyledons and dicotyledons. These compounds have a wide range of anti-inflammatory, cytotoxic, vascular protection, hypocholesterolemia, enzyme inhibition, antifungal and anti-parasitic(1, 2). In addition, some of them exert their immune-modulatory effects by affecting T cells (3). Considering the anti-inflammatory and cancer cytotoxicity effects, we were interested in extracting secondary metabolites from *Anabasis setifera* as a herbal drug candid. In this study, the effective compounds from the mentioned plant were extracted using ethyl acetate and ethanol solvents, and then their content were isolated by thin-layer chromatography. The effects of crude extract on A_{549}, PC_3, MCF_7 cancer cells and also Normal L929 cells were investigated. The obtained results from the MTT assay showed the highest cytotoxicity effects of the crude extract on PC_3 cancer cells. In the following the ethyl acetate extract was fractionated using preparative TLC method, and their cytotoxicity were investigated on PC_3 cancer cells. According to the obtained result, we found that some fractions possess high cytotoxicity effects. Therefore, the final purification, chemical structures and further biological activity assay of active fractions were studied.

References

1. Mohammadi M, Alaei M, Bajalan I. Phytochemical screening, total phenolic and flavonoid contents and antioxidant activity of Anabasis setifera and Salsola tomentosa extracted with different extraction methods and solvents. *Oriental Pharmacy and Experimental Medicine.* 2016; 16: 31-5.

2. Abdelli I, Benariba N, Adjdir S, Fekhikher Z, Daoud I, Terki M, et al. In silico evaluation of phenolic compounds as inhibitors of A-amylase and A-glucosidase. *Journal of Biomolecular Structure and Dynamics*. 2021; 39(3): 816-22.

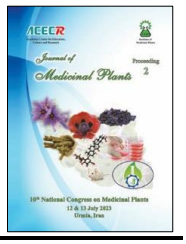
3. Sun H-X, Xie Y, Ye Y-P. Advances in saponin-based adjuvants. *Vaccine*. 2009; 27(12): 1787-96.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 334

In vitro antiparasitic effects of *Salvia officinalis*, *Pistacia vera* and *Eucalyptus globulus* extracts against *Leishmania major*

Azadeh Asadi[1], Mohammad Saaid Dayer[1, *], Fatemeh Ghafarifar[1]

[1] *Department of Parasitology and Medical Entomology, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran*
E-mail: dayer@modares.ac.ir

ARTICLE INFO

Keywords:
Sage
Pistachio pericarp
Eucalyptus
Extract
Leishmania major

ABSTRACT

Being a Lamiaceae member, sage (*Salvia officinalis*) is an important medicinal plant, which grows in warm and temperate regions. It contains phenolic, flavonoid and vitamin C compounds, which have therapeutic potentials against diseases such as gout, chronic rheumatism, nervous dizziness, blood pressure and blood sugar. Studies have reported the anti-diabetic, anti-inflammatory, anti-angiogenic, anti-tumor and antioxidant effects of sage extracts due to flavonoids contents such as carnosic acid, rosmarinic acid, caffeic acid and salvianolic acid [1]. In addition, *Pistacia vera*, a member of Anacardiaceae family, is a bipedal tree whose pericarp is used in traditional medicine to treat stomach pain, diarrhea, and hemorrhoids. It contains significant amounts of phenolic and antioxidant compounds, which have antimicrobial, and anti-angiogenesis and anticancer effects [2]. *Eucalyptus globulus*, a member of Myrtaceae, is another widely known medicinal plant, which has terpenoid and phenylpropanoid derivatives as main components in its essential oil. The eucalyptol is a component that has anti-fungal, anti-bacterial, anti-mosquito and antioxidant properties [3]. In this study, six different concentrations (1.6, 0.8, 0.4, 0.2, 0.1, 0.01 mg/ml) of aqueous alcoholic extracts of sage plant, pistachio hull, and eucalyptus leaves were tested against promastigote cells of *Leishmania major*. Absolute methanol was used as solvent to extract essential oils of these plants. Using microscopic counting and MTT test, we found that the maximum concentration of 1.6 mg/ml inhibited the motility and growth of promastigote cells with IC50 equal to 0.83 mg/ml. Each test was performed in triplicate for all concentrations.

References

1. Ghorbani A, Esmaeilizadeh M. Pharmacological properties of *Salvia officinalis* and its components. *J Tradit Complement Med.* 2017;7(4):433-440. doi: 10.1016/j.jtcme.2016.12.014.

2. Bagheri, F., Khanamani Falahati-pour, S. Beneficial Effects of Pistachio Pericarps on Some Disorders. *Pistachio and Health J*, 2021; 4(1): 1-4. doi: 10.22123/PHJ.2021.280915.1092.

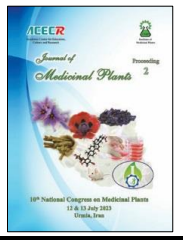
3. Djelloul R, Mokrani K and Hacini N. Study of the Antibacterial Activity of the Extract from the Essential Oil of *Eucalyptus globulus* and *Rosmarinus officinalis* on Three Bacterial Strains. *Int. J. Appl. Env. Sc*. 2017; 12(1): 47-56.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 335

Comparison of some *Matricaria chamomilla* L. wild population's essential oil with their cultivated equivalents

Najmeh Hadi[1,*], Razieh Azimi[1], Mahdi Yahyazadeh[1], Maryam Makizadeh Tafti[1], Somayeh Fekri Qomi[1]

[1] *Research Institute of Forests and Rangelands, Agricultural Research, Education and Extension Organization (AREEO), Tehran, Iran*
E-mail: n.hadi@rifr-ac.ir

ARTICLE INFO

Keywords:
Chamomile
Wild populations
Cultivation
Essential oil

ABSTRACT

Chamomile (*Matricaria chamomilla* L.) is an important medicinal plant due to many applications in food, pharmaceutical, and cosmetic-health industries. The biological properties of chamomile are attributed to its essential oil (EO) compounds and flavonoids. Wild plants cultivation under agricultural conditions improves the yield and prevents the plant extinction. In the present research, 15 wild Iranian populations collected from Khuzistan$_{Kh1-12}$, Fars$_{F1-2}$, and Bushehr$_{F3}$ provinces were cultivated under the climatic conditions of Alborz province and their EOs (wild and cultivated samples) were compared. The shade-dried flowers EOs were extracted$_{(water\ distillation)}$ and analyzed$_{(GC\&GC/MS)}$. The results showed the presence of 7 compound groups in EOs. Sesquiterpene hydrocarbons (SH), oxygenated monoterpenes (OS), and diacetylenes (DA) compounds formed the highest percentage of EO compounds in both wild and cultivated samples. These groups amount ranged from SH: 11.07%$_{Kh-3}$ to 28.99%$_{Kh-8}$ (wild) and 14.03%$_{Kh-6}$ to 23.60%$_{F-3}$ (cultivated), OS: 43.49%$_{F-3}$ to 73.81%$_{Kh-6}$ (wild) and 61.66%$_{F-3}$ to 71.05%$_{Kh-6}$ (cultivated), and DA: 0%$_{F-1}$ to 16.43%$_{Kh-1}$ (wild) and 9.09%$_{Kh-7}$ to 15.41%$_{Kh-13}$ (cultivated). Most of the cultivated samples SH compounds were obtained more than the wild ones. OS compounds in most of the wild samples were observed more than cultivated ones but with a slight difference. Chamazulene (SH) and α-bisabolol oxide A (OS) as 2 important chamomile EO compounds showed an increase from wild to cultivated. Also, the EO percentage was obtained more in cultivated samples (0.87%$_{Kh-5}$ to 1.44%$_{Kh-13}$) than in wild ones (0.05%$_{Kh-6}$ to 0.48%$_{Kh-10}$). The results of this study and the other ones [1] proves the importance of chamomile populations cultivation.

References

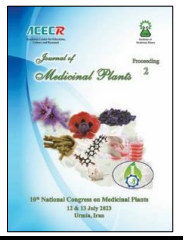
1. Nurzyńska-Wierdak, R. The essential oil of *Chamomilla recutita* (L.) Rausch. Cultivated and wild growing in Poland. Annales Universitatis Mariae Curie-Skłodowska, Lublin-Polonia, Sectio DDD. 2011: XXIV (2): 197-206.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 336

Comparison of different direct seed sowing effects on some quantitative and qualitative characteristics of *Matricaria chamomilla* L. under climatic conditions of Alborz province

Simin Mohit[1,*], Najmeh Hadi[2], Abdullah Hatamzadeh[1], Razieh Azimi[2]

[1] *Faculty of Agriculture, University of Guilan, Guilan, Iran*
[2] *Research Institute of Forests and Rangelands, Agricultural Research, Education and Extension Organization (AREEO), Tehran, Iran*
E-mail: mohit.simin@gmail.com

ARTICLE INFO

Keywords:
Chamomile
Sowing date
Cultivation
Essential oil

ABSTRACT

Chamomile (*Matricaria chamomilla* L.) is one of the important medicinal plants of Iran and the world. Different genetic and environmental factors are effective on different phenological, physiological, and phytochemical characteristics of the plant [1-2]. In this research, four direct seed sowing dates including 2021-09-16 SEPTEMBER (T1), 2021-10-17 OCTOBER (T2), 2022-03-06 MARCH (T3), and 2022-04-09 APRIL (T4) on three genotypes including a wild population from Khuzistan province (Kh), a wild population from Lorestan province (L), and a cultivated population in Isfahan province (I) were compared in a randomized complete block design with three replications under the climatic conditions of Alborz province. The planting distance was 30 $cm_{\text{between the planting rows}}$ × 20 $cm_{\text{between the plants on the planting rows}}$. The essential oils were extracted from shade-dried flowers by water distillation method and analyzed by GC and GC/MS. The results showed that the highest and lowest dry flower yields (226.8 and 103.1 $g.m^{-2}$, respectively) were obtained in the T3×I and T4×Kh treatments, respectively. The highest and lowest essential oil content was obtained 0.7% in T1×Kh and T2×I and 0.2% in T3×Kh. The highest (19.6%) and lowest (4.4%) chamazulene content in the essential oils belonged to T2×I and T3×L, respectively. Also, the highest (43.4%) and lowest (11.8%) α-bisabolol oxide A content, as the second important chamomile essential oil compound, were assigned to T3×I and T2×Kh, respectively. Overall, according to the obtained results, $October_{(autumn)}$ is recommended as the best date for direct sowing of chamomile seeds under the climatic conditions of Alborz province.

References

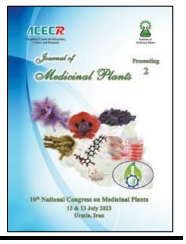
1. Bettray G. and Vomel A. 1992. Influence of temperature on yield and active principles of *Chamomilla recutita* L. Rausch under controlled conditions. *Acta Horticulturae*. 1992: 306: 83-87.
2. Gasic O., Lukic V. and Adomovic O. The influence of sowing and harvest time on the essential oil of *Chamomilla recutita*. *Journal of Essential Oil Resarch*. 1991: 3 (5): 295-302.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 338

Optimizing extraction and purification of inulin from Chicory root by macroporous resins

Fatemeh Shabani Azin[1,*], Masoud Rahimi[1,2], Hassan Rezadoost[1], Mahdi Moridi Farimani[1]

[1] *Department of Phytochemistry, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*

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

E-mail: fatemeshabaniazin99@gmail.com

ARTICLE INFO

Keywords:
Inulin
Purification
Resin

ABSTRACT

Inulin is a fructan type polysaccharide, which contains a glucose unit at the head of its chain and β (2 → 1) bonded fructose units. Inulin is mainly obtained from the roots of *Chicory intybus*. The degree of polymerization (DP) of this polysaccharide usually varies between 2-60. Polysaccharides with lower DP (up to about 10) are sweet, and have sweetness level of about 35-40 units of sucrose and can be a replacement of sugar. Consequently, as a remarkable benefit, consuming it does not result in an increased level of blood glucose. On the other hand, polysaccharides with higher DP contain fewer calories, and can be used as bulking agent and fat replacement. In addition to prebiotic benefits, inulin can be used as a valuable drug carrier, due to its unique structure [1]. In this study, we optimized the factors related to extraction and purification of Inulin from the roots of *Chicory intybus*. In particular, purification by the macroporous resins was evaluated [2]. The procedure was as follow: firstly, the collected Chicory roots were chopped into the optimized sizes, then an extract was prepared from the roots. The extract was passed through various macroporous resins, breakthroughs were calculated for the respective resins and their graphs were also drawn. The best resin was chosen and inulin was obtained as a white powder with high purity percentage (about 98%) and good yield.

References

1. F. Afinjuomo, S. Abdella, S. H. Youssef, Y. Song, and S. Garg, "Inulin and its application in drug delivery," *Pharmaceuticals*, vol. 14, no. 9, Sep. 2021, doi: 10.3390/ph14090855.

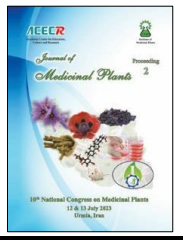
2. X. Zhang, X. Zhu, X. Shi, Y. Hou, and Y. Yi, "Extraction and Purification of Inulin from Jerusalem Artichoke with Response Surface Method and Ion Exchange Resins," *ACS Omega*, vol. 7, no. 14, pp. 12048–12055, Apr. 2022, doi: 10.1021/acsomega.2c00302.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 339

Investigating the amount of Polyphenols extracted from Mint plant using Microwaves.

Pouya Sardari Mamaghani[1,*], Behrooz Abbasi Souraki[1]

1 Department of Chemical Engineering, Faculty of Engineering, University of Guilan, Rasht, Iran
E-mail: pouya.ps1998@gmail.com

ARTICLE INFO

Keywords:
Microwaves
Polyphenol
Antioxidants
Extraction of Organic Compounds

ABSTRACT

In this article, we are going to investigate the use of microwaves to extract organic substances, especially polyphenols, in the plant tissue of mint leaves. The extraction of polyphenols from various medicinal plants, including mint, is of great importance due to their significant biological properties [1]. There are different methods to extract polyphenols from mint, but microwave is known as a new and advanced method. In addition, scientists have investigated various other methods such as continuous extraction (Soxhlet), aqueous solvent extraction, solid-liquid extraction, thermal reflux, ultrasonic extraction, pulsed electric field extraction, etc. Microwave technology has attracted a lot of attention. Recent studies have shown that this method is more effective than traditional extraction methods and significantly improves the amount of extracted polyphenols in a shorter period. For example, one study showed that the extraction of polyphenols from mint leaves using microwave technology was six times faster than the hot water boiling method and contained 17.5% more polyphenols. Previous studies have also shown that the use of microwave technology is an effective method for extracting polyphenols from medicinal plants such as green tea and mint. The amount of extracted polyphenols (in this case, the extraction yield) is determined as a function of microwave power, solvent ratio (1:8, 1:10, 1:12) and time (40, 60, 80) minutes [2].

References

1. Angshuman Bharadwaz, Chiranjit Bhattacharjee. Extraction of Polyphenols from Dried Tea Leaves. *International Journal of Scientific & Engineering Research*, Volume 3, Issue 5, May 2012.

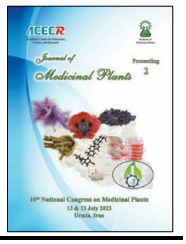
2. Chouhan, K. B. S., Tandey, R., Sen, K. K., Mehta, R., & Mandal, V. (2019). Critical analysis of microwave hydrodiffusion and gravity as a green tool for extraction of essential oils: Time to replace traditional distillation. *Trends in Food Science & Technology*, *92*, 12-21.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 340

Phytochemical characteristics of Ajwain (*Trachyspermum ammi* L.) accessions

Mahdieh Aqamohammadi[1*], Maryam Makizadeh Tafti[1], Somayeh Fekri Qomi[1]

Research Institute of Forests and Rangelands, Agricultural Research, Education and Extension Organization (AREEO), Tehran, Iran
E-mail: maghamohammadi837@yahoo.com

ARTICLE INFO

Keywords:
Trachyspermum ammi
Phytochemical
essential oils
Apiaceae

ABSTRACT

The economic value of medicinal and aromatic plants as well as other bioresources have been exploited for centuries, more recently on an industrial scale, and their impact on human health indicates an ever-increasing demand on medicinal bioresources. Medicinal plants are an excellent source of different bioactive secondary metabolites, used in developing innovative therapeutic agents presenting novel health benefits. *Trachyspermum ammi* (L.) Sprague or commonly Ajwain is an herbaceous herb belonging to the family Apiaceae and vastly grows in Egypt, Iran, Pakistan, Afghanistan, and India as well as European regions. In these regions, it is traditionally used as a medicinal plant for its antiseptic, appetizer and carminative properties. ***Trachyspermum ammi*** L., commonly known as ajowan, is a well-known traditionally used spice. Essential oil yield and composition of 17 ajowan populations in different locations of Iran was investigated. Essential oils extracted by hydrodistillation from *Trachyspermum ammi* L. were characterized by means of gas chromatography. The essential oil content of populations ranged from 2 to 9%. According to GC–MS analysis, thymol (16-89%), γ-terpinene (5-54%) and p-cymene (3-40%) were the major components. Thymol, the major phenolic compound of Ajowan, has been reported to be a germicide, antispasmodic and antifungal agent. The best accessions were endemic accessions that were collected natural habitats.

References

1. Kurnaz, M.L., Kurnaz, I.A. Commercialization of medicinal bioeconomy resources and sustainability. *Sustainable Chemistry and Pharmacy*. 2021; 22 :100484

2. Rahimmalek, M., Fadaei Heidari, E., Hossein Ehtemam, M. and Mohammadi. S., "Essential oil variation in Iranian Ajowan (*Trachyspermum ammi* (L.) Sprague) populations collected from different geographical regions in relation to climatic factors. *Industrial Crops and Products*. 2017; 95: 591-598.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran

Poster Presentation ID: 341

Bioassay-guided isolation of antioxidant constituents from the methanol extract of *Artemisia oliveriana* Bunge

Amirhosein Firouzi[1,*], Abdolrasoul H. Ebrahimabadi[1], Mahdi Abbas-Mohammadi[2], Hossein Batooli[3]

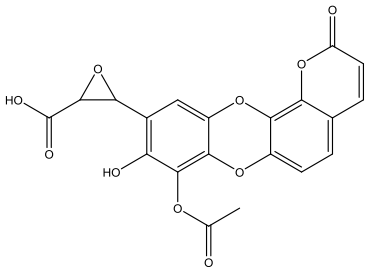
[1] *Essential Oils Research Institute, University of Kashan, Kashan, Iran*
[2] *Department of Organic Chemistry, Faculty of Chemistry, University of Kashan, Kashan, Iran*
[3] *Kashan Botanical Garden, Research Institute of Forests and Rangelands, Agricultural Research, Education and Extension Organization (AREEO), Tehran, Iran*
E-mail: Amirhosein.firouzi76@grad.kashanu.ac.ir, Amirhosein.firouzi@gmail.com

ARTICLE INFO

Keywords:
Artemisia oliveriana
Antioxidant activity
Bioassay-guided Isolation
HPLC

ABSTRACT

Today, medicinal plants have been attracted by many researchers in order to discover natural biologically active compounds. *Artemisia oliveriana* bunge is a native Iranian plant growing mainly in the east of Isfahan province. Ethnopharmacological, medicinal and phytochemical studies have revealed the antimalarial, antimicrobial and anticancer activities of the plant. Purpose of this study was the bioassay-guided isolation and identification of antioxidant compounds from the methanol extract of the plant [1]. So, methanol extract of the plant was divided into two aqueous and hexane fractions by a liquid-liqiud extraction. For obtaining phytochemical profile of the aqueous fraction, it was subjected to an analytical high-performance liquid chromatograph (Analytical HPLC). After optimization and scaling up the elution method, a preparative HPLC was applied to fractionate the extract to 12 sub-fractions (F_1-F_{12}). The antioxidant effect of sub-fractions was measured by a DPPH free radical scavenging assay. Fraction F_4 showed the highest antioxidant property by an inhibition of 85.85% of DPPH free radicals at a concentration of 100 µg/mL. For isolation and purification of effective compounds of this active fraction, it was subjected to another preparative HPLC system following by antioxidant tests on purified compounds. This attempt led to the isolation of a structurally new coumarolignane ($F_{9'}$) skeleton. It revealed a high antioxidant activity with 80.93% inhibition of free radicals at the same concentration. 1D and 2D nuclear magnetic resonance (NMR) technique including (^{1}HNMR, ^{13}CNMR, COSY, HMQC and HMBC) were used to elucidate the structure.



References

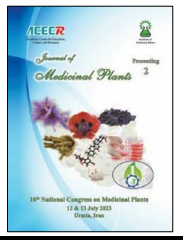
1. Yaermaimaiti S, Wu T, Aisa HA. Bioassay-guided isolation of antioxidant, antimicrobial, and antiviral constituents of *Cordia dichotoma* fruits. *indcrop*. 2021; 172:113977. doi: 10.1016/j.indcrop.2021.113977

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 342

Effect of LED photoperiods on *in vitro* propagation of *Catharanthus roseus*

Elnaz Nourozi[1,*], Ahad Hedayati[1], Hadi Madani, Shabnam Mir Yousefzadeh[1], Siyavash Hemmati [1]

[1] *Academic Center for Education, Culture and Research (ACECR), West Azarbayjan Branch, Urmia, Iran*
E-mail: norozyelnaz@gmail.com

ARTICLE INFO

Keywords:
Catharanthus roseus
Light-emitting diodes
In vitro culture
Micriopropagation

ABSTRACT

During the last decades lighting installations in tissue culture growth rooms have generally been furthered or implemented based on LED technology. Light, its intensity and wavelength, photoperiod, and lack of light belong to physical conditions that can be easily manipulated to increase medicinal plants' *In vitro* products [1]. Light has been introduced as an abiotic elicitor effective in plant morphogenesis (growth and development). Plants perceive light through photoreceptors, which regulate several specific physiological reactions, including organogenesis and synthesis of metabolites. The success of *In vitro* plant regeneration and metabolite synthesis relies greatly on the spectral quality of light and photon efficiency of the light source [2]. The effects of light spectrums on plant physiology are different among species, as a result, it causes significant variation in biomass performance and plant production. *Catharanthus roseus* one of the most medicinally valuable plant species of Apocynaceae family, which is a source of the drugs vincristine and vinblastine. According to the mentioned cases, the role of LED lights (control (White), (4Red/1Blue), (3Red/1Blue), (2Red/1Blue), (1Red/1Blue)) as elicitors on the regeneration of *C. roseus* under *In vitro* culture conditions was investigated. Our results showed that the best performance of regeneration was observed under a 3Red/1Blue mixture with an average of 18 seedlings. The maximum height (7/12 cm) was observed under the influence of 4Red/1Blue combination. Therefore, it seems that the red and blue light wavelengths are known to influence many plants physiological processes during growth and development.

References

1. Kubica P, Szopa A, Prokopiuk B, Komsta L, Pawłowska B, Ekiert H. The influence of light quality on the production of bioactive metabolites–verbascoside, isoverbascoside and phenolic acids and the content of photosynthetic pigments in biomass of *Verbena officinalis* L. cultured in vitro. *J. Photochem. Photobiol. B: Biol.* 2020; 203, 111768.

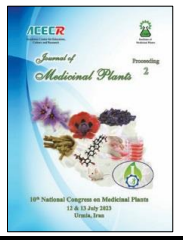
2. Jung WS, Chung IM, Hwang MH, Kim SH, Yu CY, Ghimire BK. Application of light-emitting diodes for improving the nutritional quality and bioactive compound levels of some crops and medicinal plants. *Molecules*. 2021; 26(5):1477. doi: 10.3390/molecules26051477.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 343

Significance of inoculation density control on biomass accumulation of *Hyoscyamus reticulatus* L. hairy roots in a bioreactor system

Elnaz Nourozi [1,*], **Ahad Hedayati** [1]

[1] *Academic Center for Education, Culture and Research (ACECR), West Azarbayjan Branch, Urmia, Iran*
E-mail: norozyelnaz@gmail.com

ARTICLE INFO

Keywords:
Hyoscyamus reticulatus
Inoculum size
Transgenic root
Tropane alkaloid

ABSTRACT

Hyoscyamus reticulatus L. from the Solanaceae family is one of the important commercial sources of tropane alkaloids such as hyoscyamine and scopolamine, commonly used as antispasmodic, anticholinergic, sedative, analgesic and pupil dilating agents [1]. Hairy root culture is an effective method to produce secondary metabolites. In fact, hairy roots are genetically and biologically stable. Many types of bioreactors have been successfully used for cultivating transformed root cultures. The advantages of this technique are improved mass exchange rates, strict control of the cultivation process, and possibilities for absorption of nutrients through the cultivation conditions [2]. By optimizing various factors, it is possible to improve the production of biomass and secondary metabolites in bioreactor. For example, by optimizing the amount of inoculum density and aeration volume, the production of biomass and secondary compounds can be enhanced. In this research, the hairy roots of *H. reticulatus* cultivated at a 5000 ml airlift bioreactor containing 3000 ml liquid MS medium and investigated the influence of the inoculum size (0.5, 1, 2, 3 g/L) on growth and biomass content. According to the results, an inoculum size of 3 g/L was found to be the optimum for cell biomass (262.74 g fresh weight and 16.07dry weight). In general, inoculum has an important role in biological pretreatment since the time required for the colonization of the substrate is clearly influenced by the type and amount of inoculum and should be optimized for obtaining the highest hairy root biomass and secondary metabolites.

References

1. Huang JP, Wang YJ, Tian T, Wang L, Yan Y, Huang SX. Tropane alkaloid biosynthesis: a centennial review. *Nat. Prod. Rep*. 2021; 38(9):1634-1658. doi: 10.1039/d0np00076k.

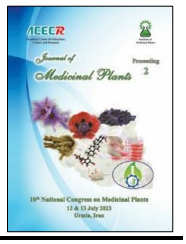
2. Bapat VA, Kavi Kishor PB, Jalaja N, Jain SM, Penna S. Plant cell cultures: biofactories for the production of bioactive compounds. *Agronomy*. 2023; 13(3): 858. https://doi.org/10.3390/agronomy13030858.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 344

Extraction and purification of carbohydrates from *Dorema kopetdaghense* gum

Fatemeh Ghasemi[1*], Elham Ahmadi[1], Hossein Dehghan[2], Mahdi Moridi Farimani[1]

[1] *Department of Phytochemistry, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*
[2] *Medicinal Plants Research Centre, Shahed University, Tehran, Iran*
E-mail: m_moridi@sbu.ac.ir

ARTICLE INFO

Keywords:
Apiaceae family
Dorema kopetdaghense
Purification
Extraction

ABSTRACT

Carbohydrates are the most abundant biological molecules on earth, which are composed of mono, di and polysaccharide units. The genus *Dorema (Apiaceae)* consists of eight species in Iran, including *D. ammoniacum, D. aitchisonii, D. glabrum, D. aucheri, D.aureum, D.gummiferum, D.hyrcanum, D.kopetdaghense* [1]. Some members of *Dorema* are used in Iranian traditional medicine. Persian *ammoniacum* is an ancient therapeutic agent that has been considered in Iranian traditional medicine useful in treatment of gastric disorders, spastic pains, skin inflammations, intestinal parasitic infections, analgesic and skin inflammations [2]. *D. kopetdaghense* is a shrub with more than 2 meters tall that distributes in Iran and Turkmenistan [1]. It is used in traditional medicine as anti-inflammatory and to treat rheumatoid arthritis and endotoxemia-induced multiple organ injury [3]. Herein we reported the purification of a water-soluble polysaccharide from *D. kopetdaghense* gum. The gum was cleaned and pre-extracted by Ethanol. The residue was extracted with distilled water at 70°C and deproteinization was treated using the Sevag method. Finally, the crude carbohydrate fraction was purified by DEAE-cellulose column to obtain a purified carbohydrate.

References

1. M. Iranshahi, F. Shaki, A. Mashlab, A. Porzel, and L. A. Wessjohann, "Kopetdaghins A-E, sesquiterpene derivatives from the aerial parts and the roots of Dorema kopetdaghense," *J. Nat. Prod.*, vol. 70, no. 8, pp. 1240–1243, 2007.

2. E. Ahmadi, H. Rezadoost, M. Alilou, H. Stuppner, and M. Moridi Farimani, "Purification, structural characterization and antioxidant activity of a new arabinogalactan from Dorema ammoniacum gum," *Int. J. Biol. Macromol.*, vol. 194, no. July, pp. 1019–1028, 2022.

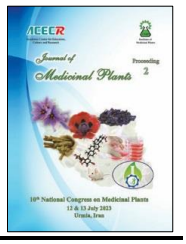
3. S. Zamani Taghizadeh Rabe, M. Iranshahi, M. Rastin, S. Zamani Taghizadeh Rabe, and M. Mahmoudi, "Anti-inflammatory effect of new kopetdaghins A, C and E from Dorema kopetdaghense," *Food Agric. Immunol.*, vol. 26, no. 3, pp. 430–439, 2015.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 347

Phytochemical properties and metabolite content of essential oil and extract of two medicinal plants, Rosemary (*Salvia rosmarinus*) and Thyme (*Thymus vulgaris*)

Zeinab Chaghakaboodi[1]*

[1] *Department of Plant Production Engineering and Genetics, Campus of Agriculture and Natural Resources, Faculty of agriculture, Razi University. Kermanshah, Iran.*
E-mail: z.chaghakaboodi@razi.ac.ir

ARTICLE INFO

Keywords:
Essential oil
Extract plant
Suger content
Phenol content

ABSTRACT

Rosemary (*Salvia rosmarinus*) and Thyme (*Thymus vulgaris*) are two medicinal plants that are widely used for their therapeutic properties [1]. Both plants are known to contain essential oils and other phytochemicals that have a variety of medicinal properties. The essential oil of Rosemary contains a variety of phytochemicals, including camphor, cineole, and α-pinene. Thyme essential oil is also rich in phytochemicals, including thymol, carvacrol, and p-cymene. In addition to their essential oils, both Rosemary and Thyme contain other phytochemicals that have medicinal properties [2]. Rosemary contains rosmarinic acid, which has been found to have antioxidant and anti-inflammatory properties, and Thyme contains flavonoids, which have been shown to have an anti-inflammatory effect. The aim of this study was to compare the phytochemical properties and metabolite content of essential oils and extracts of *Salvia rosmarinus* and *Thymus vulgaris*. The essential oils of the collected plants were extracted by distillation with water using a Cloninger machine, and the most important components of the essential oils of the samples were identified and analyzed by GC/MS. Total soluble suger, total phenol and total flavonoids for essential oil and extract were measured. Result showed that in both plant the total soluble suger, total phenol and total flavonoids of the essential oil was higher than that of the extract.

References

1. Hassan, R., & Hassan, D. R. (2023). Preventive effect of herbs Rosemary and Thyme (*Salvia rosmarinus* and *Thymus vulgaris*) on Osteoporosis in female Rats. *9*(1), 28-44.

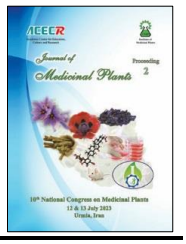
2. Viuda-Martos, M., Ruíz-Navajas, Y., Fernández-López, J., & Pérez-Álvarez, J. A. (2007). Chemical composition of the essential oils obtained from some spices widely used in Mediterranean region. *Acta Chimica Slovenica*, *54*(4), 921.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 348

Investigating of metabolite content and antioxidant properties of *Thymus vulgaris* essential oil

Zeinab Chaghakaboodi[1]*

[1] *Department of Plant Production Engineering and Genetics, Campus of Agriculture and Natural Resources, Faculty of agriculture, Razi University. Kermanshah, Iran.*
E-mail: z.chaghakaboodi@razi.ac.ir

ARTICLE INFO

Keywords:
Antioxidant
DPPH
Essential oil
GC-MS

ABSTRACT

Thymus vulgaris, commonly known as thyme, is an aromatic herb that belongs to the mint family Lamiaceae [1]. Thyme has been used for centuries for its medicinal and culinary properties. The essential oil of *Thymus vulgaris* is known to contain a large number of phytochemicals, such as thymol, carvacrol, p-cymene, γ-terpinene, and linalool, which have been shown to possess various biological activities, including antioxidant, antimicrobial, anti-inflammatory, and anticancer properties [2]. The essential oils of the collected plants were extracted by distillation with water using a Cloninger machine, and the most important components of the essential oils of the samples were identified and analyzed by GC/MS. In this study, the composition of the antioxidant activity of thyme (*Thymus vulgaris* L.). Extraction of essential oil from each plant was done with three replication and in each replication 50 gr of dry plant matter by water distillation method and Clevenger Apparatus. The yield percentage of essential oil for both plants was calculated as 2%. Essential oils were investigated using the DPPH free radical inhibition. The results showed that the antioxidant activity of thyme essential oil did not increase significantly with increasing concentration. The highest concentration of thyme essential oil (25 µl/ml) the inhibitory effect of DPPH free radicals was 95.86%.

References

1. Soleimani, M., Arzani, A., Arzani, V., & Roberts, T. H. (2022). Phenolic compounds and antimicrobial properties of mint and thyme. *Journal of Herbal Medicine*, 100604.

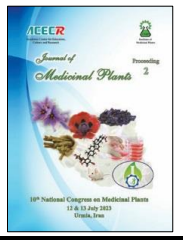
2. Kim, M., Sowndhararajan, K., & Kim, S. (2022). The chemical composition and biological activities of essential oil from Korean native thyme Bak-Ri-Hyang (*Thymus quinquecostatus* Celak.). *Molecules*, *27*(13), 4251.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 349

Analysis of essential oil content in Eucalyptus as a medicinal plant using gas chromatography mass spectrometry

Jaber Nasiri[1*] and Zeinab Chaghakaboodi[2]

[1] *Nuclear Agriculture Research School, Nuclear Science and Technology Research Institute, AEOI, Karaj, Iran*

[2] *Department of Plant Production Engineering and Genetics, Campus of Agriculture and Natural Resources, Faculty of agriculture, Razi University. Kermanshah, Iran*

E-mail: jnasiri@aeoi.org.ir

ARTICLE INFO

Keywords:
Essential oil
GC-MS
α-terpinene

ABSTRACT

Eucalyptus is a genus of evergreen trees and shrubs that belong to the family Myrtaceae. The genus includes over 700 species, most of which are native to Australia, but some are also found in other parts of the world such as South America, Africa and Asia. Eucalyptus trees are known for their distinctive aroma and are widely cultivated for their timber, pulp, essential oils, and ornamental value [1]. The identified components of Eucalyptus essential oil can vary depending on the species, geographic location, and other factors. However, some common components of Eucalyptus essential oil include eucalyptol, alpha-pinene, limonene, and beta-pinene. GC-MS analysis can provide valuable information about the chemical composition of Eucalyptus essential oil, including its potential medicinal properties. For example, eucalyptol has been shown to have anti-inflammatory and analgesic properties, while alpha-pinene and limonene have been shown to have antimicrobial properties. The essential oils of the collected plants were extracted by distillation with water using a Cloninger machine, and the most important components of the essential oils of the samples were identified and analyzed by GC/MS. The result showed that the major constituent in essential oil was the monoterpene α-terpinolene (17.631% of the total amount) [2] and α-terpinene (9.974% of the total amount). By identifying the specific components of Eucalyptus essential oil, researchers can gain insights into its potential therapeutic uses and develop more effective medicinal products.

References

1. Sartorelli, P., Marquioreto, A. D., Amaral-Baroli, A., Lima, M. E. L., & Moreno, P. R. H. (2007). Chemical composition and antimicrobial activity of the essential oils from two species of Eucalyptus. *Phytotherapy Research*, *21*(3), 231-233.

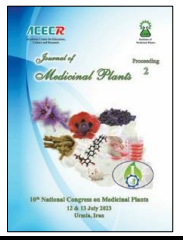
2. Pagula, F. P., Baser, K. H. C., & Kürkçüoglu, M. (2000). Essential oil composition of *Eucalyptus camaldulensis* Dehn. from Mozambique. *Journal of essential oil research*, *12*(3), 333-335.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 350

Investigating the effect of sub-MIC concentrations of *Satureja Khuzestanica* essential oil on the fatty acid composition of *P. aeruginosa* cell wall

Fariba Mofidi[1], Gholamhossein Ebrahimipour[1], Hassan Rezadoost[2], Samad Nejad Ebrahimi[2], Deniz Mohammadi[2], Atousa Aliahmadi[3*]

[1] *Department of Microbiology, Faculty of Biological Sciences, Shahid Beheshti University, Tehran, Iran*
[2] *Department of Phytochemistry, Medicinal Plants and Drugs Research Institute, Shahid Beheshti, University, Tehran, Iran*
[3] *Department of Biology, Medicinal Plants and Drugs Research Institute, Shahid Beheshti, University, Tehran, Iran*
E-mail: a_aliahmadi@sbu.ac.ir

ARTICLE INFO

Keywords:
Fatty acids
Sub-MIC
Satureja khuzestanica essential oil

ABSTRACT

Introduction: *Pseudomonas aeruginosa* is an invasive bacterial pathogen that can cause severe infections especially on immunocompromised individuals. The fatty acid composition of the cell membrane is important for the survival and virulence of *P. aeruginosa*. *Satureja khuzestanica* is a medicinal plant that has been shown to have antibacterial activities against a variety of standard as well as clinical strains of *P. aeruginosa*. **Aims**: In this study, the effect of sub-MIC concentrations of *Satureja khuzestanica* essential oil on the fatty acid composition of *P. aeruginosa* ATCC cell wall was investigated using Gas Chromatography-Mass Spectrometry (GC-MS). **Method**: The fatty acids were extracted using the derivatization method described by Lepage and Roy (1986) with slight modifications. The extracted FAMEs were analyzed using a gas chromatography machine equipped with a flame ionization detector. The fatty acid peaks were identified based on their retention times and compared to known fatty acid standards (Sigma-Aldrich). **Result**: It was shown that treatment with *S. khuzestanica* essential oil at sub-mic concentrations led to some changes in the fatty acid composition of *P. aeruginosa*. **Discussion:** Overall, our results suggest that *S. khuzestanica* essential oil at sub-mic concentrations could alter the fatty acid composition of *P. aeruginosa*, leading to decreased virulence and increased susceptibility to antimicrobial agents, and that these changes in fatty acid composition contribute to the antimicrobial effect of this plant. These findings provide insight into the mechanism of action of Satureja against *P. aeruginosa* and may have implications for the development of new antimicrobial agents.

References

1. Lepage, G., & Roy, C. C. (1986). Direct transesterification of all classes of lipids in a one-step reaction. *Journal of Lipid Research*, 27(1), 114-120.

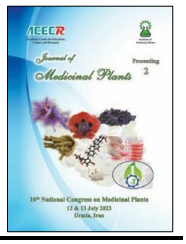
2. Morrison, W. R., & Smith, L. M. (1964). Preparation of fatty acid methyl esters and dimethylacetals from lipids with boron fluoride–methanol. *Journal of Lipid Research*, 5(4), 600-608.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 352

Serotonin improves the photosynthetic parameters of saffron plants under drought stress conditions

Hamzeh Amiri[1*], Parvaneh Hemmati Hassan Gavyar[1], Marino B. Arnao[2] and Seifollah Bahramikia[1]

[1] *Departement of Biology, Factually of science, Lorestan University, Khorramabad, Iran*
[2] *Department of Plant Biology (Plant Physiology), Faculty of Biology, University of Murcia, 30100 Murcia, Spain*
E-mail: amiri_h_lu@yahoo.com

ARTICLE INFO

Keywords:
Pn
Fv/Fm
Serotonin

ABSTRACT

Abiotic stresses significantly reduce the growth and yield of plants. In general, drought stress causes a series of physiological and biochemical changes such as stomata closure, reduction of chlorophyll content and antioxidant capacity [1, 2]. The role of serotonin as a plant growth regulator in increasing plants' resistance to stress and reducing its effects, has been the focus of researchers in recent years. The red stigmas of saffron, as the most expensive spice in the world, which also has medicinal properties, has a special place among Iran's industrial and export products. The aim of this study was to investigate the effect of serotonin as a new plant growth regulator on photosynthetic parameters of saffron under drought stress conditions. In order to apply drought stress at the level of 20%, polyethylene glycol 6000 was used, also serotonin treatment was applied at a concentration of 100 µM. The results showed that the drought stress of 20%, compared to the control group, reduced the amount of chlorophyll a (36.41%), chlorophyll b (30.66%), carotenoids 39.71%, net photosynthesis rate (Pn) (57.25%) and Maximum Quantum efficiency of photosystem II (Fv/Fm) (0.92%). The exogenous application of serotonin improved these parameters, So that the plants that received drought stress and serotonin at the same time, compared to the groups that were only under stress, the amount of chlorophyll a (17.38%), chlorophyll b (20.26%), carotenoids (44.18/%), Pn(41.25%) and Fv/Fm(60% was increased.

References

1. Cao B. L, Ma Q, Zhao Q, Wang L, Xu, K. Effects of silicon on absorbed light allocation, antioxidant enzymes and ultrastructure of chloroplasts in tomato leaves under simulated drought stress. *Sci. Hortic*. 2015; 194, 53-62. doi :/10.1016/j.scienta.2015.07.037.

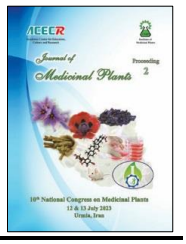
2. Sharma A, Zheng B. Melatonin mediated regulation of drought stress: Physiological and molecular aspects. *Plants*. 2019; *8*(7): 190. doi: 10.3390/plants8070190.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 353

Effect of *Stachys lavandulifolia* on the severity of Primary dysmenorrhea

Parvaneh Mirabi[1], Faraz Mojab[2], Fatemeh Rabiei[3]

[1] *Infertility and Reproductive Health Research Center, Health Research Institute, Babol University of Medical Sciences, Babol, Iran*
[2] *Department of Pharmacognosy, School of Pharmacy, Shahid Beheshti University of Medical Sciences, Tehran, Iran*
[3] *Student Research Committee, Babol University of Medical Sciences, Babol, Iran*

ARTICLE INFO

Keywords:
Stachys lavandulifolia
Dysmenorrhea
Herbal medicine

ABSTRACT

Objective: We conducted a clinical trial to evaluate the impact of *Stachys lavandulifolia* - a herb with sedative and antispasmodic effects on smooth muscles- on the severity of dysmenorrhea. Method: This clinical was performed on 50 single students 18-25 years old with primary dysmenorrhea residing in dormitories of Zanjan university. Subjects were selected through a questionnaire which included demographic and menstrual cycle characteristics and graded of dysmenorrhea. 5 Grams of the flower powder was boiled (according to traditional method), and was given three times daily for 3 days beginning at the onset of menstruation for 2 consecutive menstrual cycle. Result: At baseline and during the intervention cycles, the pain severity was evaluated with a visual analogue scale (0 to 10cm) and the systemic manifestations were assessed using a multidimensional verbal scale. The severity and duration of pain was significantly reduced ($P<0.001$) In addition, the total scores of systemic manifestations associated with dysmenorrhea decreased compared with those at the onset of the study but it wasn't significant. The only exception was Mood swings as a variable ($P<0.05$). Conclusion: *Stachys lavandulifolia* may be an effective treatment for dysmenorrhea, potentially due to the antispasmodic effects of this herb.

References

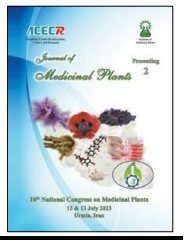
1. Cao B. L, Ma Q, Zhao Q, Wang L, Xu, K. Effects of silicon on absorbed light allocation, antioxidant enzymes and ultrastructure of chloroplasts in tomato leaves under simulated drought stress. *Sci. Hortic*. 2015; 194, 53-62. doi: /10.1016/j.scienta.2015.07.037
2. Sharma A, Zheng B. Melatonin mediated regulation of drought stress: Physiological and molecular aspects. *Plants*. 2019; 8(7), 190. doi: 10.3390/plants8070190

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 354

Relationship between zinc, selenium and superoxide dismutase and semen parameters after Carob administration: a randomized controlled trial study

Parvaneh Mirabi [1], Mir Mohammad Reza Aghajani [1], Faraz Mojab[2]

[1] *Infertility and Reproductive Health Research Center, Health Research Institute, Babol University of Medical Sciences, Babol, Iran*

[2] *Department of Pharmacognosy, School of Pharmacy, Shahid Beheshti University of Medical Sciences, Tehran, Iran*

ARTICLE INFO

Keywords:
Male infertility
Carob
Antioxidants
Superoxide Dismutase
Zinc
Selenium

ABSTRACT

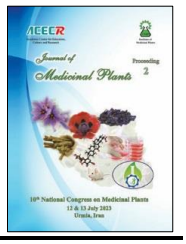
Objective: Herbal products with an antioxidant capacity can boost male reproductive functions. The empiric use of carob for its antioxidant properties is common among infertile men in Iran. We aimed to assess the relationship between zinc, selenium and superoxide dismutase and semen parameters after Carob administration in infertile. **Method:** A total of 60 idiopathic infertile men were recruited. Participants were divided randomly into the carob syrup twice a day or vitamin E 100 mg twice a day for 3 months. Semen analysis, SOD activity and Zn and Se levels were measured before and 3 months after the intervention. **Result:** There was no significant correlation between the level of Zn and sperm parameters. Improvement in sperm count occurred with increasing the level of Se. By controlling the confounding effect of the treatment groups and the baseline value of semen parameters, the number of sperm increases by 0.015 per unit of Se increase ($P = 0.05$). Other parameters from semen analysis did not show any significant increase or decrease. Also, the correlation between SOD activity and semen count and morphology were not significant. Although it was not significant for sperm motility at $\alpha = 0.05$, it can be considered marginally significant at $\alpha = 0.1$($P = 0.08$). **Conclusion:** Carob administration can improve Se level in infertile men; however, its effects on Zn level and SOD activity are unclear. Nevertheless, more studies are required to investigate the different doses and duration of carob administration.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 355

Changes in content of compatible osmolytes of *Crocus sativus* L under drought stress and serotonin treatment

Parvaneh Hemmati Hassan Gavyar[1*], Hamzeh Amiri[1], Marino B. Arnao[2], Seifollah Bahramikia[1]

[1] *Departement of Biology, Factually of science, Lorestan University, Khorramabad, Iran*
[2] *Department of Plant Biology (Plant Physiology), Faculty of Biology, University of Murcia, 30100 Murcia, Spain*
E-mail: parvanehhemati1371@Gmail.com

ARTICLE INFO

Keywords:
Proline
Soluble sugars
Polyethylene glycol

ABSTRACT

Drought stress, by affecting physiological, biochemical and metabolic processes, leads to a decrease in growth in plants. Osmotic regulation by osmolytes such as proline and soluble sugars is one of the immediate responses of plants to drought stress [1, 2]. Serotonin is a novel signaling molecule in plants that plays a key role in development and defense. Since Iran take place in dry region of the world, studying the responses of plants to water-deficit stress is of particular importance. The aim of this study is to investigate the possible improving effects of serotonin on the osmotic responses of *Crocus sativus* L. under drought stress conditions. In order to apply drought stress, polyethylene glycol 6000 was used, also serotonin treatment was applied at a concentration of 100 µM. Drought stress led to an increase in the amount of proline and sugar. The highest amount of sugar (1.07 mg/g) and proline (0.13 mg/g) was observed in 20% drought stress. The application of serotonin had a decreasing effect on the amount of proline and sugar. The lowest amount of proline and sugar were observed in the group receiving serotonin in the absence of drought stress. This reduction effect for proline and sugar were 26.17% and 8.41%, respectively, compared to the control group. The amount of sugar in the drought stress of 10% and 20% also decreased in the presence of serotonin by 1.09% and 3.37%, respectively. The decrease of proline in these treatments was 20.38% and 10.4%, respectively.

References

1. Abboud S, Vives-Peris V, Dbara S Gómez-Cadenas A, Pérez-Clemente R. M, Abidi W, Braham M. Water status, biochemical and hormonal changes involved in the response of *Olea europaea* L. to water deficit induced by partial root-zone drying irrigation (PRD). *Sci. Hortic*. 2021, *276*, 109737. doi: /10.1016/j.scienta.2020.109737.

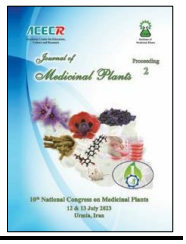
2. Han Q. H, Huang B, Ding C. B et al. Effects of melatonin on anti-oxidative systems and photosystem II in cold-stressed rice seedlings. *Front. Plant Sci*, 2021, *8*, 785. doi: /10.3389/fpls.2017.00785.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 356

Study of effects nano silicon and nano graphene oxide in *Glycyrrhiza glabra* L. under salinity stress

Farshad Abbasi[1*], Rashid Jamei[1], Babak Abdollahi Mandalokani[2]

[1] *Department of Biology, Faculty of Science, Urmia University, Urmia, Iran*
[2] *Department of Plant Breeding and Biotechnology, Faculty of Agriculture, Urmia University, Urmia, Iran*
E-mail: f.abasi9178@gmail.com

ARTICLE INFO

Keywords:
Nano silicon
Nano graphene oxide
Glycyrrhizic acid
Salinity
Glycyrrhiza glabra

ABSTRACT

Glycyrrhiza glabra L. (Licorice) is one of the most widely used herb from the ancient medical. In addition to its medicinal properties it is also used as a flavoring herb. Licorice contains the glycoside, glycyrrhizin which has a similar structure and activity as the adrenal steroids. Licorice has an anti inflammatory properties and useful for allergies, which has an activity similar to cortisone [1]. In agriculture, nanoparticles are used to investigate the properties of plants. Accordingly, silicon nanoparticles are used as a weapon against heavy metal toxicity, UVB stress, salinity stress and drought stress. In most studies, nano silicon are either beneficial for plants and support plant growth or neither effects [2]. In compare of graphene oxide (GO) with other nanomaterials, Some studies indicated that GO has a better biocompatibility with living organisms and may exert positive effects on crop plants [3]. Therefore, GO has been widely applied as an agent regulating plant loading with micronutrients and preventing phytotoxicity of soil contaminants to improve crop yield. GO can eliminate ROS in roots and change root morphology. Also, GO significantly increases root auxin or gibberellic acid content to improve plant root growth [3]. Herein, we aimed to investigate the effects of nano silicon and nano-GO on shoot and root length, dry weight and fresh weight of shoot and root, RWC and Chlorophyll a, b, carotenoids in *Glycyrrhiza glabra* L. under salinity stress.

References

1. Kaur R, Kaur H, Dhindsa AS. Glycyrrhiza glabra: a phytopharmacological review. *International journal of pharmaceutical Sciences and Research*. 2013; 4(7): 2470. doi: 10.13040/IJPSR.0975-8232.4(7).2470-77.

2. Rastogi A, Tripathi DK, Yadav S, Chauhan DK, Živčák M, Ghorbanpour M, El-Sheery NI, Brestic M. Application of silicon nanoparticles in agriculture. *3 Biotech*. 2019; 9: 1-1. doi: 10.1007/s13205-019-1626-7.

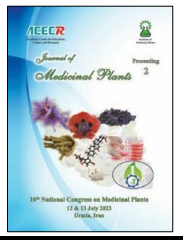
3. Gao M, Xu Y, Chang X, Dong Y, Song Z. Effects of foliar application of graphene oxide on cadmium uptake by lettuce. *Journal of Hazardous Materials*. 2020; 398: 122859. doi: 10.1016/j.jhazmat.2020.122859.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 357

Investigating the phenotypic diversity accessions of basil (*Ocimum basilicum*) in Iran.

Kheyrollah Babaei*, **Naser Gholizadeh**

Department of Horticulture, Faculty of Agriculture, Urmia University, Iran
E-mail: kh.babaei@urmia.ac.ir

ARTICLE INFO

Keywords:
Ocimum basilicum
Breeding
Accessions
Morphological diversity

ABSTRACT

Basil genus belonging to the mint family is one of the most important and economic medicinal plants in the world, Its species are used for the production of tea, essential oil, medicinal purposes, spices, and as an ornamental and potted plant. (2008 Kintzios & Makri 1996. al et). This research was conducted in order to determine the morphological diversity of 10 basil stands and to investigate the differences in morphological traits under greenhouse conditions in the form of a completely randomized design with three replications in the Department of Horticulture, Faculty of Agriculture, Urmia University. Based on the results of analysis of variance of the data, significant differences were observed in quantitatively measured traits among populations. The highest plant height belonged to accessions number 2 and number 1 and the lowest plant height belonged to accessions number 7. The highest number of leaves belonged to accessions number 8 and number 6, and the lowest number of leaves belonged to accessions number 9. In general, the results obtained from this research showed that Iranian basils have a high diversity in terms of the studied traits, and there are valuable genotypes in terms of horticultural traits among them, which can be suitable genetic resources for breeding in order to produce cultivars.

References

1. Makri O. and Kintzios S. 2008. *Ocimum* sp. (basil): Botany, cultivation, pharmaceutical properties, and biotechnology. *Journal of Herbs, Spices & Medicinal Plants* 13: 123-150.

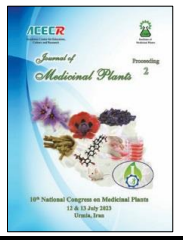
2. Marotti M., Piccaglia R. and Giovanelli E. 1996. Differences in essential oil composition of basil (*Ocimum basilicum* L.) Italian cultivars related to morphological characteristics. *Journal of Agricultural and Food Chemistry* 44: 3926-3929.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 358

Study of morphological diversity accessions of basil (*Ocimum basilicum*) in Iran.

Naser Gholizadeh moghadam*, Kheyrollah Babaei

Department of Horticulture, Faculty of Agriculture, Urmia University, Iran
E-mail: Nasergholizadeh70 @yahoo.com

ARTICLE INFO

Keywords:
Ocimum basilicum
breeding
Accessions
morphological diversity

ABSTRACT

Basil (*Ocimum basilicum*) is an important medicinal plant from the mint (Lamiaceae) family It is an annual and herbaceous plant that has a great diversity in morphology and secondary compounds, especially essential oil. This research was conducted in order to determine the morphological diversity of 10 basil stands and to investigate the differences in morphological traits under greenhouse conditions in the form of a completely randomized design with three replications in the Department of Horticulture, Faculty of Agriculture, Urmia University. According to the results of variance analysis of the data, a significant difference is observed in the morphological traits measured between the populations. The highest number of nodes per plant was related to accessions No. 3 and No. 8, and the lowest number of nodes per plant was related to accessions No. 7. The maximum length of the node was related to accessions No. 2 and No. 5, and the lowest number of nodes per plant was related to accessions No. 7. The results showed that the studied populations have high diversity and the selection should be done in terms of desired traits and can be used in future basil breeding programs.

References

1. Omidbaigi R. Production and Processing of medicinal plants (In Persian). Astan'e Qods'e Razavi publication. Vol 3. Tehran-Iran. 2008, 397 pp.

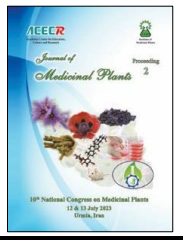
2. Omidbaigi R. Approaches to Production and Processing of medicinal plants (In Persian). Tarahane'e Nashr publication. Vol 2. Tehran-Iran. 1997, 424 pp.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 364

The effect of foliar spray with selenium nanoparticles (SeNPs) on morphological attributes of purple coneflowers (*Echinacea pupurea*) under drought stress condition

Maryam Rezagholi[1], Javad Rezapour fard[1*]

[1] *Faculty of Agriculture, Department of Horticultural Sciences, Urmia University, Urmia, Iran*
E-mail: j.rezapourfard@urmia.ac.ir

ARTICLE INFO

Keywords:
Lack deficiency
Nano particle
Purple coneflower

ABSTRACT

Echinacea pupurea is known by the English name purple coneflower (Hanafy *et al*., 2010). This species is a valuable plant from the *Asteraceae* family, which has an ornamental value, and its cultivation has been popularized in urban landscape in recent years. Environmental stresses have a great effect on the distribution of plants in the world. Drought stress is one of the most important damaging stresses for plants. Drought stress disrupts plant growth and the natural processes of plant life, as well as consequences such as a decrease in chlorophyll and the amount of photosynthesis, destruction of proteins, changes in the process of making proteins, weakening the plant's defense system and its vulnerability to all kinds of pests which finally leads to various diseases (Farooq *et al*., 2009). Nanoscience deals with tiny particles that are only 1 to 100 nanometers in size. The effect of nanoparticles depends on the size, shape, stability, concentration and physical or chemical composition of the particle (Kumar *et al*., 2018). Due to the importance of coneflower from an ornamental and medicinal point of view, the continuation of the global dehydration problem, the need to use new methods such as using stress protectant properties of nanoparticles, as well as the selenium valuable effects in the plant In this study, we used selenium nanoparticles as foliar spraying in this plant under drought stress conditions. This research was conducted in the agricultural research field of Urmia University with the main factor of drought stress at 20, 40, 60 and 100% FC and the secondary factor as spraying nanoparticle solution at 0, 5, 10 and 20 $mg.l^{-1}$ concentrations with three replications in 1401. The results of this research showed that there was a significant difference in the dry weight of the shoot at 40% FC compared to the control. In terms of total leaf surface, the interaction effect was also significant. In the attribute of petal size, had a significant difference compared to other treatments (40% FC + spraying nanoparticle at 20 $mg.l^{-1}$ concentrations).

References

1. Hanafy M, Aly U, Mohamed A. Regeneration and transformation via Agrobacterium tumefaciens of *Echinacea purpurea* L. *Plant Tissue Culture and Biotechnology*. 2010, 20(2): 101-111.

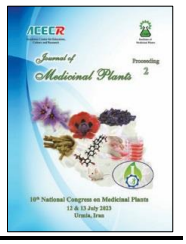
2. Kumar A, Gupta K, Dixit S, Mishra K, Srivastava S. A review on positive and negative impacts of nanomaterials in plants–critical review. *Nanotoxicology*. 2018, 10(3): 257-278.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 365

Screening of catharanthine, vindoline, vinblastine and vincristine in different cultivars of *Catharanthus roseuse*

Syavash Hemmaty[1,*], Ahad Hedayeti[1], Majid Ghorbani[2], Rahele Tahmasebi[3], Bahman Hosseini[4]

[1] *Research Department of Secondary Metabolites Production in Bioreactor, Academic Center for Education, Culture and Research (ACECR), West Azarbayjan Branch, Urmia, Iran*
[2] *Medicinal Plants Research Center, Institute of Medicinal Plants, ACECR, Karaj, Iran*
[3] *Research Department of Chromatography, Academic Center for Education, Culture and Research (ACECR), Urmia, Iran*
[4] *Department of Horticulture, Faculty of Agriculture, Urmia University, Urmia, Iran*
E-mail: syavash.hort@gmail.com

ARTICLE INFO

Keywords:
Catharanthus roseus
Alkaloid
Vincristine
HPLC

ABSTRACT

As an important medicinal plant, *Catharanthus roseus* is a source of important indole alkaloid compounds such as vincristine, vinblastine, ajmalicine, serpentine, yohimbine etc. Vincristine and vinblastine have anticancer activity and are used for treat various cancers. Catharanthine and vindoline are precursors for the synthesis of vinblastine and vincristine [1]. Because the chemical synthesis of vincristine and vinblastine is currently not possible, the only source of these compounds is *C. roseus*. Different cultivars of *C. roseus* have been improved based on appearance attributes, such as flower size and color, so the concentration of secondary metabolites in various cultivars can be different [2]. Because the concentration of vincristine and vinblastine in the biomass is very low, it is important to select a variety in which the concentration of these compounds is higher. In this research, the concentration of vindoline, catharanthine, vincristine and vinblastine in the leaves of 9 different cultivars of *C. roseus* (Blush, Apricot, Red Really, Polka Dot, Burgundy Halo, Burgundy, Orange, Little Mix (Pink) and Little Mix (White)) was investigated by HPLC. Results showed that highest concentration of vindoline (118.4 and 81.7 mg/g DW) and Catharanthine (53.3 and 41.2 mg/g DW) was observed in Little Mix (White) and Little Mix (Pink), respectively. Little Mix (White) and Red Really had higher concentration of vinblastine (177.2 and 161.5 mg/g DW) and vincristine (438.6 and 146.0 mg/g DW) respectively. Blush cultivar had lowest concentration of vindoline, catharanthine and vinblastine. The lowest concentration of vincristine was observed in Burgundy.

References

1. Almagro, L., Francisco Fernández-Pérez, F, Pedreno, MA. Indole alkaloids from *Catharanthus roseus*: bioproduction and their effect on human health. *Molecules*, 2015; 20: 2973-3000. doi: 10.3390/molecules20022973.

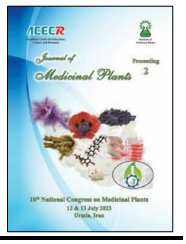
2. Hemmati N, Azizi M, Aruei H, Saeedi M, Yamchi A. Evaluation of some morphological traits and amount of vinblastine, vincristine and ajmalicine alkaloids in different organs of prewinkle cultivars (*Catharanthus roseus* (L.) G. DON). *J. Plant Pro*. 2021; 28(2): 53-66. doi: 10.22069/JOPP.2021.17622.2629.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 366

Screening of catharanthine, vindoline, vinblastine and vincristine in different cultivars of *Catharanthus roseuse*

Syavash Hemmaty[1,*], Ahad Hedayeti[1], Majid Ghorbani[2], Rahele Tahmasebi[3], Bahman Hosseini[4]

[1]*Research Department of Secondary Metabolites Production in Bioreactor, Academic Center for Education, Culture and Research (ACECR), West Azarbayjan Branch, Urmia, Iran*
[2]*Medicinal Plants Research Center, Institute of Medicinal Plants, ACECR, Karaj, Iran*
[3]*Research Department of Chromatography, Academic Center for Education, Culture and Research (ACECR), Urmia, Iran*
[4]*Department of Horticulture, Faculty of Agriculture, Urmia University, Urmia, Iran*
E-mail: syavash.hort@gmail.com

ARTICLE INFO

Keywords:
Catharanthus roseus
Alkaloid
Vincristine
HPLC

ABSTRACT

As an important medicinal plant, *Catharanthus roseus* is a source of important indole alkaloid compounds such as vincristine, vinblastine, ajmalicine, serpentine, yohimbine etc. Vincristine and vinblastine have anticancer activity and are used for treat various cancers. Catharanthine and vindoline are precursors for the synthesis of vinblastine and vincristine [1]. Because the chemical synthesis of vincristine and vinblastine is currently not possible, the only source of these compounds is *C. roseus*. Different cultivars of *C. roseus* have been improved based on appearance attributes, such as flower size and color, so the concentration of secondary metabolites in various cultivars can be different [2]. Because the concentration of vincristine and vinblastine in the biomass is very low, it is important to select a variety in which the concentration of these compounds is higher. In this research, the concentration of vindoline, catharanthine, vincristine and vinblastine in the leaves of 9 different cultivars of *C. roseus* (Blush, Apricot, Red Really, Polka Dot, Burgundy Halo, Burgundy, Orange, Little Mix (Pink) and Little Mix (White)) was investigated by HPLC. Results showed that highest concentration of vindoline (118.4 and 81.7 mg/g DW) and Catharanthine (53.3 and 41.2 mg/g DW) was observed in Little Mix (White) and Little Mix (Pink), respectively. Little Mix (White) and Red Really had higher concentration of vinblastine (177.2 and 161.5 mg/g DW) and vincristine (438.6 and 146.0 mg/g DW) respectively. Blush cultivar had lowest concentration of vindoline, catharanthine and vinblastine. The lowest concentration of vincristine was observed in Burgundy.

References

1. Almagro, L., Francisco Fernández-Pérez, F, Pedreno, MA.. Indole alkaloids from *Catharanthus roseus*: bioproduction and their effect on human health. *Molecules*, 2015; 20: 2973-3000. doi: 10.3390/molecules20022973.

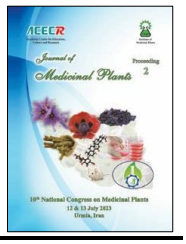
2. Hemmati N, Azizi M, Aruei H, Saeedi M, Yamchi A. Evaluation of some morphological traits and amount of vinblastine, vincristine and ajmalicine alkaloids in different organs of prewinkle cultivars (*Catharanthus roseus* (L.) G. DON). *J. Plant Pro*. 2021; 28(2): 53-66. doi: 10.22069/JOPP.2021.17622.2629.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 369

The use of the medicinal plant of *Tribulus terrestris* for the preservation of frozen sperm of horses

Majid Morovati sharifabad[1], Elham Salehi[2], Zahra Shamsadini ahmadabadi

[1,2] *Associate Professor, Department of Basic Sciences, Faculty of Paraveterinary Medicine, Ardakan University, Ardakan, Iran*
[3] *Master's student in developmental cell biology, Ardakan University, Ardakan, Iran*
E-mail: mmorovati@ardakan.ac.ir

ARTICLE INFO

Keywords:
Frozen sperm
Tribulus terrestris
Oxidative stress

ABSTRACT

The use of assisted reproductive technology (ART) is now a common method for optimal breeding of livestock, conservation of wildlife and endangered animals, and treatment of human infertility. Essentially, seminal fluid freezing techniques may induce irreversible damage to sperm, resulting in loss of sperm motility, viability, and destruction of plasma cells. The researchers showed that efficient antioxidant systems should be used to prevent lipid peroxidation and sperm dysfunction. Due to the toxicity problems of synthetic antioxidants, herbal and natural antioxidants are safer and more effective. Therefore, the present study was carried out to investigate the *Tribulus terrestris* the parameters of frozen sperm. *Tribulus terrestris* has many properties, including antimicrobial and antibacterial properties, clearing free radicals and inhibiting fat peroxidation, and through various cellular and molecular mechanisms, it causes various pharmacological and therapeutic properties. In this research, 20 bulls between 5 and 8 years of age were used. Sperm collection was done and the samples included a control group and three groups with three levels of water thistle extract (20, 25 and 30 ml/dL), which were added to the semen samples diluted in citrate-egg yolk diluent. Then the samples were frozen and stored in a nitrogen tank for 3 weeks. After thawing and incubation for 5 minutes at 37 degrees, sperm qualitative parameters such as motility, viability, and plasma membrane integrity and lipid peroxidation were evaluated. As a result, the level of 30 mm/dL significantly had a positive effect on the studied parameters.

References

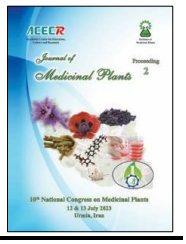
1. Celik-Ozenci, C, Sati L, Huszar, G. Role of sperm-hyaluronic acid binding in the evaluation and treatment of subfertile men with ROS-affected semen. 2022, Male infertility (pp. 695–706). Springer.
2. Aparicio I M, Martin Muñoz P, Salido G M, Peña F J, Tapia J A, The autophagy-related protein LC3 is processed in stallion spermatozoa during short-and long-term storage and the related stressful conditions. *Animal*. 2016, 10, 1182–1191. [Google Scholar] [CrossRef]

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 370

Investigating the effect of edible *Boswellia* extract on the immunogenicity of bighead fish

Majid Morovati sharifabad[1], Elham Salehi[2], Zahra Shamsadini ahmadabadi

[1,2] Associate Professor, Department of Basic Sciences, Faculty of Paraveterinary Medicine, Ardakan University, Ardakan, Iran
[3] Master's student in developmental cell biology, Ardakan University, Ardakan, Iran
E-mail: mmorovati@ardakan.ac.ir

ARTICLE INFO

Keywords:
Frankincense
Bighead
Body immunity

ABSTRACT

Frankincense is a resinous gum obtained from some species of Boswellia genus. In this research, the effect of oral administration of frankincense on total serum protein, albumin, serum globulin and white blood cells of phytophagous fish in a pond. Fish farming was studied in Ardakan city. In this study, 30 pieces of fish with an average weight of 5±55 grams were selected and after adaptation to the environment. They were randomly divided into two groups. For 48 days, 5 grams of frankincense powder was added to the feed of the experimental group per kilogram of fish body weight. At the end of the 48th day, 14 fish were randomly selected from each treatment. Became and after anesthesia with 2% phenoxyethanol solution, blood was taken. The amount of serum total protein, albumin and serum globulin of bighead fish was investigated. The results showed that the administration of this plant increased total protein and serum globulin. It is effective ($p<0.05$) while the increase of serum albumin is not significant in this research. And it also caused a decrease in degranulasin in mast cells and an increase in the number of white blood cells in bighead fish. According to this study, adding frankincense powder to the diet of fish as an immune system stimulant can be recommended.

References

1. Efferth, Thomas, and Franz Oesch. "Anti-inflammatory and anti-cancer activities of frankincense: Targets, treatments and toxicities." Seminars in cancer biology. Vol. 80. Academic Press, 2022.

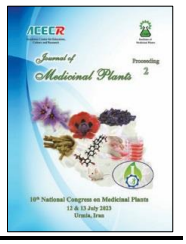
2. Beghelli, D., Isani, G., Roncada, P., Andreani, G., Bistoni, O., Bertocchi, M., ... & Alunno, A. (2017). Antioxidant and ex vivo immune system regulatory properties of Boswellia serrata extracts. *Oxidative medicine and cellular longevity*, 2017.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 371

Effect of *Salvia rosmarinus officinalis* on gastric ulcer healing in rat

Majid Morovati sharifabad[1], Elham Salehi[2], Zahra Shamsadini ahmadabadi

[1,2] Associate Professor, Department of Basic Sciences, Faculty of Paraveterinary Medicine, Ardakan University, Ardakan, Iran
[3] Master's student in developmental cell biology, Ardakan University, Ardakan, Iran
E-mail: mmorovati@ardakan.ac.ir

ARTICLE INFO

Keywords:
Salvia rosmarinus
Rat
Stomach ulcer

ABSTRACT

Frankincense is a resinous gum obtained from some species of Boswellia genus. In this research, the effect of oral administration of frankincense on total serum protein, albumin, serum globulin and white blood cells of phytophagous fish in a pond. Fish farming was studied in Ardakan city. In this study, 30 pieces of fish with an average weight of 5±55 grams were selected and after adaptation to the environment. They were randomly divided into two groups. For 48 days, 5 grams of frankincense powder was added to the feed of the experimental group per kilogram of fish body weight. At the end of the 48th day, 14 fish were randomly selected from each treatment. Became and after anesthesia with 2% phenoxyethanol solution, blood was taken. The amount of serum total protein, albumin and serum globulin of bighead fish was investigated. The results showed that the administration of this plant increased total protein and serum globulin. It is effective ($p<0.05$) while the increase of serum albumin is not significant in this research. And it also caused a decrease in degranulasin in mast cells and an increase in the number of white blood cells in bighead fish. According to this study, adding frankincense powder to the diet of fish as an immune system stimulant can be recommended.

References

1. El-Hadary, A. E., Elsanhoty, R. M., & Ramadan, M. F. (2019). In vivo protective effect of Rosmarinus officinalis oil against carbon tetrachloride (CCl4)-induced hepatotoxicity in rats. *PharmaNutrition*, *9*, 100151.

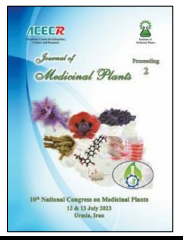
2. El-Demerdash, F. M., El-Sayed, R. A., & Abdel-Daim, M. M. (2021). Rosmarinus officinalis essential oil modulates renal toxicity and oxidative stress induced by potassium dichromate in rats. *Journal of Trace Elements in Medicine and Biology*, *67*, 126791.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 372

Effect of Different Quality of Light on Growth and Biomass Production in *Hyoscyamus reticulatus* Hairy Roots

Ahad Hedayati[1,*], Elnaz Nourozi [1], Siyavash Hemmati[1]

[1] *Academic Center for Education, Culture and Research (ACECR), West Azarbayjan Branch, Urmia, Iran*
E-mail: a.hedayati@urmia.ac.ir

ARTICLE INFO

Keywords:
Hairy root
Light-emitting diodes
Biomass

ABSTRACT

Light is an important resource for plants that profoundly influences plant morphology, physiology and development. LED lights have been extensively used in controlled growing systems for amending crop yield, nutritional value, and phytochemical level, because they are more environmentally friendly and economically favorable as compared with conventional light sources [1]. Furthermore, recent studies have showed that the supplementation of different colors of LED lights could lead to the increased biomass productivity together with higher yields of pharmacologically important phytochemicals in *in vitro* cultures of some medicinally important plants. Species of *Hyoscyamus* are rich sources of medicinally important tropane alkaloids, which have anticholinergic, antispasmodic and sedative effects and are competitive inhibitors of acetylcholine. *H. reticulatus* L is native to arid areas in Egypt, southwest Asia, Iran and Turkey. Today, there is a need for effective strategies to improve both biomass production and increase the accumulation of important medicinal compounds [2]. In the present study, the effects of different colors of LED lights i.e., control (dark), White, 4Red/1Blue, 3Red/1Blue, 2Red/1Blue and 1Red/1Blue on the *H. reticulatus* hairy roots lines growth and biomass production were investigated for the first time. Our results showed that the highest fresh weight of hairy roots was in line L13 (1.36 g) under the influence of 4 Red/1 Blue light. While this amount was 1.24 g and 1.17 g in lines L5 and A4, respectively. Among the studied lines, the lowest amount of fresh weight (0.7 g) was related to the hairy roots of line L5 under the influence of 1Red/1Blue light.

References

1. Bantis, F., Smirnakou, S., Ouzounis, T., Koukounaras, A., Ntagkas, N. and Radoglou, K., 2018. Current status and recent achievements in the field of horticulture with the use of light-emitting diodes (LEDs). *Scientia Horticulturae*, 235, pp.437-451.

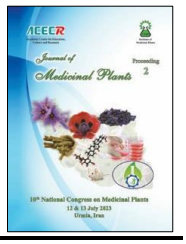
2. Zhao, T., Li, S., Wang, J., Zhou, Q., Yang, C., Bai, F., Lan, X., Chen, M. and Liao, Z., 2020. Engineering tropane alkaloid production based on metabolic characterization of ornithine decarboxylase in *Atropa belladonna*. *ACS Synthetic Biology*, 9(2), pp.437-448.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 373

Enrichment and separation of Glycyrrhizin and glabridin from *Glycyrriza glabra* root using macroporous adsorption resins

Kosar Tavili[1,2], Khalil Farhadi[2]*, Sima Najafi[2], Mohsen Farhadpour[1]*

[1] *Department of Agricultural Biotechnology, National Institute of Genetic Engineering and Biotechnology (NIGEB), Tehran, Iran*
[2] *Department of Analytical Chemistry, Faculty of Chemistry, Urmia University, Urmia, Iran*
E-mail: m-farhadpour@nigeb.ac.ir, khalil.Farhadi@yahoo.com

ARTICLE INFO

Keywords:
Glycyrriza glabra
Glycyrrhizin
Glabridin
Macroporos Resin

ABSTRACT

Licorice the root of the glycyrriza plant species has been used medicinally for more than 4000 years. The main active secondary metabolite in glycyrrhiza glabra roots and rhizomes is glycyrrhizin. Glycyrrhizin is a tri-terpenoidal saponin. Licorice is also rich in flavonoid derivatives, isoflavanes, such as glabridin which has been shown to possess the anti-inflammatory and anti-tyrosinase activity [1]. In the current study, the dried plant material of *D. innoxia* of major regions of Iran, were used. The extracts of samples were prepared by sonication of 20 g of dried plant material for 30 min in 100 mL of methanol. The TLC analysis has been used to ensure the existence of these two compounds in obtained extract. Total saponin and total flavonoid content of samples were determined, using the spectrophotometrically methods separately. In the following, a simple and effective strategy for the simultaneously enrichment of glycyrrhizin and glabridin from the roots of the Glycyrrhiza glabra plant using five maroporos adsorption resins with wide range of polarity, MC270, ,LXA8,LXA17 , LSF905 and LXA8101 After choosing the best resin based on HPLC result of their static adsorption and desorption capacities. The thermodynamics test will be investigated [2].

References

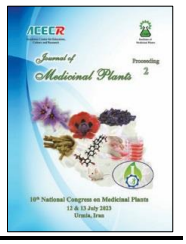
1. E. Hasanzadeh, F. Shamsa, K. Ohtsuki, S. Rezazadeh, *J. Med. Plants* 9 (2010) 1–28.
2. A. Gantait, S. Pandit, Neelesh, K. Nema, P.K. Mukherjee, *J. AOAC Int*. 93 (2010) 492–495,

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 377

The effect of air pollution stress on the chlorophyll pigments of *Eucalyptus* plants sampled from the areas around Abadan oil industries

Seyed Lafteh Fardzadeh[1], Saeedeh Ghiasvand[1,*], Seyed Mansour Seyed Nejad [2],Maryam Shooshtari[3]

[1]*Department of Biology, Faculty of Basic Science, Malayer University, malayer, Iran*
[2]*Department of Biology, Faculty of Basic Science, Shahid Chamran University, Ahvaz, Iran*
[3] *Chronic Renal Failure Research Center, Ahvaz Jundishapur University of Medical Sciences*
E-mail: S.ghiasvand@malayeru.ac.ir

ARTICLE INFO

Keywords:
Air pollution
Oil industry
Eucalyptus
Chlorophyll a
Chlorophyll b

ABSTRACT

Location of oil industries in the vicinity of cities are among the most important causes of air pollution. In this research, the effect of air pollution in the polluted area of Abadan oil industries and Sangur region on chlorophyll a,b and total chlorophyll pigments in the Eucalyptus was investigated and compared with similar plants taken from the tongeh region as the region clear was compared. Also, the amount of total chlorophyll of Eucalyptus plant under the stress of air pollution in Abadan and Sangur oil industry areas decreased from 1.17 mg/g.fw to 0.92 and 0.59 mg/g.fw. According to the obtained results, the amount of eucalyptus chlorophyll a has decreased in the investigated areas, and this difference in the concentration of chlorophyll a and chlorophyll b in the eucalyptus plant was evaluated to be significant at the level of 0.01 between the oil industry areas and the Strait, while at the same level, there was a significant difference between the oil industry areas. And Sangur was not observed. The amount of total chlorophyll concentration has also decreased in the studied medicinal plant in the investigated areas, and this decrease in concentration was evaluated to be significant at the level of 0.05 in all areas. According to the results obtained in the investigation of the three regions, it can be concluded that the Eucalyptus plant in the oil industry region was more sensitive than the tongeh region, while the stress of air pollution also affected the plant in the Sangur region.

References

1. Rajput, M. and Agrawal, M. Physiological and yield responses of pea plants to ambient air pollution. *Indian Journal of Plant Physiology*. 2004; 9(1) : 9-14.

2. Assadi, A., Ghasemi pirpaluti, A., Malekpoor, F. and Teimori, N. Impact of air pollution on physiological and morphological characteristics o Eucalyptus camaldulensis Den. *Journal of Food, Agriculture & Environmen*. 2011; 9 (2): 676-679.

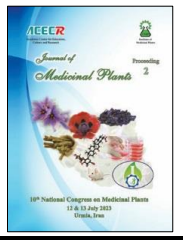
Lichtenthaler, H.K. and Wellburn, A.R. Determinations of total carotenoids and chlorophylls a and b of leaf extrats in different solvents. *Biochemical Society Transactions*. 1983; 11: 591-592.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 378

The effect of foliar application of magnesium and zinc green nanoparticles on the morphophysiological characteristics of *Dracocephalum moldavica* L.

Maryam Rezagholi[1*], Ahmad Reza Abbasifar[2], Morteza Akramian[3]

[1] *Masters Segree in Medicinal Plant Breeding and Physiology, Department of Horticultural Sciences, Faculty of Agriculture and Natural Resources, Arak University, Arak, Iran (Doctoral student in Breeding and Biotechnology, Urmia University), Urmia, Iran*
[2] *Associate Professor, Department of Horticultural Sciences, Faculty of Agriculture and Natural Resources, Arak University, Arak, Iran*
[3] *Assistant Professor, Department of Horticultural Sciences, Faculty of Agriculture and Natural Resources, Arak University, Arak, Iran*
E-mail: mehregan6816@yahoo.com

ARTICLE INFO

Keywords:
Moldavian balm
essential oil
Nano particle

ABSTRACT

Moldavian balm plant with the scientific name *Dracocephalum moldavica* L. is a herbaceous, annual plant belonging to the mint family (*Lamiaceae*). In Iran, there are 8 annual or perennial herbaceous species with nectar-bearing flowers and essential aerial parts (Tajik *et al*., 2012). The whole body of the plant contains essential oil and its amount is different in different parts (Omidbaigi *et al*., 2009). The flower and the vegetative body of the plant have the most essential oil. Its main compounds include geranial, neral, geranyl acetate and geraniol, which are oxygenated cyclic monoterpenes and make up 90% of the essential oil, which has the highest amount of essential oil in the full flower stage, considering that between the performances. There is a direct relationship between the vegetative body of the plant and the performance of the essential oil present in it, therefore, by harvesting the maximum performance of the vegetative body of the plant, it is possible to achieve the maximum performance of the essential oil of the plant. The purpose of this research, in addition to increasing the vegetative and reproductive performance of the plant, was to try to increase the effective substances using green nanoparticles and introduce them to the pharmaceutical and health industries. The experiment was conducted as a split plot and in the form of a randomized complete block design with four replications in the greenhouse of Arak University. The results of this study showed that in terms of fresh weight, plant dry weight and leaf width, zinc foliar application alone had the highest average compared to nano magnesium and the interaction effect. In terms of chlorophyll amount, total phenol, internode length, plant length, stem length and essential oil content, zinc and magnesium foliar application showed the highest average compared to nano magnesium alone and nano zinc alone. In terms of antioxidant properties and leaf length, magnesium spray alone has the highest average compared to nanozinc and the interaction effect.

References

1. Omidbaigi R, Borna F, Borna T, Inotai K. Sowing Dates Affecting on the Essential Oil Content of Dragonhead (*Dracocephalum moldavica* L.) and its Constituents. *Journal of Essential Oil Bearing Plants*; 2009. 12(5): 580-5.

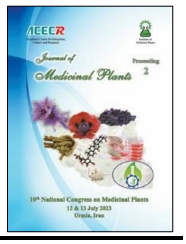
2. Tajik H, Razavi Rohani S, Moradi M, Farhangfar A. Evaluation of antibacterial characteristics of zein edible film incorporated with *zataria multiflora* boiss essential oil and monolaurin against listeria monocytogenes and E. *coli* o157: h7 in vitro. *Urmia Med J*; 2012. 23 (3): 232-240 22.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 379

Effect of Microwave Drying on the Phenolic Compounds and Antioxidant Activity of *Althea Rosea Cav. Var. Nigra*)

Abbas Ghorbani[1], Ghasem Eghlima[1*], Mohammad Hossein Mirjalili[1]

[1] *Department of Agriculture, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*
E-mail: gh_eghlima@sbu.ac.ir

ARTICLE INFO

Keywords:
Drying
Total phenol
Antioxidant activity
Hollyhock

ABSTRACT

Althaea rosea L. is a popular garden plant, and its dark-violet flower variety (*Althaea rosea (*L.*) Cav. var. nigra*) belongs to the Malvaceae family [1]. Dried flowers is used in traditional medicine. Extract from the hollyhock flowers is a source of antocyanides and flavonoids. It also has many medicinal effects, including antimicrobial properties effective against cardiovascular diseases and strengthening the immune system [2]. Drying is one of the main processes postharvest and storing medicinal plants, which greatly affects their quantitative and qualitative characteristics [3]. In this study, the effect of different microwave powers (540, 720 and 900 W) on drying time, total phenol, flavonoids and antioxidant activity in hollyhock flowers was measured. The result showed that the highest amount of total phenol (99.7 mg GAE/g DW), total flavonoid (94.6 mg RUT/g DW) and antioxidant capacity (966.092 µmol Fe (II)/g DW) was obtained at 540 W. The shortest drying time was related to the power of 900 W, but it significantly reduced the content of total phenol, total flavonoid and antioxidant activity. Among the power, 540 W was the best method for the hollyhock plant to maintain its chemical composition.

References

1. Dudek M, Matławska I, Szkudlarek, M, Phenolic acid in the flowers of *Althaea rosea var. nigra, Acta Pol. Pharm.* 2006; 63(3): 207-11.

2. Papiez M, Gancarczyk M, Bilińska B., The compounds from the hollyhock extract (*Althaea rosea Cav. var. nigra*) affect the aromatization in rat testicular cells in vivo and in vitro. *Folia Histochem. Cytobiol*. 2002; 40(4): 353-359.

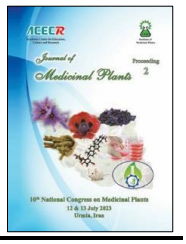
3. Ebadi M.T, Rahmati M, Azizi M, Khayyat M.H, Dadkhah A, The effects of different drying methods on drying time, essential oil content and composition of basil (*Ocimum basilicum* L.). *Iran. J. Med. Arom. Plant.* 2013; 29(2): 425-437.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 380

Effect of extraction solvent on phytochemical contents and antioxidant activity of *Asplenium onopteris*

Leila Shafiee Dastjerdi[1,*], Ali Mazooji[2]

[1] *Department of Chemistry, Roudehen Branch, Islamic Azad University, Roudehen, Iran*
[2] *Department of Biology, Roudehen Branch, Islamic Azad University, Roudehen, Iran*
E-mail: shafiee_l@yahoo.com

ARTICLE INFO

Keywords:
Asplenium onopteris
Effect of solvent
Phytochemicals
Antioxidant

ABSTRACT

Ferns, constituting the major class of pteridophytes, are reported for their medicinal uses to treat ascaris infections, bleeding, trauma, burning diarrhea and cold. Previous studies mentioned their various bioactivities such as antioxidant, antitumor, anti-HIV, antimicrobial, anti-inflammatory and antiviral effects [1, 2]. *Aspleniaceae* is one of the largest families of leptosporangiate ferns included in the *polypodiales* order. The genus *Asplenium* is a large and complex are comprising approximately 700 species [3]. *Asplenium onopteris* (commonly known as Irish Spleenwort) is a small fern in the spleenwort genus *Asplenium*. Within the objective to search for natural antioxidants and biologically active compounds, the present work deals with a phytochemical investigation of *A. onopteris*. In this study, water and various concentrations (50%, 75%, and 100%) of methanol, ethanol, and acetone in water were used as solvent in the extraction of *A. onopteris*. The antioxidant activity, total phenolic content and total flavonoid content of the freeze-dried *A. onopteris* extracts were investigated using various *in vitro* assays. The extract obtained by 75% acetone showed the highest total antioxidant activity, reducing power and DPPH (2, 2-diphenyl-1-picrylhydrazyl) radical scavenging activity. Among the extracts, 50% acetone and 75% acetone extracts were containing the highest amount of phenolic compounds (119.35±2.65 and 113.63±1.92 mg gallic acid /g dry extract, respectively). Large differences in the amount of flavonoids and flavonols of *A. onopteris* in various solvent extracts were detected. 100% acetone extract has been found to be rich in flavonoids and flavonols with a value of 88.35±1.47 and 36.45±0.91 mg quercetin/g dry extract, respectively. These results indicate that *A. onopteris* can be used in dietary applications with a potential to reduce oxidative stress.

References

1. Hammami S. et al. Essential Oil Constituents and Antioxidant Activity of *Asplenium* Ferns. *J. Chromatogr. Sci.* 2016; 54(8): 1341–1345. doi: 10.1093/chromsci/bmw071.

2. Sureshkumar J. A review on ethnomedicinally important pteridophytes of India. *J. Ethnopharmacol.* 2018; 219(12): 269-287. doi: org/10.1016/j.jep.2018.03.024.

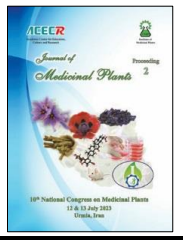
3. PPG I. A community-derived classification for extant lycophytes and ferns. *J. Syst. Evol.* 2016; 54(6): 563–603. doi: org/10.1111/jse.12229.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 381

Studying of Temperature and Chitosan Effect on Some Biochemical Traits of *Passiflora edulis*

Fakhteh Shahpouri Bahri[1], Khodayar Hemmati[2*], Feryal Varasteh[2], Nastaran Hemmati[3], Mina Gholampour[2]

[1] *Department of Plant Productions, Baharan Institute of Higher Education, Gorgan, Iran*
[2] *Department of Horticulture Science, Faculty of Plant Production, Gorgan University of Agricultural Science and Natural Resources, Gorgan, Iran*
[3] *Department of Horticulture Science, Faculty of Agriculture, Ferdowsi University of Mashhad, Mashhad, Iran*
E-mail: Kh_hemmati@gau.ac.ir

ARTICLE INFO

Keywords:
Chitosan
Flavonoid
Phenol
Vitamin C

ABSTRACT

Passion fruit is climacteric fruit that has high ethylene production in Shelf life. This study was done to investigate the effect of temperature and different concentrations of chitosan on quantitative and qualitative characteristics of passion fruit in Tonekabon City and factorial design in three replications. Treatments Contain four Concentrations of Chitosan (0, 0.25, 0.5, and 0.75 %) and two stored temperatures (7 °C and 25 °C). Measured parameters Contain Vitamin C, antioxidant activity, Total Phenol, and Total Flavonoid. The results indicated that the amount of Vitamin C (23.99 $mg.100g^{-1}$), Total Phenol (14.01 $mg.g^{-1}{}_{FW}$), and antioxidant activity (73.88%) in 7 °C were higher in comparison to control treatment at room temperature (7.89 $mg.100g^{-1}$, 4.18 $mg.g^{-1}{}_{FW}$ and 26.38% respectively). But the highest amount of total flavonoids (22.67 $mg.g^{-1}$) was observed in control at room temperature, and the lowest amount (3.10 $mg.g^{-1}$) was recorded in 0.75% chitosan at 7°C. By increasing the concentration of chitosan in the fruit treatments, the content of total flavonoid compounds decreased during storage. The use of high concentrations of chitosan in lower temperature conditions as an edible and non-toxic coating for fruits can cause better preservation and delay the reduction of vitamin C, total phenol, and antioxidant activity. So, it leads to the preservation of the medicinal and anticancer properties of passion fruit.

References

1. Zhou, Y., Zhong, Y., Li, L., Jiang, K., Gao, J., Zhong, K. & Yan, B. A multifunctional chitosan-derived conformal coating for the preservation of passion fruit. *LWT*, 2022; *163* (2). https://doi.org/10.1016/j.lwt.2022.113584.

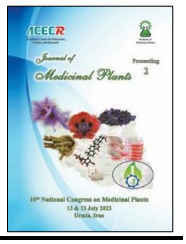
2. Arjona, H. E., Matta, F. B., & Garner, J. O. Temperature and storage time affect quality of yellow passion fruit. *HortScience*, 1992; *27*(7), 809-810. https://doi.org/10.21273/HORTSCI.27.7.809.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 382

Evaluation of effects of freeze-dried extract of *Persicaria bistorta* (L.) SAMP on colitis rat model

Niusha Esmaealzadeh[1*], Amirhossein Abdolghaffari[3,4], Maryam Baeeri [5,6], Roodabeh Bahramsoltani[1,2]

[1] *Department of Traditional Pharmacy, School of Persian Medicine, Tehran University of Medical Sciences, Tehran, Iran*
[2] *PhytoPharmacology Interest Group (PPIG), Universal Scientific Education and Research Network (USERN), Tehran, Iran*
[3] *Department of Toxicology & Pharmacology, Faculty of Pharmacy, Tehran Medical Sciences, Islamic Azad University, Tehran, Iran*
[4] *GI Pharmacology Interest Group (GPIG), Universal Scientific Education and Research Network (USERN), Tehran, Iran*
[5] *Department of Toxicology and Pharmacology, Faculty of Pharmacy, Tehran University of Medical Sciences, Tehran 11369, Iran*
[6] *Toxicology and Diseases Specialty Group, Pharmaceutical Sciences Research Center (PSRC)*
[7] *The Institute of Pharmaceutical Sciences (TIPS), Tehran University of Medical Sciences, Tehran 11369, Iran*
E-mail: Niushaesmaealzadeh@yahoo.com

ARTICLE INFO

Keywords:
Inflammatory Bowel Diseases
Colitis
Persian medicine
Toll-Like Receptors

ABSTRACT

Inflammatory Bowel disease (IBD) is a chronic disease that affects more than 6.8 million people around the globe. The signs and symptoms of IBD include inflammations, hematochezia, cramps, and weight-shedding. Current drug regiments for IBD are aminosalicylates and corticosteroids which patients remains unresponsive to. Therefore, it is necessary to seek new safe medications. According to Persian medicine, the roots of *Persicaria bistorta* (L.) Samp. (Polygonaceae), Anjebar, is frequently prescribed for colitis. In this study, the effect of freeze-dried extract of Anjebar has been investigated in rat model of colitis. After authentication of the plant (voucher No.: PMP-1239), Anjebar aqueous extract was prepared with freeze-dryer and the contained gallic acid was measured by HPLC on a C18 column and an isocratic mobile phase of acetonitrile: acidified water (10:90) at λ=270 nm. Colitis was induced by rectal administration of 4% acetic-acid in 24 Wistar rats. Animals were divided into 6 groups: sham, disease control, dexamethasone (1 mg/kg i.p.), 300, 500, and 700 mg/kg of extract (orally). The medications were administered for 2 successive days. The rats were euthanized on day 3. Distal colons were cut open and dissected for macroscopic examination and checking biomarkers, i.e., Tumor necrosis factor-α (TNF-α), Toll-like receptor 4 (TLR-4), and Myeloperoxidase (MPO) activity. Data were analyzed by SPSS.22 with ANOVA and Tukey's post-hoc test; $p < 0.05$ was considered significant. The concentration of gallic acid was 2.08 mg/g. After induction of the colitis in the control group, a significant increase was observed in the level of TLR-4, TNF-α, and MPO, comparing with the sham group ($P<0.001$). Nevertheless, with administration of the standard treatment, Dexamethasone, the levels of these factors dropped notably ($P<0.001$). The same results were obtained with 500 and 700 mg/kg ($P<0.001$), but not with 300 mg/kg. Anjebar, as a Persian medicine recommendation for colitis, could significantly improve macroscopics and biomarker scores of the colon tissues in rat. Future studies are needed to confirm the anti-colitis properties of Anjebar.

References

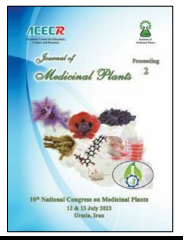
1. Shahraki, Faezeh Niazi et al. "Licofelone Attenuates Acetic Acid-Induced Colitis in Rats Through Suppression of the Inflammatory Mediators." Inflammation, 10.1007/s10753-023-01835-0. 26 May. 2023, doi: 10.1007/s10753-023-01835-0

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 383

The effect of *Artemisia absinthium* medicinal plant on chick embryo angiogenesis

Gholamhosein Pourghanbari[1], Zahra Shamsadini ahmadabadi[2]

[1] *Associate Professor, Department of Basic Sciences, Faculty of Paraveterinary Medicine, Ardakan University, Ardakan, Iran*
[2] *Master's student in developmental cell biology, Ardakan University, Ardakan, Iran*
E-mail: mmorovati@ardakan.ac.ir

ARTICLE INFO

Keywords:
Artemisia absinthium
angiogenesis
Chicken embryo

ABSTRACT

Angiogenesis is the process of forming new blood vessels from previous vessels, which plays an important role in physiological conditions, including growth and development, wound healing and reproduction. Artemisia absinthium is used in folk medicine for various purposes. The use of medicinal plants in medicine is associated with harmful effects. Chicken embryo is a suitable model to evaluate the toxicity of these drugs. The present study was carried out with the aim of investigating vascular changes in the extraembryonic membrane of chicks. The changes after the treatment period with esfantin were investigated. And changes in molecular pathways related to early embryonic angiogenesis such as vascular endothelial growth factors were investigated. For this purpose, on the second day of incubation, a window was opened on the eggs and they were inoculated with different doses of sphentine extract (50 and 100 mg/kg) per kilogram of egg weight. Analysis of extraembryonic membranous vessels showed that sphincter extract decreased some vascular parameters such as vessel area, total vessel length, and increased lacunarity. Vascular toxicity of this plant was dose-dependent. A decrease in VEGF-A expression was also observed in the extraembryonic membrane treated with the extract.

References

1. Bulant C, Blanco P, Müller L, Scharfstein J, Svensjö E. Computer-aided quantification of microvascular networks: Application to alterations due to pathological angiogenesis in the hamster. *Microvasc Res*. 2017; 112: 53-64. [PubMed] [Google Scholar]

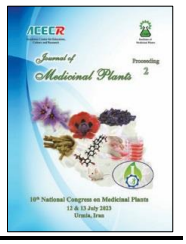
2. Chaiworapongsa T, Romero R, Whitten A, Korzeniewski S, Chaemsaithong P, Hernandez-Andrade E, Yeo L, Hassan S. The use of angiogenic biomarkers in maternal blood to identify which SGA fetuses will require a preterm delivery and mothers who will develop pre-eclampsia. *J Matern Fetal Neonatal Med*. 2016; 29: 1214-1228. [PMC free article] [PubMed] [Google Scholar]

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 385

The Effect of Mycorrhizal Fungi on the Physiological Traits of *Satureja sahendica*Bornm.

Fatemeh Zakerian[1*], Bohloul Abbaszadeh[1], Fatemeh Sefidkon[1], Masoumeh Layeghhaghighi[1], Samaneh Asadi-Sanam[1]

[1] Research Institute of Forests and Rangelands, Agricultural Research Education and extension Organization (AREEO), Tehran, Iran.
E-mail: fm.zakerian@gmail.com

ARTICLE INFO

Keywords:
Mycorrhiz
Proline
Peroxidase
Phenol

ABSTRACT

Satureja sahendica Bornm. is a shrubby perennial plant that is exclusive to Iran and is distributed in the natural areas of the west and northwest of the country. The effective ingredients of this plant are used in treatment and food industry [1]. In order to investigate this medicinal plant under different fertilization conditions and the importance of biofertilizers in preventing the increase in environmental pollution, the effect of mycorrhizal treatments on *S. sahendica* in the form of randomized complete block design and inoculation treatments with *G. intraradices*, inoculation with *G. mosseae* and inoculation with (*G. intraradices* + *G. mosseae*) compared to the non-inoculation treatment was investigated in three replications at Alborz research station in two years. The desired traits in this research included the measurement of protein, catalase, peroxidase, chlorophyll a, chlorophyll b, total chlorophyll, proline, total phenol, malondialdehyde, superoxide desmutase, carotenoid, soluble sugar and polyphenol oxidase. The results of this research showed that the effect of mycorrhizal fertilizers on protein, chlorophyll a, total chlorophyll, carotenoid, polyphenol oxidase and soluble sugar was not significant. In comparing the averages, the highest amount of catalase (0.32 unit/mg pro), superoxide dismutase (450/67 unit/mg pro), peroxidase (0.16 unit/mg pro), chlorophyll b (0.45 mg/g.f.w), proline (1.15 µg/g.f.w.), total phenol (5.04 mg/g.f.w.) and malondialdehyde (1.95 µg/g.f.w.) were observed in non-inoculation treatments. As a result, it can be said that mycorrhizal fertilizers did not play an effective role in increasing the physiological traits of *S. sahendica*.

References

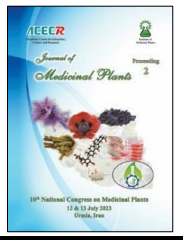
1. Babajafari S, Nikaein F, Mazloomi SM, Zibaeenejad MJ and Zargaran A. A review of the benefits of Satureja species on metabolic syndrome and their possible mechanisms of action. *Journal of Evidence-Based Complementary & Alternative Medicine*. 2015, 20(3): 212-223.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 387

Protective effect of medicinal plant *Echinacea angustifolia* on the histopathology of testicular tissue of lead-treated roosters

Gholamhosein Pourghanbari[1], Zahra Shamsadini ahmadabadi

[1] *Associate Professor, Department of Basic Sciences, Faculty of Paraveterinary Medicine, Ardakan University, Ardakan, Iran*
[2] *Master's student in developmental cell biology, Ardakan University, Ardakan, Iran*
E-mail: mmorovati@ardakan.ac.ir

ARTICLE INFO

Keywords:
Echinacea angustifolia
Rooster
Histopathology

ABSTRACT

Heavy elements such as lead and nickel are the most important pollutants of zeolite, which have received much attention in the last few decades. The environment has a great impact on human health. Lead is a metabolic toxin that can adversely affect biological processes and lead to disease and death in a large number of organisms. Currently, wild and domestic animals are exposed to risk factors, one of the most important of which is the amount of chemical compounds that are constantly increasing in the atmosphere. The aim of this study was to investigate the effect of black nightshade on the testicular tissue of roosters treated with lead. and methods: In this experimental study, 4 roosters were divided into four control groups: lead (5 mg per body weight subcutaneously), Sarkhargol (100 mg of warm substance per body weight, subcutaneous) and Sarkhargol with lead. The treatment period was 48 hours. After treatment, the rooster was dissected and the testes were fixed in formalin. and analyzed for histopathological study. Findings: In the sows treated with lead, the thickness of the wall of the spermatogenic tubes and the diameter of the spermatogonial nucleus decreased compared to the control group. In the lead sorghum group, sorghum significantly reduces the adverse association of lead in the testicular tissue. The results of Sarkhargol's research compensate for the difference caused by lead in testicular tissue.

References

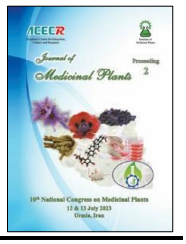
1. A. Rizvi, S. Parveen, S. Khan, I. Naseem Nickel toxicology with reference to male molecular reproductive physiology. *Reprod. Biol*., 20 (2020), pp. 3-8.
2. Percival, S. S. (2000). Use of Echinacea in medicine. *Biochemical Pharmacology*, *60*(2), 155-158.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 388

Investigating the absorption of macro and micro elements of *Satureja mutica* Fisch&C.A.Mey under biofertilizer treatment

Masoumeh Layeghhghighi*, Bohloul Abbaszadeh, Fatemeh Sefidkon, Fatemeh Zakerian, Meysam Ansari, Samaneh Asadi Sanam, Zahra Behrad, Behrouz Naderi

Research Institute of Forests and Rangelands, Agricultural Research Education and Extension Organization (AREEO), Tehran, Iran
E-mail: Layeghhaghighi@yahoo.com

ARTICLE INFO

Keywords:
Satureja mutica
Nitrogen
Magnesium
Absorption

ABSTRACT

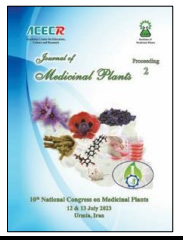
In order to investigate the absorption of macro and micro elements in Satureja mutica Fisch&C.A.Mey, this research was carried out as complete randomized blocks with 3 replications in 2017 in field conditions and in the Research Institute of Forests and Rangelands. The treatments were biofertilizers containing mycorrhizal fungi *Glomus intraradices* and *Glomus mosseae*, phosphate-dissolving bacteria including *Azospirillum lipoferum* strains OF and *Pseudomona putida*, Thiobacillus, Thiobacillus+S (205kg/ha), Thiobacillus+ S (500kg/ha) and control. Mycorrhizal fungus is in the form of active fungal organs (including spores, hyphae, and roots) that at the time of transplanting to the main land, 10 grams of biofertilizer containing 400 to 500 active fungal organs (spores) was poured into each planting hole. Sulfur fertilizers were added to the soil at the same time as transplanting. Harvesting was done at the full flowering stage (70% flowering). The results of examining the condition of the elements of the organs showed that the percentage of nitrogen, phosphorus, potassium, calcium, magnesium, iron, manganese, zinc and copper, as well as the amount of accumulation (yield per hectare) of nitrogen, calcium, magnesium and manganese elements were statistically different. Examining the means showed that the percentage of nitrogen absorption in control and *G. mosseae* was higher than others. The maximum percentage of magnesium absorption with 0.72% was observed in Thiobacillus treatment. The maximum absorption of iron was 78 ppm in *G. intraradices.* The highest amount of manganese absorption was observed in the treatment of *G. mosseae* and Thiobacillus+ S (500kg/ha). The highest absorption of zinc was observed with 48 ppm in *Pseudomona putida*. Examining the absorption of elements during one year in different organs of the plant showed that the maximum absorption of nitrogen was 22.31 kg/ha in *G. mosseae*. The highest amount of potassium absorption with 12.52 kg was obtained from *Azospirillum lipoferum*. The amount of absorption of micro elements indicated that the amount of absorption of micro elements in this plant is very low.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 389

Investigating the growth indices of *Satureja mutica* Fisch&C.A.Mey under the influence of biological fertilizers

Bohloul Abbaszadeh*, Fatemeh Sefidkon, Masoumeh Layeghhghighi, Fatemeh Zakerian, Meysam Ansari, Samaneh Asadi Sanam, Zahra Behrad, Saeideh Mehkizadeh, Behrouz Naderi

Research Institute of Forests and Rangelands, Agricultural Research Education and Extension Organization (AREEO), Tehran, Iran
E-mail: babaszadeh@rifr-ac.ir

ARTICLE INFO

Keywords:
Satureja mutica
Biofertilizer
Growth indicators
Leaf area index

ABSTRACT

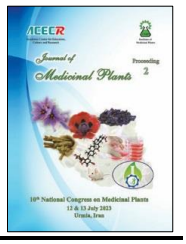
Knowing and investigating growth indicators is very important in analyzing the factors affecting yield and its components, and its stability determines the total amount of dry matter produced, which is a measure of yield potential. In order to investigate the effect of biofertilizers on the growth indicators of *Satureja mutica* Fisch&C.A.Mey, this research was carried out as randomized complete blocks with 3 replications in 2017 in field conditions and in the Research Institute of Forests and Rangelands. Biofertilizers containing mycorrhizal fungi: *Glomus intraradices* and *Glomus mosseae*, phosphate dissolving bacteria including *Azospirillum lipoferum* strain OF and *Pseudomona putida*, Thiobacillus, Thiobacillus+ S (250kg/ha), Thiobacillus+ S (500kg/ha) and control. Examining the amount of dry matter accumulation during the 7-month period of plant growth showed that there was a statistical difference between different treatments in terms of dry matter accumulation in all 7 stages of sampling. It was observed that plants receiving more than 3600 growth degree days and reach the leaf area index (LAI) between 0.6 and 0.9, and the maximum leaf yield with 611 kg/ha in *Glomus mosseae* and at least 475 kg/ha in *Glomus intraradices*, in none of the treatments, leaf fall and reaching the highest level of the leaf and starting to decrease did not happen, which is due to the unlimited growth of the plant, the long growth period and having leaves that are resistant to falling. The highest amount of total dry weight (TDW) with 3600 growth degree days occurred in *Azospirillum lipoferum* strain OF with 120 g/m2 and the lowest with 80 g/m2 in *Glomus intraradices*. The crop growth rate (CGR) of the plant was very different in treatments, and one of the main reasons for this difference can be related to the effect of the treatments and the second reason is related to the non-uniformity of the mother seed mass. The overall results of the graphs showed that *Satureja mutica*, in terms of growth indicators, is one of the important medicinal plants that can compete with other agricultural plants from the first year of cultivation.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 390

The Effect of Water Deficit Stress in Different Stages of Growth on Morphological Traits and Yield of *Satureja sahedica* Bornm.

Fatemeh zakerian[1*], Bohloul Abbaszadeh[1], Fatemeh Sefidkon[1], Masoumeh Layeghhaghighi[1], Samaneh Asadi-Sanam[1]

[1] Research Institute of Forests and Rangelands, Agricultural Research Education and extension Organization (AREEO), Tehran, Iran
E-mail: fm.zakerian@gmail.com

ARTICLE INFO

Keywords:
Yield
Plant height
Stress
Morphology

ABSTRACT

Satureja sahedica Bornm.from the mint family [1], is often found in Mediterranean regions. This medicinal plant is one of the 10 species of satureja exclusive to Iran ([2]. In order to investigate the resistance of this plant in the conditions of dehydration in different stages of growth, this research in the form of randomized complete block design in 4 different levels of irrigation (D1= no water stress, D2= no irrigation during stem elongation till blooming, D3= no irrigation at the blooming up to start of flowering, and D4= no irrigation at 50% flowering up to full flowering) was done in 3 repetitions in 2 years in Alborz province. Plant height, crown width, number of leaves, internode length, number of inflorescences, inflorescence length, stem diameter, root weight, root length, leaf yield, stem yield and total yield were measured. The results showed that the effect of Water Deficit stress only on internode length was not significant. The highest size of plant height (52.15cm), number of inflorescences (35.08 n/p), length of inflorescences (23.03cm) in D_1, Canopy (113.57cm), number of leaves (4008.2 n/p), root weight (14.38 g/p), leaf yield (851.47 kg/h), stem yield (1134.70 kg/h), total yield (1986.2 kg/h) in D_4 and stem diameter (2.69 mm), root length (19.51 cm) was observed in D_3. The favorable effect of stopping irrigation at the 50% flowering stage on the yield of *S.sahedica*, in addition to proving the resistance of this plant, can be useful in managing water consumption in low water areas.

References

1. El-Gazzar A, Watson A. Taxonomic study of Labiatae and related genera. *New Phytologist*. 1970, 69: 451-486.

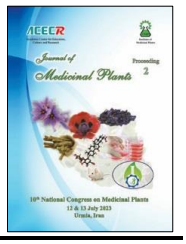
2. Rechinger KH.Satureja in Flora Iranica. Akademische Druck-u Verlagsamstalt, Graz. 1982.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 392

Utilization of medicinal plants is a destructive or sustainable opportunity for rangelands?

Mohammad Farzam

[1] *Department of Range and Watershed Management, Faculty of Natural Resources and Environment, Ferdowsi University of Mashhad, Mashhad, Iran*
E-mail: mjankju@um.ac.ir

ARTICLE INFO

Keywords:
Rangelands
Multiple uses
Restoration
Management
Sustainability

ABSTRACT

Rangelands encompass 52% of Iran and about 40 % of the global land area. Origin of almost all medicinal plants is from rangelands, deserts and forest lands. Nowadays, medicinal products taken from the plants growing in natural ecosystem are more appealing in the international markets; because no fertilizer or pesticides are used for their production. Indigenous people traditionally use medicinal plants of their surrounding ecosystems i.e., rangelands, forest and deserts. Nevertheless, there is a sad story for medicinal plants of natural habitats. Overutilization, root eradication and improper use of many known medicinal such as *Ferula*, *Thymus* and *Astragalus* species have exposed them are in danger of extinction and/or their habitats are highly destroyed. The good news is that there are wise and scientific solutions for sustainable use of medicinal plants in natural ecosystems. I will present a model for utilization of medicinal plants that lead to both economic and environmental benefits. There are some examples from the successful restoration projects in which changing the main use of rangeland from livestock grazing to medicinal plants have enhanced other utilization benefits such as forage production for livestock, ecotourism, water production, genetic conservation and wildlife return. Finally, I will discuss that applying proper management on cultivation and utilization of medicinal plants in rangelands, will be beneficial both for improving the economic wealth of local inhabitants also for the ecosystem sustainability.

References

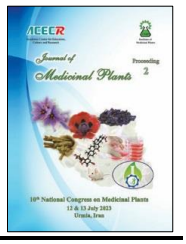
1. Jankju Mohammad 2016. *Potential and constraints on dryland restoration, case studies from Iran*. in Squirez V.R. Ecological Restoration, Global Challenges, Social Aspects, and Environmental Benefits. Nova Science Publishers Inc, NewYork USA. 177-192 pp.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 393

Effect of Ecotype and Harvesting Methods on Some Biochemical Characteristics of Feijoa Fruit (*Feijoa sellowiana*)

Narges Partovi[1], Khodayar Hemmti[2]*, Kamran Rahnama[3], Feryal Varasteh[2], Mina Gholampour[2], Nastaran Hemmti[4]

[1] *Baharan Higher Education Institution, Gorgan, Iran*
[2] *Department of Horticultural Sciences, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Iran*
[3] *Department of Plant Protection, Faculty of plant production, Gorgan University of Agricultural sciences and Natural Resources, Gorgan, Iran*
[4] *Department of Horticulture Science, Faculty of Agriculture, Ferdowsi University of Mashhad, Mashhad, Iran*
E-mail: kh_hemmati@gau.ac.ir

ARTICLE INFO

Keywords:
Ecotype
Feijoa
Post-harvest
Shelf life

ABSTRACT

Feijoa fruit contains vitamin C, polyphenols, flavone and alpha-tocopherols. Vitamin C and polyphenols act synergistically and define the antioxidant properties of juices. Also it is obvious that ecotype and harvesting methods are factors affecting the final quality of the fruit and the maturity of the fruit at the time of harvesting has a great impact on the quality after harvesting. In this regard, research was conducted to investigate the effect of the ecotype and harvesting method on the chemical characteristics of feijoa fruit in the form of a completely randomized design in three replications. A sampling of feijoa fruit in the ripening stage was done from Gorgan and Ramsar regions by two methods of collection from tree and ground. The investigated parameters included titratable acidity, total soluble solids, and vitamin C. The results showed that the independent effect of the harvesting method on titratable acidity was significant at the probability level of one percent, and the interaction effect of the ecotype and harvesting method on total soluble solids and vitamin C was significant at the probability level of five percent. The highest amount of titratable acid (0.157 mg.100 g^{-1} juice) was recorded in the tree harvesting method. The highest amount of total soluble solids (14.33%) and vitamin C (41.56 mg.100 g^{-1} $_{FW}$) were observed in the Ramsar ecotype in the ground harvesting method. According to the assessed traits, the Ramsar ecotype showed more compounds and better quality than the Gorgan ecotype, and the most suitable harvesting method for this fruit is tree harvesting.

References

1. Belous O, Omarow M, Omarova Z. Chemical composition of fruits of a feijoa (*F. sellowiana*) in the conditions of subtropics of russia, *Journal of Potravinarstvo*. 2014; 8(1): 119-123.

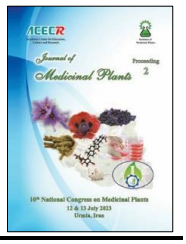
2. East A R, Trejo Araya X I, Hertog M, Nicholson S E, Mawson A J. The effect of controlled atmosphers on respiration and rate of quality change in 'Unique' feijoa fruit. *Postharvest Biology and Technology*. 2009; 53:66-71. https://doi.org/10.1016/j.postharvbio.2009.02.002

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 395

Macro and miccro element absorbtion in 16 different ecotypes of *Allium hirtifolium* Boiss

Najmeh Raiesee[1], Hossein Zeinali[2*], Ramin Babadaei Samani[1], Ardalan Alizadeh[1], Mehrzad Honarvar[1]

[1] *Department of medicinal and Aromatic Plants, Estahban Branch, Islamic Azad University Estahban, Iran*
[2] *Research Institute of Forests and Rangelands, Agricultural Research Education and Extension Organization (AREEO), Tehran, Iran*
E-mail address: hoszeinali@yahoo.com

ARTICLE INFO

Keywords:
Shallot
Nitrogen
Population
Exploitation

ABSTRACT

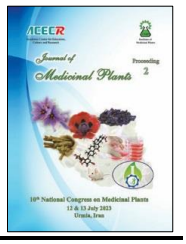
Allium hirtifolium is one of the perennial plants of the Alliaceae family, which is widely used in the food and pharmaceutical industries. Shallot is a rich source of vitamins, mineral elements and essential fatty acids, and due to its high amount of sulfur compounds, it has antioxidant, antimicrobial and antitumor properties. Unfortunately, due to indiscriminate exploitation and incorrect harvesting in many pastures, the density of shallot plant per unit area has decreased drastically and it is one of the species in danger of extinction. In this study, 16 shallot populations belonging to different provinces were evaluated and the results of analysis of variance showed a significant difference between the populations. The highest percentages of nitrogen and potassium were observed in Kohgiluyeh and Boyer-Ahmad with 2.2 and 9.2%, respectively. The highest percentage of phosphorus was found in Yasuj with 0.4. The highest percentage of calcium was obtained in Chaharmahal Bakhtiari with an average of 1.3 and the highest percentage of magnesium was obtained in East Azerbaijan with an average of 0.3. The highest amount of iron with an average of 166.7 ppm was found in Kohgiluyeh and Boyer-Ahmad. Manganese was the highest in Kurdistan with an average of 32.9 ppm. The highest zinc was observed in Shahrekord with 75.4 ppm, copper in Chaharmahal Bakhtiari with 12.8 ppm and chromium in Lorestan with an average of 8.5ppm. The difference in absorption elements by plants of different populations showed that this plant reacts to soils with different nutritional elements, and with principled and purposeful nutrition, it is possible to achieve better crop production.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 396

Effects of watering regimes on morphological traits and phytochemical compounds of *Capparis spinosa* L.

Fatemeh Agah[1], Mohammad Ali Esmaeili[1], Mohammad Farzam[2*], Rahmat Abbasi[1]

[1] *Department of Agronomy, Faculty of Agronomy Science, Sari Agricultural Sciences and Natural Resources University, Sari, Iran*

[2] *Department of Range and Watershed Management, Faculty of Natural Resources and Environment, Ferdowsi University of Mashhad, Mashhad, Iran*

E-mail: mjankju@um.ac.ir

ARTICLE INFO

Keywords:
Climate Change
Drought
Caper
Medicinal Plants
Secondary Metabolites

ABSTRACT

Considering the fact that 90% of Iran is situated in the arid and semiarid climates, drought is can be considered as the most important factor affecting the growth and chemical compounds of medicinal plant in Iran. Caper is a (*Capparis spinosa* L.) is a valuable medicinal plant that is naturally growing in almost all semi-arid plains of Iran. Nevertheless, there is little information on responses of this species to the drought [1, 2]. We conducted an experiment in which effects of different watering regimes were evaluates on the morphological and phytochemical characteristics of caper. Caper seeds were directly sown in the plastic pots and experiment was carried out under the ambient conditions in spring to summer 2018. Study was conducted in a completely randomized design at four levels of irrigation (25, 50, 75 and 100% field capacity), with four replicates in each treatment. Morphological indices (leaf number, leaf length, shoot length, root length, shoot/root length ratio, shoot dry weight, root dry weight and shoot/root dry weight ratio), physiological traits (chlorophyll a, b and total chlorophyll content, total carotenoids content) and phytochemical properties (total alkaloid content, total phenol content, total flavonoid content and essential oils) were measured. Evaluation of different levels of irrigation showed that as the level of irrigation increased, morphological traits decreased significantly but shoot/root length and weight ratio was not affected by changes in irrigation levels. Despite the decrease in other morphological traits, the content of photosynthetic pigments and secondary metabolites increased significantly at lower irrigation levels. Due to the low water requirement of the caper plant and by applying lower levels of irrigation to achieve higher secondary metabolite content, the caper plant can be one of the suitable plants for cultivation in arid and semi-arid agricultural systems.

References

1. Fici, S. A taxonomic revision of the *Capparis spinosa* group (Capparaceae) from the Mediterranean to Central Asia. *Phytotaxa*. 2014; 174(1): 001-024.

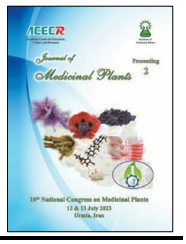
2. Lansky EP, Paavilainen HM, Lansky Sh. Caper the Genus Capparis. CRC Press, Taylor & Francis Group. 2014, pp: 334.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 397

Effect of selenium on allicin in garlic under drought stress

Nesa Gharehbaghli*

Department of Agriculture science, Payame Noor University, Tehran, Iran
E-mail: ghare-b@pnu.ac.ir

ARTICLE INFO

Keywords:
Allicin
Drought
Garlic
Selenium

ABSTRACT

Garlic (*Allium sativum* L.) is one of onion vegetables, which is of interest in terms of food and medicine, and its medicinal importance is expanding. The medicinal properties of garlic are mainly due to the presence of a sulfur compound called allicin. The amount of allicin in garlic is affected by various factors such as the environmental conditions of the place of cultivation. Drought is the most important environmental stress that affects crops in most stages of growth. Therefore, in order to investigate the changes in growth characteristics and the amount of allicin under the influence of drought stress, a factorial experiment was conducted in the form of a completely randomized design in three replications at four levels of drought (100, 80, 60 and 40% of water requirement) and selenium at two levels (zero and 5 mg/kg) was carried out by using sodium selenate on the native mass of Hamadan garlic. The results of the experiment showed that drought caused a significant decrease in plant height, shoot dry weight, root dry weight, bulb dry weight, allicin yield. Although the percentage of allicin increased.The findings of Habus et al. 2023 confirm the results of the present study. The findings of the research also showed that the application of sodium selenate reduced negative effects of drought stress on the dry weight of aerial parts, dry weight of stems and yield of allicin. Therefore, in order to mitigate the adverse effects of drought stress on the active substance allicin in garlic, the use of sodium selenate at a concentration of 5 mg/kg is recommended. The results of Liu et al. (2023) confirm the mitigating effect of selenium on reducing the adverse effects of drought.

References

1. Habuš Jerčić I, Bošnjak Mihovilović A, Matković Stanković A, Lazarević B, Goreta Ban S, Ban D, Major N, Tomaz I, Banjavčić Z, Kereša S. Garlic Ecotypes Utilise Different Morphological, Physiological and Biochemical Mechanisms to Cope with Drought Stress. *Plants (Basel)*. 2023 Apr 28; 12(9): 1824. doi: 10.3390/plants12091824.

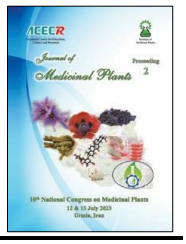
2. Liu H, Xiao C, Qiu T, Deng J, Cheng H, Cong X, Cheng S, Rao S, Zhang Y. Selenium Regulates Antioxidant, Photosynthesis, and Cell Permeability in Plants under Various Abiotic Stresses: A Review. *Plants*. 2023; 12(1):44. doi: 10.3390/plants12010044.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 398

Evaluation of agronomic traits of the three best populations of *Lallemantia iberica* for the introduction of cultivars

Bohloul Abbaszadeh[1], Masoumeh Layeghhaghighi[1*], Ali Ashraf Jafari[1], Saeid Rashvand[2]

[1] *Research Institute of Forests and Rangelands, Agricultural Research Education and Extension Organization (AREEO), Tehran, Iran*
[2] *Agricultural Research, Education and Extension Organization (AREEO), Qazvin, Islamic Republic of Iran*
E-mail: Layeghhaghighi@yahoo.com

ARTICLE INFO

Keywords:
Lallemantia iberica
Yield
1000 seed weight
Agricultural traits

ABSTRACT

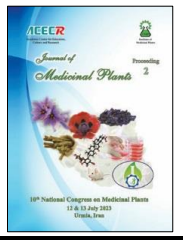
Lallemantia iberica Fischer C.A. Meyer is a plant whose leaves or seeds are used. It is used in food, oil, pharmaceutical, industrial, fodder and green fertilizer industries. The most important components of fatty acids in the seeds of this plant are linolenic acid (67-74%), linoleic acid (10%), oleic acid (10%), palmitic acid (6%) and stearic acid (2%). The presence of phenolic acid, flavonoids, tannin, triterpenes, mucilage and essential oil, antibacterial and antioxidant effects were confirmed in this plant. The seeds of the selected populations (3 populations) from the previous phases were cultivated in the winter of 2021 at the Research Institute of Forests and Rangelands in the form of a randomized complete block design with 5 replications. The dimensions of the plots were 9 m^2 and the distance between the plants was 50 x 30 cm. Irrigation was done by drip method, during the growth period the necessary treatment was done and finally harvesting was done during the ripening stage of the seeds. The results showed that there was a statistical difference in the number of lateral stems, dry weight of single plants, yield in hectare and weight of 1000 seeds among the populations. But in terms of plant height, seed weight per plant and seed yield per hectare, no statistical difference was observed between the investigated populations. The mean comparison showed that the highest average number of lateral stems with 34 numbers per plant belonged to population number 2 and the lowest number with 19.4 numbers belonged to population number 1. The highest yield with 690 kg/ha was observed in population No. 3 and the lowest with 520 kg/ha in population No. 1. In population number 3, the highest weight of one thousand seeds was observed with 4.66 g, the highest seed yield per hectare was 149 kg. According to the obtained results, population number 1 was the weakest population in terms of agricultural traits.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 399

Cytotoxicity investigation and bioassay guided isolation of the biologically active compounds of the Iranian native plant, *Calotropis persica*

Pegah Amini[1,3], Mahdi Abbas Mohammadi[2], Mohsen Farhadpour[3]

[1] *Essential Oil Research Institute, University of Kashan, Kashan, Iran*
[2] *Department of Organic Chemistry, Faculty of Chemistry, University of Kashan, Kashan, Iran*
[3] *Department of Agricultural Biotechnology, National Institute of Genetic Engineering and Biotechnology (NIGEB), Tehran, Iran*
E-mail: pegah_amini78@yahoo.com

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 IC50=120 µg/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.

References

1. Pardesi Goldee S, PRELIMINARY STUDIES ON ANTIMITOTIC AND ANTI CANCER ACTIVITY OF CALOTROPIS GIGANTEA, Pharmacologyonline 1: 38-47 (2008)

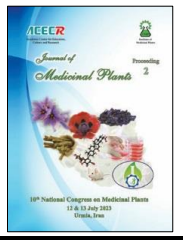
2. Mohammed A. M. Al-Qahtani, Anticancer Effects of *Calotropis procera* Latex Extract in MCF-7 Breast Cancer Cells, *Pharmacogn. Mag.* 2022, IP: 185.159.158.100

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 401

The effect of organic and biological fertilizers on morphological traits, yield and essential oil of *Satureja spicigera*

Masoumeh Layeghhghighi*, Bohloul Abbaszadeh, Razieh Azimi, Fatemeh Zakerian, Samaneh Asadi Sanam, Behrouz Naderi

Research Institute of Forests and Rangelands, Agricultural Research Education and Extension Organization (AREEO), Tehran, Iran
E-mail: Layeghhaghighi@yahoo.com

ARTICLE INFO

Keywords:
Satureja spicigera
Vermicompost
Phosphate solvent
Essential oil

ABSTRACT

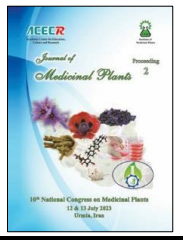
This research was carried out in Alborz Research Station, Research Institute of Forests and Rangelands in 2017 in order to investigate the effect of vermicompost application, phosphate solvents and nitrogen fixer on Satureja spicigera. Using the experimental design of randomized complete blocks with 3 replications, it was implemented in field conditions. The experimental treatments included the control, vermicompost of 5 tons per hectare, *Pseudomonas putida*, *Azospirillum lipoferrum*, *Glomus intraradices* and *Glomus mosseae*. The results showed that plant height, stem length and canopy were the highest in control treatments and vermicompost application of 5 tons per hectare. The highest yields of shoot, leaves, stems and total biomass (roots and aerial parts) were observed in vermicompost consumption of 5 tons per hectare with 3129.1, 1795.9, 1333.1 and 4693.7 kg per hectare, respectively. The results of variance analysis showed that the effect of fertilizer treatments on the percentage of essential oil was significant at the five percent probability level. The highest percentage of essential oil was observed in *Azospirillum lipoferrum* with 2.5%. Vermicompost with an average of 60.7 kg per hectare had the highest yield of essential oil. Shoot yield with stem length (*r=0.53), canopy (*r=0.49), root yield (r=0.92**), total yield (r=0.99**), leaf yield (r=0.98**), stem yield (r=0.97**) and essential oil yield (r=0.98**) had a positive correlation. The results of this research showed that due to the long-term growth period of the plant, the use of organic fertilizers is recommended compared to other used fertilizers due to the gradual release of elements and the possibility of optimal use of them by the plant.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 402

Investigating the effect of selenium on changes in allicin content of garlic plants under cadmium stress

Nesa Gharehbaghli*

Department of Agriculture of science, Payame Noor University, Tehran, Iran
E-mail: ghare-b@pnu.ac.ir

ARTICLE INFO

Keywords:
Allicin
Cadmium
Selenium

ABSTRACT

Potential health risks of cadmium (Cd) in agroecosystems migrating to the human body along the food chain have become a worldwide hotspot issue, but information on phytotoxicity mitigation and product quality and safety assessment of Cd-stressed garlic is still lacking. Therefore, in order to investigate the changes in growth characteristics and the amount of allicin under the influence of cadmium stress, a factorial experiment was conducted in the form of a completely randomized design in three replicates at 4 levels of cadmium 0, 5, 10 and 20 mg/kg$_{soil}$ from cadmium chloride and selenium at two levels (0 and 5 mg/kg$_{soil}$) was done by using sodium selenate on the native stand of Hamadan garlic. The test results showed that added 5 mg/kg cadmium chloride did not significantly change the growth characteristics and allicin content. Although the concentration of 10 mg/kg soil showed drastic reduction changes in the growth characteristics and the amount of allicin was also reduced by 42%. At concentration of 20 mg/kg of cadmium chloride in the soil, garlic plants were completely damaged and died. Cadmium (10 mg/kg) caused significant decrease in plant height, plant dry weight, root dry weight, stem dry weight, allicin yield and allicin percentage. The findings of Zhu et al. 2023 confirm the results of the present study. The findings of the research also showed that the application of sodium selenate caused the negative effects of cadmium (5 and 10 mg/kg) on the dry weight of the shoot, the dry weight of the stem and the yield of allicin. Therefore, in order to reduce the adverse effects of cadmium on the content of allicin in garlic, the use of sodium selenate is recommended. The results of Sepehri and Gharehbaghli (2019) confirm the mitigating effect of selenium on reducing the adverse effects of cadmium.

References

1. Xu J-M., Mei X., Lv Y., Gao S., Li N., Liu Y., Cheng H-Y and Xu k., Silicon actively mitigates the negative impacts of soil cadmium contamination on garlic growth, yield, quality and edible safety, *Sci. Hortic*. 2023. 309, 111625, doi:10.1016/j.scienta.

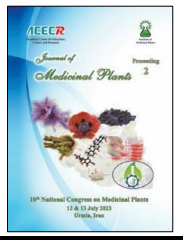
2. Sepehri A., Gharehbaghli N. Selenium Alleviate Cadmium Toxicity by Improving Nutrient Uptake, Antioxidative and Photosynthetic Responses of Garlic. *Russ J Plant Physiol* .2019. 66, 152–159. doi: 10.1134/S1021443719010151.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 403

Effects of soil fertility additives on seed germination and seedling survival of caper (*Capparis spinosa* L.)

Elahe Ehsanipour[1], Mohammad Farzam[1,*], Fatemeh Agah[2], Amir Fotovat[2]

[1] *Department of Range and Watershed Management, Faculty of Natural Resources and Environment, Ferdowsi University of Mashhad, Mashhad, Iran.*
[2] *Khorasan Razavi Jihad Keshvarzi Organization, Mashhad, Iran*
[3] *Department of Soil Sciences, Faculty of Agriculture, Ferdowsi University of Mashhad, Mashhad, Iran*
E-mail: mjankju@um.ac.ir

ARTICLE INFO

Keywords:
Caper
Medicinal Plants
Soil fertility
Domestication

ABSTRACT

Caper is a medicinal plant with the scientific name (*Capparis spinosa* L.) from the Capparidacea family. It is is native to arid and semi-arid regions of the world. Nevertheless, despite widespread distribution and cultivation of *Capparis spinosa*, it is currently considered at risk of genetic erosion, mainly due to overgrazing and overharvesting for domestic uses and for trade. In fact, it has been included in the IUCN Red List of Threatened Species [1]. For this purpose, the present research was carried out under the glasshouse conditions in spring to summer 2022. This experiment was carried out as a factorial based on randomized complete including biochar (B) at four levels (0, 5, 10 and 20 ton/ha), mycorrhiza (M) species (Glomus mosseae) and (Glomus Intraradices) each at three levels (0, 12.5 and combination of both species 25 ton/ha), phosphate-dissolving rhizobacteria (P) at four levels (0, 6.25, 12.5 and 25 liter /ha), manure and vermicompost each at four levels (0, 20, 25 and 30 ton/ha) with six replications. Root characteristics (total shoot dry weight, root wet weight, root dry weight, root length, root length density, root surface density, root specific volume and root tissue density) and seedling survival were investigated. Phosphate solubilizing Rhizobacteria (PSB) increased all root growth traits, whereas biochar increased germination percentages and speed. All soil additives led to higher seedling survival as compared with control, but the highest survival was found under biochar, manure and PSB, with the consistently high values for found under PSB only. Accordingly, PSB seems to be the most efficient treatment for caper establishment and survival under the harsh environmental conditions of the aridlands.

References

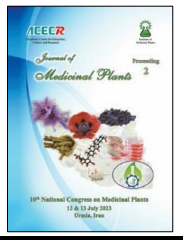
1. Kasdhl R, Kapus H. Toxicology of the antioxidant vitamin E. *Z. Lebensm. Unters. Forsch.* 2023; 19(4): 39-42. doi: 10.1007/BF0121297931.
2. Mozaffarian V. A dictionary of Iranian plant names. Tehran: Farhang Moaser. 2022, 361-363.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 404

Ethnobotanical study of some medicinal plants of Avdi region in Urmia, West Azarbaijan province

Shabnam miryousefzadeh[1], Abolfazl Alirezalu [2,*]

[1] *M.Sc. student, Department of Horticulture, Faculty of Agriculture, Urmia University, Urmia, Iran*
[2] *Department of Horticulture, Faculty of Agriculture, Urmia University, Urmia, Iran.*
E-mail: a.alirezalu@urmia.ac.ir

ARTICLE INFO

Keywords:
Ethnobotany
Medicinal plants
Traditional medicine
West Azerbaijan

ABSTRACT

Ethnobotany is a powerful tool to obtain valuable information from medicinal plants used in different cultures, which provides the basis for the discovery of new drugs. It aims at describing the relationships between cultures and plants, focusing on their applications. In this present study, the most important medicinal plant species of Avdi region (Silvana district) in Urmia and their uses in traditional medicine are introduced. This research was done descriptively, the medicinal and aromatic species, the plants collected after being transferred to the herbarium were identified using different floras, then their medicinal properties were recorded using local information obtained from direct interviews. In the spring of 1401, sampling, identification, and classification of medicinal plants species was done using field surveys, study of beliefs, popular information and documentary studies. Generally, more than 50 species of medicinal plants from different families were identified. The families of Asteraceae, Lamiaceae, and Apiaceae with 14, 12, and 7 species, respectively, are the most important ones in the studied area. The most common medicinal use of plants was for digestive disorders, joint pains and infectious diseases, respectively. Aerial parts were the most used organ among the studied species, and their most important use was in digestive disorders, especially poisoning. The overall results show that Avdi region has a wide variety of medicinal plants with different uses, so this ecosystem can be a local natural habitat for teaching the principles of natural resource exploitation, especially the harvesting of medicinal plants.

References

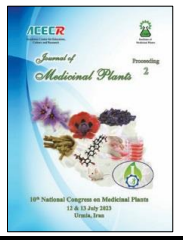
1. de Santayana M, Pieroni A, & Puri RK. Ethnobotany in the new Europe: people, health, and wild plant resources. Berghahn Books, 2010, Vol. 14.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 405

Diversity of phytochemical components in *Phlomis herba venti* (Lamiaceae) populations from West Azerbaijan

Seyyed Ali Gheibi[1], Abolfazl Alirezalu[1,*], Habib Shirzad[1], Hadi Alipour[2]

[1] *Department of Horticultural Sciences, Faculty of Agriculture, Urmia University, Urmia, Iran*
[2] *Department of Plant Production and Genetics, Faculty of Agriculture, Urmia University, Urmia, Iran*
E-mail: a.alirezalu@urmia.ac.ir

ARTICLE INFO

Keywords:
Lamiaceae
Antioxidant activity
PAL enzyme

ABSTRACT

The *Phlomis herba venti* belongs to the Lamiaceae family, an medicinal perennial herb native to West Azerbaijan province. In order to investigate the phytochemical diversity of *P. herba venti* populations, samples collected from different geographical regions. The diversity of samples was studied based total phenol, flavonoid, tannin, antioxidant activity (by DPPH and FRAP assays), and PAL enzyme activity. The results showed that the samples that were located at the highest altitude above sea level, the westernmost point of longitude and northernmost point of latitude had the highest amount of total phenol (77.18 mg/g dw), tannin (13.94 mg/g dw) and antioxidant activity by DPPH assay (45.40%) which was observed in Chaldaran region. Also, the lowest amount of total phenol (32.54 mg/g dw), tannin (7.26 mg/g dw) and antioxidant activity (14.09%) were observed in Shahindezh samples which was at the lowest altitude above the sea level. The samples located in the easternmost longitude and southernmost latitude (Takab) showed the highest amount of total flavonoid (14.35 mg/g dw), antioxidant activity by FRAP and the lowest amount of PAL enzyme activity. The results indicated the existence of high phytochemical diversity of *P. herba venti* in West Azerbaijan province.

References

1. Almagro L, Fernández-Pérez F, Pedreño MA. Indole Alkaloids from Catharanthus roseus: Bioproduction and Their Effect on Human Health. *Molecules*. 2015; 20(2):2973-3000. https://doi.org/10.3390

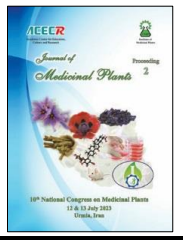
2. Koul M, Lakra NS, Chandra R, Chandra, S. Catharanthus roseus and prospects of its endophytes: A new avenue for production of bioactive metabolites. *International Journal of Pharmaceutical Sciences and Research*. 2013; 4(7): 2705.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 408

The effect of different ratios of NH_4^+:NO_3^- on the phytochemical and antioxidant activity of *Cannabis sativa* L. medicinal plant

Masume Hasanalizade[1*], Abbas Samadi[2], Abolfazl Alirezalu[3], Parviz Noruzi[4]

[1] *Department of Agriculture, Group of Soil Science, PhD Student, Urmia University, Iran*
[2] *Department of Agriculture, Group of Soil Science, Professor, Urmia University, Iran*
[3] *Department of Agriculture, Group of Horticulture, Associate Professor, Urmia University, Iran*
[4] *Department of Agriculture, Group of Horticulture, Assistant Professor, Urmia University, Iran*
E-mail: mhalizade@ymail.com

ARTICLE INFO

Keywords:
Cannabis sativa
Phytochemical
Antioxidant

ABSTRACT

Cannabis sativa L. is a one-year plant from the hemp family and important in industry, pharmaceutical-medicine and agriculture. *Cannabis* is very complex in terms of phytochemical compounds and more than 480 different chemical compounds have been identified. Plants need enough nutrients in the right proportions to grow. Nitrogen is absorbed in the form of NO_3^- or NH_4^+, and the total absorbed N is the combination of these two forms. So, the ratio of these two is important in plants and affects it. In this research, the effect of NH_4^+:NO_3^- ratios including 20:80, 40:60 and 60:40 with full and half-ionic strength with a randomized complete block experimental design on the phytochemical properties including chlorophyll a and b as well as its antioxidant activity investigated. According to the results, the highest amount of Chlorophyll a in the ratio was 20:80 in half-ionic strength and, the Chlorophyll b in the ratio was 20:80 in full-ionic strength. The highest antioxidant activity of both leaves and flowers was in the ratio of 60:40 in half -ionic strength The highest antioxidant activity of both leaves and flowers was in the ratio of 60:40 in half -ionic strength and the highest antioxidant activity in the root was in the ratio of 20:80 in full ionic strength.

References

1. ElSohly, M.A. and Slade, D., 2005. Chemical constituents of marijuana: the complex mixture of natural cannabinoids. *Life sciences*, *78*(5), pp.539-548.

2. Zuk-Golaszewska, K. and Golaszewski, J., 2018. *Cannabis sativa* L.–cultivation and quality of raw material. *Journal of Elementology*, *23*(3).

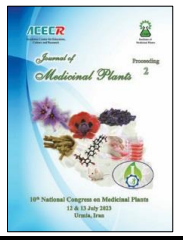
3. Yep, B., and Zheng, Y. 2019. Aquaponic trends and challenges - A review. *J. Clean. Prod*. 228: Yield of Industrial Hemp (*Cannabis sativa* L.). Notulae Botanicae Horti Agrobotanici ClujNapoca. 2018; 46 (1): 197-201.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 409

The effect of melatonin on phytochemical properties and antioxidant activity of *Punica granatum* cv. Malas Saveh during cold storage

Zeynab Alizadeh[1], Atefeh Moshari-Nasirkandi[1], Mehrshad Mollanejad[1], Abolfazl Alirezalu[1,*]

[1] *Department of Horticultural Sciences, Faculty of Agriculture, Urmia University, Urmia, Iran*
E-mail: a.alirezalu@urmia.ac.ir

ARTICLE INFO

Keywords:
Antioxidant activity
Melatonin
Phytochemical
Pomegranate

ABSTRACT

Pomegranate is known for its high polyphenolic content, which is responsible for its potent antioxidant and antimicrobial properties. The ability of pomegranate fruit extract to absorb free radicals has generated significant interest in its potential use in the cosmetics industry. Free radicals are known to cause damage to cells and contribute to the aging process, and the antioxidant properties of pomegranate extract make it a promising ingredient for anti-aging and skin-rejuvenating products. The study aimed to investigate the effects of various concentrations of melatonin (0, 250, 500, 750, 1000, and 1500 mM) and different time treatments (0, 20, 40, 60, 80 days) on the total phenol content (TPC), total flavonoid content (TFC), total tannin content (TTC), and antioxidant activity (DPPH) of *Punica granatum* cv. Malas Saveh during cold storage. The results showed that the highest concentrations of TPC, TFC, TTA, and DPPH were observed in the 750 mM (day 20), 1000 mM (day 20), 0 mM (day 0), and 1000 mM (day 80) treatments, respectively. On the other hand, the lowest concentrations of TPC and TFC were observed in the 0 mM (day 0) treatment. The lowest concentrations of TTC and DPPH were observed in the 250 mM (day 20) and 1000 mM (day 60) treatments, respectively. Therefore, results of the present study suggested that melatonin as a non-chemical treatment has efficient effects on prolonging the shelf-life and quality improvement of pomegranate fruit during storage.

References

1. Shaygannia, E., Bahmani, M., Zamanzad, B. and Rafieian-Kopaei, M. (2016). A review study on *Punica granatum* L. *Journal of evidence-based complementary and alternative medicine*, 21(3), 221-227.

2. Arun, N. and Singh, D. P. (2012). *Punica granatum*: a review on pharmacological and therapeutic properties. *IJPSR*, 3(5), 1240-1245.

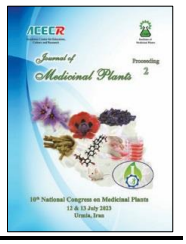
3. Gigliobianco, M. R., Cortese, M., Nannini, S., Di Nicolantonio, L., Peregrina, D. V., Lupidi, G. and Censi, R. (2022). Chemical, antioxidant, and antimicrobial properties of the peel and male flower by-products of four varieties of *Punica granatum* L. cultivated in the Marche region for their use in cosmetic products. *Antioxidants*, 11(4), 768.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 410

Comparative advantage of exporting medicinal plants in Iran and the world

Mohammad Khodaverdizadeh

Department of Agricultural Economics, Urmia University, Urmia, Iran
E-mail: mo.khodaverdizadeh@urmia.ac.ir

ARTICLE INFO

Keywords:
Medicinal plants
Iran
Comparative Advantage
Export

ABSTRACT

The development of non-oil exports and getting rid of oil income is one of the important goals of Iran's economic system. In this regard, it is necessary to pay attention to medicinal plants as one of the products that have the potential to be exported. The current research was carried out with the aim of determining the relative advantage of exporting selected medicinal plants (Anise, badian, coriander, cumin, caraway, fennel and juniper berries) in Iran and other major countries that export medicinal plants in the world. The study period of this research is 2016-2021. In order to determine the relative advantage, two indicators of revealed comparative advantageand (RCA) and revealed symmetrical comparative advantageand (RSCA) were used. Statistics related to the export of medicinal plants show that the major countries exporting medicinal plants in the years under review are India, China, Vietnam, Turkey, Syria, Afghanistan, Russia, Germany, Egypt, Italy, UAE and the Netherlands. Iran's share in the global export of medicinal plants is less than 5%, and in this respect, it was ranked 17th in the world in 2021. The results related to comparative advantage with RCA and RSCA indicators showed that Iran has a comparative advantage in the export of medicinal plants. The highest relative advantage is related to the countries of Syria, Afghanistan, Ethiopia, India, Albania, North Macedonia, Egypt, Bosnia, Sierra Leone, Bulgaria and Morocco. Iran ranked 16th in the world in terms of relative advantage in 2021.

References

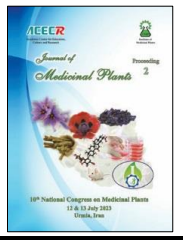
1. Bahta, S.T. & Jooste, A. The Effect of Internationalisation on the Beef and Maize Sub-sectors: The Relevance of Revealed Comparative Advantage Measures, Agrekon, 2005, 44: 452-464.
2. Food and Agriculture Organization (FAO). 2013. <www.fao.org>.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 412

Fungal agents associated with leaf spot diseases of some Iranian medicinal plants; Implications for Health promotion and producing high-quality, mycotoxin-free products

Zahra Hasany[1], Zahra Abollahpour[1], Elhameh Abdi-Nejad[1], Aminallah Tahmasebi[2], Alireza Alizadeh[1*]

[1] *Department of Plant Protection, College of Agriculture, Azarbaijan Shahid Madani University, Tabriz, Iran*
[2] *Department of Agriculture, Minab Higher Education Center, University of Hormozgan, Bandar Abbas, Iran*
E-mail: Alireza.alizadeh@azaruniv.ac.ir

ARTICLE INFO

Keywords:
Fungal disease
Fungal taxonomy
Healthy product
Mycotoxins
Phylogeny

ABSTRACT

Plant pathogenic fungi are major threats to medicinal plant communities, causing numerous diseases such as leaf spots, rotting, and wilting. These agents affect agricultural products both qualitatively and quantitatively, leading to significant economic losses [1]. Moreover, fungi can produce mycotoxins that can cause dangerous diseases in humans, including cancer [2]. Therefore, producing healthy, mycotoxin-free medicinal plant products is outmost of importance. During the years 2020-2022, comprehensive samplings were conducted from a large number of tree and shrub medicinal plant species such as *Camellia sinensis, Citrus limetta, Diospyros kaki, Hypericum perforatum, Phoenix dactylifera, Punica Granatum, Quercus sp.* and *Ziziphus spina-christi* showing leaf spot symptoms in numerous locations of East Azerbaijan, Guilan, Mazandaran, Golestan, Fars, and Hormozgan provinces. Multigene phylogenetic studies based on the nucleotide sequence of ITS, TEF, TUB2 and LSU genomic regions showed that the symptoms of the studied medicinal plants are associated with numerous fungal species including *Alternaria* spp., *Aspergillus* spp., *Bartalinia robillardoides, Botrytis* sp. *Chaetospermum camelliae, Colletotrichum gloeosporioides, C. fructicola, C. lini, C. siamense, C. truncatum, Curvularia* spp., *Discosia artocreas, D. pseudoartoceras, Diploceras hypericinum, Myrothecium* sp., *Neodidymelliopsis moricola, Nigrospora* sp., *Pestalotiopsis paeoniicola, P. brachiata, P. camelliae, Pseudopestalotiopsis camelliae-sinensis, Pse. chinensis, Pse. theae, Robillarda roystoneae, R. sessilis* and *Stachybotrys* sp. As the leaves of most of the studied medicinal plants has high therapeutic consumption and also, most of the recognized fungi have high potential to produce dangerous mycotoxins on plant surfaces [3], it is crucial to adopt modern agricultural methods such as precision agriculture, forecasting and integrated disease management to reduce the incidence of fungal leaf spot diseases on the studied medicinal plants.

References

1. Abtahi F, Nourani SL. The most important fungal diseases associated with some useful medicinal plants. *Medicinal Plants and Environmental Challenges*. 2017:279-93.

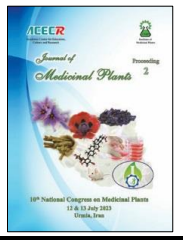
2. Ahmed Adam MA, Tabana YM, Musa KB, Sandai DA. Effects of different mycotoxins on humans, cell genome and their involvement in cancer. *Oncology Reports*. 2017 Mar 1; 37(3):1321-36.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 413

Antimicrobial resistance properties of *Staphylococcus aureus* isolates from powdered packaged medicinal plants and bottle herbal distillates

Zohreh Mashak[1], Bahareh Tavakoli-Far[2,3*]

[1] *Department of Food Hygiene, Karaj Branch, Islamic Azad University, Karaj, Iran*
[2] *Dietary Supplements and Probiotic Research Center, Alborz University of Medical Sciences, Karaj, Iran*
[3] *Department of Physiology and Pharmacology, School of Medicine, Alborz University of Medical Sciences, Karaj, Iran*
E-mail:tavakkolifarb@yahoo.com

ARTICLE INFO

Keywords:
Antibiotic resistance
medicinal plants
Staphylococcus aureus
Phenotypic resistance
Genotypic resistance

ABSTRACT

Human involvement in the production and processing of medicinal plants and herbal distillates caused a potential risk of microbial contamination, particularly with *Staphylococcus aureus* [1, 2]. The present research was performed to assess the prevalence and phenotypic and genotypic properties of antibiotic resistance of *S. aureus* bacteria isolated from diverse kinds of powdered packaged medicinal plant and bottle herbal distillate samples. Three-hundred different powdered packaged medicinal plant and bottle herbal distillate samples produced in traditional conditions were collected and examined by the culture method. Phenotypic and genotypic patterns of antibiotic resistance of *S. aureus* isolates were examined using disk diffusion and PCR techniques. Thirty out of three-hundred (10%) powdered packaged medicinal plant and bottle herbal distillate samples were contaminated with *S. aureus*. The prevalence of *S. aureus* amongst the samples were 8.33% and 11.11%, respectively. *A. citrodora* (10%) and *R. damascene* (10%) powdered packed medicinal plants and *A. maurorum* (16.66%) bottle herbal distillate had the highest contamination rate with *S. aureus*. *S. aureus* isolates harbored the highest prevalence of resistance toward penicillin (93.33%), tetracycline (90%), gentamicin (86.66%), erythromycin (70%), trimethoprim-sulfamethoxazole (63.33%) and ciprofloxacin (53.33%). Totally, 13.33% of the *S. aureus* isolates harbored resistance toward more than 7 antibiotic agents. *blaZ* (63.33%), *tetK* (60%), *ermA* (46.66%), *msrA* (43.33%), *aacA-D* (43.33%), and *mecA* (43.33%) were the most frequent antibiotic resistance genes. Powdered packaged medicinal plant and bottle herbal distillate samples may be sources of multidrug resistant-*S. aureus*, which poses a hygienic threat concerning the consumption of these therapeutic options in Iran.

References

1. Kneifel W, Czech E, Kopp B. Microbial contamination of medicinal plants-a review. *Planta Medica*. 2002; 68(01):5-15.

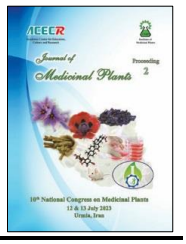
2. Madahi H, Rostami F, Rahimi E, Dehkordi FS. Prevalence of enterotoxigenic Staphylococcus aureus isolated from chicken nugget in Iran. *Jundishapur J. Microbiol*. 2014; 7(8).

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 414

To investigate the effect of *Lepidium sativum* ethanolic seed extract on spermatogenesis in mice fed with a high-fat diet

Zahra Ahmadi[1], Hasan Fallah Huseini[2], Marjan Hosseini[3], Bahareh Tavakoli-Far[3,4*]

[1] *Student Research Committee, Alborz University of Medical Sciences, Karaj, Iran*
[2] *Medicinal Plants Research Center, Institute of Medicinal Plants, ACECR, Karaj, Iran*
[3] *Department of Physiology and Pharmacology, School of Medicine, Alborz University of Medical Sciences, Karaj, Iran*
[4] *Dietary Supplements and Probiotic Research Center, Alborz University of Medical Sciences, Karaj, Iran*
E-mail:tavakkolifarb@yahoo.com

ARTICLE INFO

Keywords:
Lepidium sativum
infertility
ethanolic seed extract
spermatogenesis

ABSTRACT

High fat diet and obesity are important factors that related to infertility. *Lepidium sativum* (LS) has been documented to possess numerous antioxidants but little is known about its effect on male reproductive features [1, 2]. The aim of this study was to investigate the effect of *Lepidium sativum* ethanolic seed extract on spermatogenesis in mice fed with a high-fat diet.45 mice were divided into five groups. The animals were treated as follows: Group (1) Control Treated orally with normal food Group (2) High fat diet Group (3) to (5) High fat diet and *Lepidium sativum* ethanolic seed extract *with* doses of 200, 300 and 400 mg/kg respectively. After 12 weeks, sperm analysis was performed. The results showed that the motility in the positive control group was significantly reduced (p-value<0.05). Also, the use of extract in all doses significantly increased viability compared to the second group (HFD group) (p-value<0.05). In addition, the results showed that the use of the extract in all doses except the dose of 200 mg/kg significantly increased the number of spermatogonial cells compared to the second group (HFD group) (p-value<0.05). The difference between the dose of 200 mg/kg and HFD was not significant (p-value<0.05). The present study showed that the use of ethanolic extract from watercress (*L. sativum*) seeds in all doses significantly increased sperm motility and viability. This extract also increased the number of spermatogonia in doses of 300 and 500 mg/kg. It seems that these effects can be justified by the antioxidant properties of *L. sativum*.

References

1. Manohar, D., et al., Ethnopharmacology of *Lepidium sativum* Linn (Brassicaceae): a review. 2012. 2(1): p. 1-7.

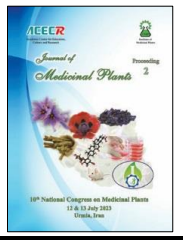
2. Jain, T. and K.J.P.o.t.N.A.o.S. Grover, India Section B: Biological Sciences, A comprehensive review on the nutritional and nutraceutical aspects of garden cress (*Lepidium sativum* Linn.). 2018. 88(3): p. 829-836.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 415

Development of liposomal formulation of Quercetin

Monireh Abbassi[1], Shirin Goudarzi[1], Samad Nejad Ebrahimi[1,*]

[1] *Department of Phytochemistry, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*
E-mail: s_ebrahimi@sbu.a.cir

ARTICLE INFO

Keywords:
Quercetin
Nanoliposome
Thin film layer hydration
Nano spray drying

ABSTRACT

Quercetin, a bioflavonoid polyphenolic phytochemical, possesses inherent anti-inflammatory and antioxidant properties. However, it faces limitations such as low solubility and bioavailability. One highly effective drug delivery system is nanoliposomes. The main objective of this study was to create quercetin-loaded liposomes using the thin film layer hydration method, with a lecithin base. The incorporation of quercetin into nanoliposomes aimed to enhance its physicochemical properties and release rate. Additionally, a second coating of pectin, a natural polymer, was applied to the quercetin-loaded nanoliposomes to improve their physicochemical stability. The nano lipid-based particles were evaluated for product yield, encapsulation efficiency, loading capacity, particle size, and in vitro release under dermal conditions; the resulting values of 63.51%, 92.5 ± 0.42%, 5.24 ± 0.15% and153.5-174.5 nm were found to be standard characterized values respectively. Fourier Transform Infrared Spectroscopy (FTIR) results confirmed the interaction between quercetin and the phospholipid bilayers. Scanning electron microscopy (SEM) images showed the produced liposome had a regular spherical shape. It is hypothesized that the liposomal formulations containing quercetin provide sustained release of the drug at the site of lesions.

References

1. Cong L, Wang J. Toxicology of the antioxidant vitamin E. *Z. Lebensm. Unters. Forsch.* 2023; 19(4): 39-42.

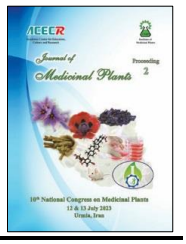
2. Mozaffarian V. A dictionary of Iranian plant names. Tehran: Farhang Moaser. 2022, 361-363.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 416

Assessing the Effectiveness of Tannin-Rich Herbal Supplements in Preventing Calf Diarrhea

Samad Nejad-Ebrahimi1, Reza Zadali[2], Monireh Mehrabi[3], Matin Jafar-Aghaee[3], Mohsen Farzaneh[*,4]

[1] *Department of Phytochemistry, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*
[2] *Department of Pharmacognosy, Faculty of Pharmacy, Islamic Azad University, Damghan Branch, Iran*
[3] *Sepahan Foudeh Milk and Meat Company, Esfahan, Iran*
[4] *Department of Agriculture, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran*
E-mail: m_farzaneh@sbu.ac.ir

ARTICLE INFO

Keywords:
Tannins-rich plants
Calf diarrhea
Prevention
Herbal supplement formulations

ABSTRACT

Diarrhea poses a significant health challenge for dairy calves [1]. Traditional chemical agents have been widely used for prevention and treatment, but due to the rise in antibiotic resistance, there is a growing interest in exploring alternative natural methods [3]. This study investigates the efficacy of four herbal supplement formulations (HBs) containing oak fruit, oleaster fruit, sumac fruit, and pomegranate peel. The HB formulations, namely HB1 (40% oak fruit, 45% oleaster fruit, 0% sumac fruit, 15% pomegranate peel), HB2 (40% oak fruit, 45% oleaster fruit, 15% sumac fruit, 0% pomegranate peel), HB3 (0% oak fruit, 45% oleaster fruit, 15% sumac fruit, 40% pomegranate peel), and HB4 (0% oak fruit, 45% oleaster fruit, 40% sumac fruit, 15% pomegranate peel), were prepared. Calves were administered 30 g of HBs per day to assess their effectiveness in preventing diarrhea. The total phenol content of HB1, HB2, HB3, and HB4 was found to be 1379, 1577, 1389, and 1378 mg/100 g products, respectively. Similarly, the total tannin content in HB1, HB2, HB3, and HB4 was determined as 306, 320, 322, and 305 mg/100 g product, respectively. The administration of HBs resulted in a significant reduction (75-85%) in the incidence of diarrhea among the calf population. Furthermore, HBs showed a positive effect on calves' daily weight gain and increased the height of the withers. There was also a significant reduction in stool and health scores among calves that received HBs. The phenolic and tannin compounds in HBs were believed to inhibit diarrhea-causing microbes and parasites and act as astringent agents.

References

1. Mukarram, M., Khan, M.M.A., Uddin, M. and Corpas, F.J., Irradiated chitosan (ICH): An alternative tool to increase essential oil content in lemongrass (*Cymbopogon flexuosus*). *Acta Physio. Plantarum*, 2022; 44: pp.1-15.

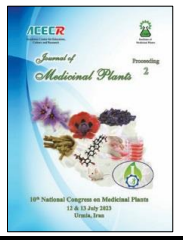
2. Kiani HS, Ali A, Zahra S, Hassan ZU, Kubra KT, Azam M, Zahid HF, Phytochemical Composition and Pharmacological Potential of Lemongrass (Cymbopogon) and Impact on Gut Microbiota. *Applied Chem*. 2022; 2: 229-246.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 417

Bio fabrication of AgNPs with dandelion extract and Acetylcholinesterase inhibitory activities

Soheil Yousefzadeh-Valendeh[1], Mohammad Fattahi [1 *], Behvar Asghari[2], Zeinab Alizadeh[1]

[1] *Department of Horticulture, Faculty of Agriculture, Urmia University, Urmia, Iran*
[2] *Department of Horticultural Sciences Engineering, Faculty of Agriculture and Natural Resources, Imam Khomeini International University, Qazvin, Iran*
Email: mohamadfattahi@yahoo.com

ARTICLE INFO

Keywords:
Green synthesis
Autoimmune diseases
Taraxacum officinale

ABSTRACT

Autoimmune diseases are one of the most important diseases of the nervous system that affect human health. One of the causes of this disease is the acetylcholinesterase enzyme present in the synaptic clefts of the central and peripheral nervous system, which leads to the hydrolysis of acetylcholine. It disrupts the transmission of nerve messages, which is the cause of many neurological diseases such as mesenchymal gravis and Alzheimer's disease (1). Green synthesis is one of the modern and growing methods of producing nano products in recent decades, which has received attention due to its positive role in preserving the environment and human health. In this method, nanoparticles are synthesized using plant extracts and micro-organisms, which are considered due to their medicinal metabolites such as flavonoids, phenolic acids, tannins, alkaloids and terpenoid compounds. These compounds play an important role as stabilizing and reducing agents in the synthesis and formation of green nanoparticles. *Taraxacum officinale* is an herbaceous perennial plant that belongs to the Asteraceae family. It has medicinal metabolites including carotenoids, flavonoids, phenolic acids, polysaccharides, sterols, and triterpenoids (2). Dandelion leaf extract has many biological properties such as: liver protector, anti-viral, anti-bacterial, anti-fungal, anti-cancer, anti-atheistic, anti-obesity, and anti-inflammatory. Nanoparticles synthesized by dandelion extract were confirmed by FTIR, XRD, SEM and UVvisible. In concentrations of 2 and 4 mg/ml, they have 30% and 48% inhibitory properties, respectively.

References

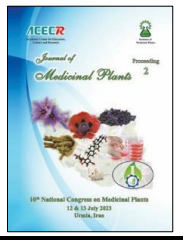
1. Marucci, G., Buccioni, M., Dal Ben, D., Lambertucci, C., Volpini, R., & Amenta, F. (2021). Efficacy of acetylcholinesterase inhibitors in Alzheimer's disease. *Neuropharmacology*, 190, 108352.
2. Astafieva, A.A., Enyenihi, A.A., Rogozhin, E.A., Kozlov, S.A., Grishin, E.V., Odintsova, T.I., Zubarev, R.A., Egorov, T.A., 2015. Novel proline-hydroxyproline glycopeptides from the dandelion (*Taraxacum officinale* Wigg.) flowers: de novo sequencing and biological activity. *Plant Science* 238, 323-329.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 418

Phytochemical diversity of dandelion (*Taraxacum officinale*) Flowers collected from west Azerbaijan of Iran

Soheil Yousefzadeh-Valendeh[1], Mohammad Fattahi [1,*], Behvar Asghari[2], Zeinab Alizadeh[1]

[1] *Department of Horticulture, Faculty of Agriculture, Urmia University, Urmia, Iran*
[2] *Department of Horticultural Sciences Engineering, Faculty of Agriculture and Natural Resources, Imam Khomeini International University, Qazvin, Iran*
Email: mohamadfattahi@yahoo.com

ARTICLE INFO

Keywords:
Taraxacum officenael
Total phenol
total flavonoid
antioxidant

ABSTRACT

The dandelion flower with the scientific name *Taraxacum officinale* is an herbaceous perennial weed from the Asteraceae family that is native to Asia, Europe and North America, which is mostly seen in China, the Middle East, Romania and Central European countries. The leaves, roots and flowers of this plant have a wide range of antioxidant and medicinal compounds such as flavonoids and phenolic acids (1). The plant materials were collected from 12 regions of western and northwestern Iran and the results showed that the amount of total phenol in the range of 5.39- 37.81 mg GAE/g DW, the lowest and highest amount of which is related to Sento Road and Rouzeh chai region in Urmia, total flavonoid in the range of 3.35- 20.32 mg rutin/g DW, the lowest and highest amount of which is related to Jadeh Sento, Barandoz-chai area and Rozeh-chai area are in Urmia, and the amount of antioxidants in the plants collected from Rozeh-chai area in Urmia city have the highest amount of antioxidants in fact, identification of plant variety is an important and fundamental method for breeding program and cultivation studies in related of medicinal plants.

References

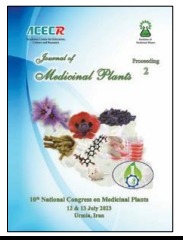
1. Astafieva, A.A., Enyenihi, A.A., Rogozhin, E.A., Kozlov, S.A., Grishin, E.V., Odintsova, T.I., Zubarev, R.A., Egorov, T.A., 2015. Novel proline-hydroxyproline glycopeptides from the dandelion (*Taraxacum officinale* Wigg.) flowers: de novo sequencing and biological activity. *Plant Science* 238, 323-329

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 419

The effects of marmarin and salicylic acid on morphological and physiological traits of (*Ocimum basilicum* L.) under salt stress

Sakineh Behrouzi[1,]*, Asghar Ebrahimzadeh

[1] *Department of Horticultural Science, Faculty of Agriculture, Urmia University, Urmia, Iran*
[2] *Department of Horticultural Science, Faculty of Agriculture, University of Maragheh, Maragheh, Iran*
E-mail: s.behrouzi@urmia.ac.ir

ARTICLE INFO

Keywords:
Medicinal plants
Seaweed
Secondary metabolites
Abiotic stress
Growth regulator

ABSTRACT

In order to investigate the effects of different levels of salinity stress and the application of marmarin seaweed and salicylic acid on the morphological and physiological traits of basil plant (*Ocimum basilicum* L.), a factorial experiment based on a completely randomized design with 5 treatments and 3 replications was carried out in greenhouse conditions. The first factor includes different levels of salinity stress (including three levels of 0, 50 and 100 mM/L) and the second factor includes T1 (50 mM salicylic acid), T2 (100 mM salicylic acid), T3 (1.5 ml of marmarin), T4 (2.5 ml of marmarin). The studied traits included morphological indices (chlorophyll index, plant height, fresh and dry weight of shoot, fresh and dry weight of root) and some physiological indices including photosynthetic pigments, total protein, proline, carbohydrate, percentage and yield of essential oil. The results showed that with increasing salinity stress, morphological traits such as (plant height, fresh and dry weight shoot and root) and some physiological traits such as carbohydrate index, protein index, chlorophyll index, chlorophyll a, chlorophyll b, total chlorophyll a and b, carotenoid and essential oil percentage and yield decreased compared to the control. On the other hand, proline values increased significantly with increasing salinity level compared to the control.

References

1. Caliskan, O., Kurt, D., Temizel, K. E., & Odabas, M. S. Effect of salt stress and irrigation water on growth and development of sweet basil (*Ocimum basilicum* L.). *Open Agriculture*, 2017; 2(1): 589-594.

2. SILVA, H., NETO, A. A., MENEZES, R., SILVA, P., & GHEYI, H. Use of hydrogen peroxide in acclimation of basil (*Ocimum basilicum* L.) to salt stress. *Turkish Journal of Botany*, 2019; 43(2): 208-217.

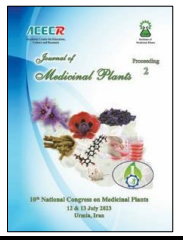
3. Zeeshan, M., Lu, M., Sehar, S., Holford, P., & Wu, F. Comparison of biochemical, anatomical, morphological, and physiological responses to salinity stress in wheat and barley genotypes deferring in salinity tolerance. *Agronomy*, 2020; 10(1): 127.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 420

The effect of plant density on the essential oil content of *Nepeta crispa* in different harvest times

Faeze Sayadi[1], Mahdi Ayyari[1*], Ali Mokhtassi-Bidgoli[2]

[1] *Department of Horticultural Science, Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran*
[2] *Department of Agronomy, Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran*
E-mail: mahdiayyari@gmail.com

ARTICLE INFO

Keywords:
Nepeta crispa
Essential oil
Lamiaceae
Hydrodistillation

ABSTRACT

Moffarah (*Nepeta crispa* Willd.) is a member of the Lamiaceae family and an endemic and threatened medicinal and aromatic plant native to western Iran, especially Hamedan [1]. Apart from medicinal properties such as anti-asthmatic, expectorant, and antiseptic, aerial parts of *N. crispa* have been used traditionally in forms of beverages and infusions as sedative and relaxant tonics and as an herbal treatment for respiratory disorders [2]. A previous study revealed that the highest essential oil (EO) content of wild samples of *N. crispa* was 2.09% [3]. An experiment was conducted for two consecutive harvest time to investigate the effect of plant density (18, 27, 36, 45 and 54 plants m-2) on the EO content (%) of Moffarah. The EO was obtained by hydrodistillation of the aerial parts of the plants and the EO content was determined (v/w %). The plant density had no significant effect on the EO content. However, the impact of harvest time was significant at the 1% level and the EO content of the second and first harvests was 2% and 1.2%, respectively. In the second harvest, due to the expansion of the root system, water and nutrient uptake became higher and, consequently, the quantity of EO has increased. The EO content in *N. crispa* is directly correlated with the height above sea level; However, in this study, a considerable percentage of essential oil was obtained from planting Moffarah at a much lower elevation (1275 meters above sea level) than the natural habitat (3021 meters above sea level).

References

1. Ali T, Javan M, Sonboli A, Semnanian S. Antinociceptive and anti-inflammatory activities of the essential oil of *Nepeta crispa* Willd. in experimental rat models. *Natural Product Research*. 2012; 26(16), 1529-1534. doi: 10.1080/14786419.2011.565284.

2. Ranjbaran P, Moradkhani S. Iron chelating activity of *Nepeta crispa* willd., An endemic plant in the west of iran. *Avicenna J Med Biochem*. 2022; 10(1):65-70. doi:10.34172/ajmb.2022.09.

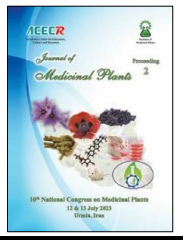
3. Karami M, Ebadi MT, Ayyari M. Investigation of changes in the quantity and quality of the essential oil of *Nepeta crispa* Willd. in different natural agrohabitats. *Ecophytochemistry journal of Medicinal Plants*. 2019; 8(2), 1-12.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 421

The effect of eight weeks high-intensity interval training and curcumin supplementation on gene expression of some effective factors in mitochondrial biogenesis in middle-aged wistar rats.

Behrouz Baghaiee

[1] *Department of Sport science, Aras Branch, Islamic Azad University, Jolfa, Iran*
E-mail: Behrouz_phsport@yahoo.com

ARTICLE INFO

Keywords:
Curcumin
Interval training
Mitochondrial biogenesis

ABSTRACT

Aging and inactivity are associated with some heart failure and the possibility of increasing cardiovascular diseases (1-2). Therefore, the aim of this study was to investigate the effect of eight weeks of intense interval training and curcumin consumption on PGC-1α and ERR-α gene expression in middle-aged rats. In this experimental study, 28 middle-aged male rats were randomly divided into four groups of; training, supplement, control, and training with supplement. Interval training in two groups of training alone and training with supplements included eight weeks of 4-minute activity with an intensity of 85-90% VO2max. Curcumin was also used at 100 mg/kg. Expression of mitochondrial PGC-1α and ERR-α gene was obtained using Real-time PCR method. Statistical analyzes showed a significant increase in the expression of PGC-1α and ERR-α genes in the training and training and supplement groups compared to the control and supplement groups (P=0.001). There was no significant difference between the control and supplement groups. Interval training alone and in interaction with curcumin increased the expression of ERRα and PGC-1α in the heart tissue of rats. It seems that interval training and curcumin consumption can be a good way to increase mitochondrial biogenesis and improve heart function.

References

1. LIPPI, Giuseppe; SANCHIS-GOMAR, Fabian. An estimation of the worldwide epidemiologic burden of physical inactivity-related ischemic heart disease. *Cardiovascular Drugs and Therapy*, 2020, 34: 133-137.

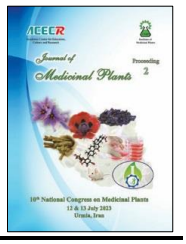
2. DAVINELLI, Sergio, et al. Polyphenols as caloric restriction mimetics regulating mitochondrial biogenesis and mitophagy. *Trends in Endocrinology & Metabolism*, 2020, 31.7: 536-550.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 422

Effect of phenylalanine foliar application on some phytochemicals and antioxidant activity of Moldavian balm (*Dracocephalum moldavica* L.)

Zahra Imani Zeraatkar[1], Abolfazl Alirezalu[1,*], Parviz Noruzi[1]

[1] *Department of Horticulture, Faculty of Agriculture, Urmia University, Urmia, Iran*
E-mail: a.alirezalu@urmia.ac.ir

ARTICLE INFO

Keywords:
Phenylalanine
Antioxidant activity
Phenolic compounds
Moldavian balm

ABSTRACT

The soilless or hydroponic system has become one of the main cultivation systems among the various techniques used in horticulture due to the problems in soil cultivation. Moldavian balm (*Dracocephalum moldavica* L.) is a medicinal plant belongs to the Lamiaceae family, which is used as stomachic, sedative and healing of wound. The use of elicitors is very important to increase the production content of secondary metabolites in medicinal plants. In order to investigate the effects of foliar application of phenylalanine, a study was conducted on completely randomized design with three replications in the DFT cultivation system in the research greenhouse of Urmia University. The experimental treatment included 5 concentrations of phenylalanine (0, 5, 10, 20, 40 mM) in to time stages. According to the results, phenylalanine treatment had a significant effect on many of the studied traits including chlorophyll a and b, carotenoid, total phenol and flavonoid and antioxidant activity. The highest amount of total phenol, flavonoid and total antioxidant content was observed in 5 mM phenylalanine treatment. Also, the highest levels of chlorophyll a and b and carotenoids were obtained at concentrations of 10 and 40 mM. Therefore, the use of phenylalanine is recommended to improve physiological indicators.

References

1. Mar, C.W. 1994. Hydroponic systems. Kansas state university agricultural experiment station and cooperative extension service. Pp. 1-7

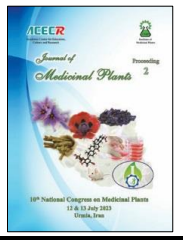
2. Neumann, K., Kumar, A, and Imani, J., 2009. Plant cell and tissue cultire-a too in biotechnology, principles and practice: Springer-Verlag, Berlin, Heidelberg. 333p.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 423

Effect of foliar application of nickel and γ-aminobutyric acid (GABA) on phytochemicals and photosynthetic pigments of *Cannabis sativa*

Fatemeh Khoshnavazi[1], Abolfazl Alirezalu[1,*], Jalal Khorshidi[2], Masume Hasanalizade[3]

[1] *Department of Horticultural Sciences, Faculty of Agriculture, Urmia University, Urmia, Iran*
[2] *Department of Horticultural Science and Engineering, University of Kurdistan*
[3] *Department of Agriculture, Group of Soil Science, PhD Student, Urmia University, Iran*
E-mail: a.alirezalu@urmia.ac.ir

ARTICLE INFO

Keywords:
Cannabis
Nickel
GABA

ABSTRACT

In the present study, a pot experiment was used in order to evaluate the effects of foliar application nickel and γ-aminobutyric acid on total phenol (TPC) and flavonoids (TFC) and photosynthetic pigments of *Cannabis sativa* in leaf organ, based on factorial completely randomized design (FCRD). Treatments consisted of 4 different concentrations of nickel nitrate, including 0 (control), 0.156, 0.234, 0.312 g L^{-1} and 4 levels of 0, 5, 10 and 20 mM of GABA in three replications. The foliar application of the different concentrations of nickel and γ-aminobutyric acid was performed in three stages. The highest content of total phenols was recorded in concentration of 5 mM GABA and 0.312 g L^{-1} nickel. Also, the highest content of total flavonoid was obtained in concentration of 10 mM GABA and 0.312 g L^{-1} nickel. The considerable variations in the photosynthetic pigments were demonstrated by different treatments. The highest amount of Cl a and Cl b were obtained in the in concentration of 10 mM GABA and 0.234 g L^{-1} nickel. Also, the highest content of total carotenoid was obtained in concentration of 20 mM GABA and control treatment of nickel. Therefore, application of appropriate concentrations of GABA and nickel element can improve the polyphenolic contents and photosynthetic pigments of *C. sativa*.

References

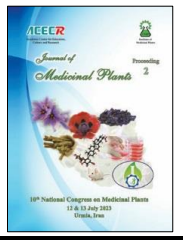
1. Alirezalu, A.; Salehi, P.; Ahmadi, N.; Sonboli, A.; Aceto, S.; Maleki, H. H.; Ayyari, M. *Int. J. Food Prop*. 2018, 21, 452-470.
2. Chang, Q.; Zuo, Z.; Harrison, F.; Chow, M.S. S. *J. Clin. Pharmacol*. 2002, 42, 605-612.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 424

Improving phytochemical properties of lemon balm using different $NH4^+$ to NO_3^- ratios under DWC system

Farzad Safaei[1], Abolfazl Alirezalu[1,*], Parviz Noruzi[1]

[1] *Department of Horticultural Sciences, Faculty of Agriculture, Urmia University, Urmia, Iran*
E-mail: a.alirezalu@urmia.ac.ir

ARTICLE INFO

Keywords:
Lemon balm
Polyphenolic contents
DWC system

ABSTRACT

Lemon balm (*Melissa officinalis* L.), a perennial herbaceous plant is an edible and medicinal herb belong to the Lamiaceae family. Nitrogen is one of the most important nutrients that affects the growth, development, yield and quality of plants. The current study aimed to improving phytochemical properties of lemon balm (*Melissa officinalis*) using different NH_4^+ (ammonium) to NO_3^-(nitrate) ratios (0:100, 25:75, 50:50, 75:25 and 100:0) under deep water culture (DWC) system. The highest total phenolics (60.40 mg GAE/g DW), flavonoid (12.97 mg QUE/g DW), chlorophyll a (31.32 mg/100g DW), carotenoids (83.06 mg/100g DW) contents were observed in plants that supplied with 0 NH_4^+:100 NO_3^-ratio. The highest antioxidant activity by both DPPH (37.39 AA µg/mL) and FRAP (69.55 mM Fe^{++}/g DW) methods was obtained in 75 NH_4^+:25 NO_3^-treatment. The results of current study suggests that the management of $NH4^+$ to NO_3^- ratios in nutrient solutions could contribute to improve growth, physiological and phytochemical properties of *M. officinalis*.

References

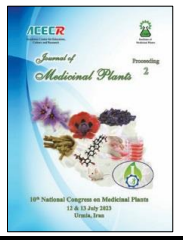
1. Mar, C.W. 1994. Hydroponic systems. Kansas state university agricultural experiment station and cooperative extension service. Pp. 1-7.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 425

The study of essential oil composition and biological properties of fennel (*Foeniculum vulgare*)

Masoumeh Najafpoor[1], Sona Behrouzi-zad[1], Zahra Akbari[2], Abolfazl Alirezalu[1,*]

[1] *Department of Horticultural Sciences, Faculty of Agriculture, Urmia University, Urmia, Iran*
[2] *Department of Horticulture, Science and Research Branch, Islamic Azad University*
E-mail: a.alirezalu@urmia.ac.ir

ARTICLE INFO

Keywords:
Fennel
Phytochemical analysis
Biological properties
Essential oil

ABSTRACT

Fennel is a plant with the scientific name *Foeniculum vulgare* species that belong to the Apiacea family. In the research for a suitable alternative for pesticides, fungicides, herbicides, chemical bactericides, the phytochemical and biological properties of fennel plant essential oils were investigated and tested. The analysis of fennel seeds essential oil by gas chromatography showed that main constituents are anethole (58.01%) and fenchone (20.03%). The antibacterial properties of the fennel essential oil at different concentrations on the two bacterial strains Escherichia coli and Staphylococcus aureus showed that the most significant inhibitory effect of growth zone the concentration of 2000 µl / L observed in both bacteria. The antifungal effect of essential oil on fennel in control of Botrytis cinerea and Aspergillus niger at different concentrations showed that the most significant inhibitory effect of mycelium growth on Botrytis cinerea was 85.37%, and for Aspergillus niger was 88.49%. To determine the insecticidal effects (LC90, LC50) of essential oil on respiratory toxicity, insect mortality assessed at three different time points after the start of the experiment. The results showed that in respiratory toxicity, the essential oil of fennel in high concentrations and in the last hour (highest essential oiling time) caused the highest mortality rate in the beetle and weevil beetle. In general, it can be expressed that the essential oil of fennel can be a good selection in biological control for these activities because of the high number of effective substances with biological properties.

References

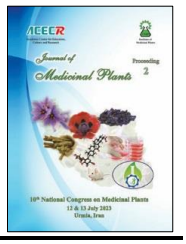
1. Esra Y. et al. "Chemical composition and antimicrobial activity of *Foeniculum vulgare* Mill. essential oil." Facta Universitatis, Series: *Physics, Chemistry and Technology* 16.1 (2018): 146.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 426

Beneficial effects of *Lippia citriodora* essential oil on postharvest quality and shelf life of *Citrus sinensis* cv. Thomson Navel fruit

Houshmand Sharafi[1], Elham Rezaie[2], Nashmil Farhadi[3], Abolfazl Alirezalu[4,*]

[1] *Department of Food Hygiene and Quality Control, Faculty of Veterinary Medicine, Urmia University, Urmia, Iran*
[2] *Department of Plant Protection, Faculty of Agriculture, Urmia University, Urmia, Iran*
[3] *Department of Biosystem Engineering, Urmia University, Urmia, Iran*
[4] *Department of Horticultural Sciences, Faculty of Agriculture, Urmia University, Urmia, Iran*
E-mail: a.alirezalu@urmia.ac.ir

ARTICLE INFO

Keywords:
Citrus sinensis
Shelf life
Nano-emulsion
Lemon verbena

ABSTRACT

Citrus fruit due to its high content of bioactive and excellent organoleptic properties is very popular among consumers worldwide [1]. *Lippia citriodora* essential oil nano-emulsion (LEN) was investigated for postharvest preservation of *Citrus sinensis cv.* Thomson Navel fruit. LEN containing control, 0.25%, 0.5%, 0.75%, 1%, 1.5% and 2% of *L. citriodora* essential oil was used as treatments. Change in total phenol content (TPC), total flavonoid contents (TFC), tannin content (TTC) and antioxidant activity (AA) by DPPH assay of fruits stored at cold condition were studied on different days of analysis during the 100-day storage period. A considerable increases in TPC was noted in the 0.5% LEN treated sample on 60th of storage than other samples. At the end of storage 0.75% LEN treated sample had the highest TFC and TTC. During storage time the sample treated with 1% LEN showed better AA than control. The experimental results investigated in this study suggested that the LEN nano-emulsion preserved chemical quality related of *Citrus* fruit during storage as well as extended shelf life. In conclusion, LEN can be used as a bio-preservative and environment-friendly material for fruit preservation.

References

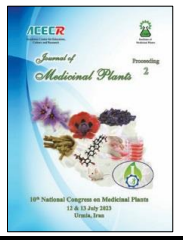
1. Hu, L., Yang, C., Zhang, L., Feng, J., & Xi, W. Effect of Light-Emitting diodes and ultraviolet irradiation on the soluble sugar, organic acid, and carotenoid content of postharvest sweet oranges (*Citrus sinensis* (L.) Osbeck). *Molecules*. 2019; 24(19), 3440.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 427

Effect of lemon verbena essential oil on biochemical and antioxidant properties of *Punica granatum* cv. Malas Saveh

Abolfazl Alirezalu[1*], Sobhan Vakili[1], Sonia Khorshidi[2], Fatemeh Zanbili[3]

[1] *Department of Horticultural Sciences, Faculty of Agriculture, Urmia University, Urmia, Iran*
[2] *Department of Food Hygiene and Quality Control, Faculty of Veterinary Medicine, Urmia University, Urmia, Iran*
[3] *Department of Organic Chemistry, Faculty of Chemistry, Urmia University, Urmia, Iran*
E-mail: a.alirezalu@urmia.ac.ir

ARTICLE INFO

Keywords:
Postharvest
Shelf life
Nano-emulsion
Essential oil
Antioxidant activity

ABSTRACT

Pomegranate (*Punica granatum* L.) is an important crop in world and particularly in Iran from a health point of view. The pomegranate is affected by several pathogenic fungi (such as gray and blue molds, dry and soft rots) during postharvest and shelf-life phases. The development of encapsulation of essential oils (EOs) by nano-emulsions can help overcome these problems during storage. In the present study, nano-emulsion based on *L. citriodora* essential oil was prepared using probe ultrasonic method in various concentrations (0, 250, 500, 750, 1000, 1500 and 2000 µL/L) and used as an edible coating to increase the shelf life of pomegranate fruit. Quality parameters including, antioxidant activity (by DPPH assay), total phenolic (TPC), flavonoid (TFC) and total tannin (TTC) were measured throughout 80 days of storage at 4 ◦C. The findings of present study revealed that the highest antioxidant activity and TTC on 20th and 80th days at concentration of 250 µL/L, were observed. Also, the highest TPC and TFC were recorded at 2000 µL /L on 20th days. This research confirms the conversion of the lemon verbena essential oil into nano-emulsion improved antioxidant activity. Therefore, this study presents an innovative approach that utilizes the antimicrobial and antioxidant properties of *L. citriodora* essential oil to enhance the postharvest quality of pomegranate fruits.

References

1. Yazgan H, Ozogul Y, Kuley E. Antimicrobial influence of nanoemulsified lemon essential oil and pure lemon essential oil on food-borne pathogens and fish spoilage bacteria. *Int. J. Food Microbiol*. 2019; 306(July).

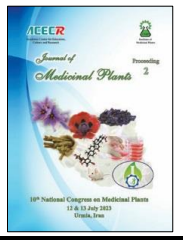
2. Meng FB, Gou ZZ, Li YC, Zou LH, Chen WJ, Liu DY. The Efficiency of Lemon Essential Oil-Based Nanoemulsions on the Inhibition of *Phomopsis* sp. and Reduction of Postharvest Decay of Kiwifruit. *Foods*. 2022;11(10).

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 428

Effect of natural melatonin phytohormone on some phytochemical contents and antioxidant activity of *Citrus sinensis* cv. Thomson Navel fruit during cold storage

Abolfazl Alirezalu[1*], Sevda Mojarab Gushchi[1], Negar Mortazavi[2], Raana Jangi[1]

[1] *Department of Horticultural Sciences, Faculty of Agriculture, Urmia University, Urmia, Iran*
[2] *Department of Food Hygiene and Quality Control, Faculty of Veterinary Medicine, Urmia University, Urmia, Iran*
E-mail: sevdamojarab7572@gmail.com

ARTICLE INFO

Keywords:
Melatonin
Antioxidant
Total tannin
Postharvest

ABSTRACT

The exogenous application of melatonin as a new phytohormone in reducing senescence caused by oxidative stress, improving storage, physiological, and phytochemical quality of citrus fruits after harvest has been considered [1]. The objective of this study was to investigate the effect of different concentrations of melatonin (0, 250- 500, 750, 1000, and 1500 µM) on antioxidant activity (by DPPH assay) and some phytochemical properties of *Citrus sinensis* cv. Thomson Navel fruit during 100 days of storage at 4 ˚C. According to the results, the highest antioxidant activity was observed on the 60th day of storage at a concentration of 250 µM melatonin. In the case of total tannin, total phenol, and flavonoid content, the highest amount was related to days 80, 20, and 80, and concentrations of 500 µM, 1500 µM, and 1000 µM of melatonin, respectively. As a conclusion, the results from this study highlight the beneficial effects of melatonin on the antioxidant capacity and maintains the phytochemical characteristics of fruits during shelf life.

References

1. Xu T, Chen Y and Kang H. Melatonin is a potential target for improving post-harvest preservation of fruits and vegetables. *Frontiers in Plant Science*. 2019, 10: 1388.

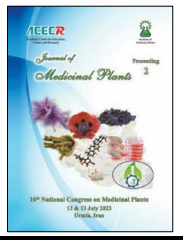
2. Ma Q, Lin X, Wei Q, Yang X, Zhang Y. N and Chen J. Melatonin treatment delays postharvest senescence and maintains the organoleptic quality of 'Newhall'navel orange (*Citrus sinensis* (L.) *Osbeck*) by inhibiting respiration and enhancing antioxidant capacity. *Scientia Horticulturae*. 2021, 286: 110236.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 431

Antioxidant activity and phenolic contents of some native medicinal plants from Urmia (West Azerbaijan province)

Nashmil Farhadi[1], Mahya Dolatkhah-Bache Jik[2], Sadaf Seyed-Najafi[2], Abolfazl Alirezalu[2,*]

[1] *Department of Biosystem Engineering, Urmia University, Urmia, Iran*
[2] *Department of Horticultural Sciences, Faculty of Agriculture, Urmia University, Urmia, Iran*
E-mail: a.alirezalu@urmia.ac.ir

ARTICLE INFO

Keywords:
Phenolics
Antioxidant activity
Lamiaceae

ABSTRACT

Recently, scientific interest in secondary metabolites of native medicinal plants has burgeoned. Different endemic and native medicinal herbs are rich sources of biologically-active substances such as phenolic compounds and antioxidants. In the present study, antioxidant activity (AA), total phenol (TPC) and flavonoid (TFC) contents and total tannin (TTC) of some native medicinal plants of urmia region (W Azerbaijan) including *Lamium purpureum*, *Nepeta cataria*, and *Salvia multicaulis* were assessed. Antioxidant capacity and total phenolic, flavonoid and tannin contents of the studied species were conducted by DPPH assay, Folin–Ciocalteu, aluminum chloride reagents, and vanillin reagent respectively. The species collected from Urmia region had high levels of phenolic compounds and antioxidant activity. The highest total phenolic (128.55 mg GAE g-1 DW), flavonoid contents (43.18 mg Qu/g DW), tannin content (14 mg/g DW) were obtained in *Salvia multicaulis*. As well as, highest antioxidant capacity in both assays DPPH (89.25 %) was reported in *Salvia multicaulis*. The obtained results can provide new natural antioxidant resources for using in food and pharmaceutical industries.

References

1. Porte, A., Godoy, R. L. O. and Maia-Porte, L. H. (2013). Chemical composition of sage (*Salvia officinalis* L.) essential oil from the Rio de Janeiro State (Brazil). *Revista Brasileira de Plantas Medicinais*, 15, 438-441.

2. Lu, Y. and Foo, L. Y. (2000). Flavonoid and phenolic glycosides from *Salvia officinalis*. *Phytochemistry*, 55(3), 263-267.

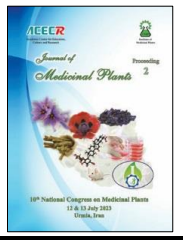
3. Vidović, S., Cvetkovic, D., Ramić, M., Dunjić, M., Malbaša, R., Tepić, A., Šumić., Z., Velićanski., A. and Jokić, S. (2013). Screening of changes in content of health benefit compounds, antioxidant activity and microbiological status of medicinal plants during the production of herbal filter tea. *Industrial Crops and Products*, *50*, 338-345.

Institute of Medicinal Plants

National Research and Technology Network of Medicinal Plants

10th National Congress on Medicinal Plants

12 & 13 July 2023
Urmia, Iran



Poster Presentation ID: 437

Analysis of apoptosis induced of *Cuscuta epithymum* extract on esophageal squamous cell carcinoma cell line

Mehdi Hashemi[1], Alireza Panahi[1], Gholamreza Dadashi Oranj[2], Rahim Nosrati[3,*]

[1]*Biology Department, Science Faculty, University of Mohaghegh Ardabili, Ardabil, Iran*
[2]*Cellular and Molecular Biology, Faculty of Natural Sciences, University of Tabriz, Tabriz, Iran*
[3]*Cellular and Molecular Research Center, School of Medicine, Guilan University of Medical Sciences, Rasht, Iran*
E-mail: nosratirahim@gmail.com

ARTICLE INFO

Keywords:
Esophageal cancer
Cuscuta epithymum
Apoptosis
Cytotoxicity
MTT

ABSTRACT

Esophageal cancer is the eighth most commonly diagnosed cancer and is the sixth leading cause of cancer death worldwide (1). The antitumor effects of medicinal plants have been shown as a therapeutic strategy to control and treat various cancers, including esophageal cancer. Recently, the antitumor properties of *Cuscuta epithymum* has been reported (2). This study aimed to evaluate *in vitro* anticancer effects of *C. epithymum* extract on the survival and apoptosis of esophageal cancer cell line. In the present study, the esophageal cancer cell line (Kyse30) was treated with concentrations of 50, 100, 200, 400, 600, 800, and 1000 µg/ml of the hydroalcoholic extract of *C.epithymum* for 24 h. Then, cell viability and apoptosis were evaluated by MTT and Propidium Iodide (PI) staining methods and sub-G1 peak analysis. The results showed that the hydroalcoholic extract of *C.epithymum* could decrease the viability of kyse30 cells in a dose-dependent manner. IC_{50} of *C.epithymum* extract was obtained 664 µg/ml for kyse30 cells. The results also showed that increasing the concentration of hydroalcoholic extract of *C.epithymum* enhanced the percentage of apoptotic cells compared to untreated cells. The present study indicated the cytotoxicity of the hydroalcoholic extract of *C.epithymum* against kyse30 cancer cells *in vitro*. Further *in vivo* studies and investigating the mechanism of action of this extract are recommended.

References

1. Liu CQ, Ma YL, Qin Q, Wang PH, Luo Y, Xu PF, et al. Epidemiology of esophageal cancer in 2020 and projections to 2030 and 2040. *Thoracic Cancer*. 2023;14(1):3-11.

2. Chabra A, Monadi T, Azadbakht M, Haerizadeh SI. Ethnopharmacology of Cuscuta epithymum: A comprehensive review on ethnobotany, phytochemistry, pharmacology and toxicity. *Journal of Ethnopharmacol*. 2019;231:555-69.

معاونت علمی و فناوری ریاست جمهوری
ستاد توسعه علوم و فناوری
گیاهان دارویی و طب سنتی

شبکه ملی پژوهش و فناوری
گیاهان دارویی

پژوهشکده گیاهان و مواد اولیه
دارویی دانشگاه شهید بهشتی

انجمن گیاهان دارویی ایران (شاخه اصفهان)

دانشکده داروسازی دانشگاه
علوم پزشکی شهید بهشتی

پایگاه استنادی
علوم جهان اسلام

دانشگاه ارومیه

سازمان نظام مهندسی
کشاورزی و منابع طبیعی

جمعیت هلال احمر جمهوری اسلامی ایران
سازمان تدارکات پزشکی
شرکت کشت و صنعت فرآوری گیاهان دارویی سهامیا

پژوهشکده گیاهان دارویی
جهاد دانشگاهی

انجمن علمی دانشجویی باغبانی
دانشگاه ارومیه