EuroSciCon

DAY 1

Special Session

6th Edition of International Conference on

Pharmacognosy and Medicinal Plants

April 16-17, 2018 | Amsterdam, Netherlands

EuroSciCon

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Pedro Medina, Am J Ethnomed 2018, Volume 5
DOI: 10.21767/2348-9502-C1-005

PHARMACOGNOSY AND THE PEACE PROCESS IN COLOMBIA

Pedro Medina

Yo creo en Colombia, Colombia

Statement of the Problem: In 1999 Colombia, the world´s most biodiverse country per square meter and home of 2,400 plants with medical properties, woke up with a picture in the front page of all newspapers. This picture shattered the dream of all Colombians that we were going to finish the year, the century, the millennium in peace. The picture was f the empty seat – when the headof the FARC, the oldest guerrilla group in the world, stood up President Pastrana in the middle of the peace talks. Two weeks later, the picture in the papers was of the earthquake in the coffee zone. The rest of that year was shattered dreams and earthquakes for Colombia. That year we had 80% of the kidnappings in the world. 55% of the terrorist acts in the world happened in Colombia that year. 400,000 Colombians, 1% of the population, left the country. There was a graffiti on the way to the airport which read - "will the last one to leave, please turn off the lights". That year, our economy plummeted. For the first time in written economic history, our GNP decreased - 4.3%. 1,200 companies went bust and Colombia´s best humorist, Jaime Garzón, was shot to death. While all this was happening, I was running McDonald´s and teaching a business strategy class.

I asked my 39 students - "which of you sees yourself in Colombia in 5 years?" Only 12 raised their hands. Unable to sell Colombia to my students, I was perplexed.I then understood that the stories of success which we were told were almost always, foreign. And the local stories were incredibly vivid and terrifying. I realized we lacked local positive models, reasons to be proud, examples, sources of inspiration. One of them is pharmacopsy and how we leverage our biodiversity.

Biography

Pedro Medina is a pioneer in Colombia and Latin America in Asset Based Development, specializing in how to leverage the biodiversity in a sustainable way transforming the huge botanical treasure in medicine, the systems, insights, best practices of nature into solutions for mankind – biomimicry, and the fauna into engaged tourism – bird watching. He leads an NGO called Yo Creo en Colombia and for the past 18 years has created contents which lead to a new discourse in his country. He is part of the board of advisors of Colciencias, the Colombian National Science Institution.

pmedina@yocreoencolombia.com

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Mona Alyedreessy, Am J Ethnomed 2018, Volume 5
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USING ORGANIC MIDDLE EASTERN AND NORTH AFRICAN INGREDIENTS FOR THEIR MEDICAL BENEFITS IN NATURAL HANDMADE COSMETICS

Mona Alyedreessy

Azara Beautique, UK

Azara Beautique is our small family run boutique brand that specializes in handmade and organic hair and skin products. Azara in the Arabic language is the plural for Azraa, which means 'pure and virgin'. We chose this name for our boutique, as we only use the finest extra virgin oils and the purest of raw materials grown in The Middle East and North Africa in our products in order for you to gain the medical benefits that they provide to enhance your health and beauty. The products have secret formulas that have been created according to the 20 years of knowledge and medical experience of my mother Dr. Samira Zaidan, the first Saudi female homeopath and quantum physician. The extensive medical knowledge of the ingredients that are used in our products are what makes them special and effective in our soaps, lotions, balms and creams and we wish to revive and share their traditional uses. Together we have dedicated time and effort travelling across the mountains, deserts and lustrous valleys of Oman, Saudi Arabia, Lebanon, Morocco, the United Arab Emirates and Yemen to find the most inaccessible and rarest jewels; mineral-rich Zamzam water from Makkah, green hojari frankincense from Oman, sidr honey from Yemen are only a few of the refined and pure ingredients used in our products that are all individually and freshly handmade by us with love, passion and care. We take great pride in providing a unique service by creating truly natural products and ensuring that our creams, lotions, shampoos and conditioner in particular are freshly made for each customer, ensuring that they are packed with natural goodness for maximum health benefits. We do not use any chemical preservatives, scents or colours in any of our products.

Biography

Mona Alyedreessy, who is a specialist in the field of sociology, is the Director of Azara Beautique Ltd in London. She has been working in the field of herbs and organic products since 2012. She launched this business after years of experience in research, making and selling products and learning from her mother who is a certified homeopath. Her handmade products are unique, as they contain many rare and special ingredients that contain many medical benefits and are all organically grown and found in North Africa and The Middle East.

mona.alyedreessy@gmail.com

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Scientific Tracks & Abstracts

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Sessions

Complementary and Alternative Medicine Phytochemistry | Pharmacognosy | Natural Products of Medicinal Interest | Traditional Medicine Ethnopharmacology |Toxicological Studies of Plant Products | Natural Products in Medicines | Applications of Natural Products

Session Chair
Nikola Kovinich
West Virginia University, USA

Session Chair
Rajasekaran Aiyalu
KMCH College of Pharmacy, India

Session Introduction

Title: **Foxglove: The poison and the antidote**
Samira H Zaidan, Zaidan Clinic, UK

Title: **Enhancing the regulation of phytoalexin biosynthesis in plants**
Nik Kovinich, West Virginia University, USA

Title: **Formulation and evaluation of novel herbal aerosol for arthritis**
Rajasekaran Aiyalu, KMCH College of Pharmacy, India

Title: **Determining the level of substitution in herbal products containing *Harpagophytum* spp. through a standard reference barcode library**
Estherna Pretorius, University of Johannesburg, South Africa

Title: ***Pulmonaria mollis Wulfen ex Hornem* seed oil - A promising vegetarian source of polyunsaturated fatty acids**
Svetlana Lyashenko, Volgograd Medical State University, Russia

Title: **Acute toxicity and anti-nociceptive activity of methanolic extract of *Hyoscyamus muticus* in Mice**
Hicham Boufous, Hassan 1st University, Morocco

Title: **Characterization and determination of chemicals in sumbul (*Berberis lyceum royle*) though HPLC and insecticidal activities against common resistant insect *Tribolium castaneum***
Humaira Shaheen, COMSATS Institute of Information Technology, Pakistan

Title: **Traditional medicine and ethnopharmacology in Algeria through history to modernity**
Amel Bouzabata, Badji Mokhtar University, Algeria

Title: **Wound healing property of *Syzygium mundagam* bark methanol extract in diabetic rats**
Rahul Chandran, University of Johannesburg, South Africa

Title: **Preliminary structure activity studies on *Hyal1* inhibitors**
John Addotey, University of Münster, Germany

Title: **Screening of 100 plant extracts as tyrosinase and elastase inhibitors, two enzymatic target of cosmetic interest**
Manuela Mandrone, Bologna University, Italy

Title: **Knowledge of traditional medicine toward enhancement of cognitive performance**
Hamid-Reza Adhami, Tehran University of Medical Sciences, Iran

Title: **Catechin from pine needle act as an anti-hypertension agent**
Jian He, Shanghai Jiaotong University, China

Title: **Management - marketing channels on the pharmaceutical market in transition countries**
Veselin Dickov, University of Novi Sad, Serbia

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FOXGLOVE: THE POISON AND THE ANTIDOTE

Samira H Zaidan
Azara Beautique, UK

Foxglove or *Digitalis purpurea* is a very toxic plant used by folklorists and herbalists, years ago to treat congested heart failure, boils, wounds, ulcers, oedema, epilepsy and other seizure disorders as well. Some symptoms of ingesting *Digitalis* include nausea, vomiting, diarrhea, abdominal pain, wild hallucinations, delirium, and severe headache. The victim may as well suffer from irregular and slow pulse, tremors and various cerebral disturbances, especially of a visual nature, convulsions, and deadly disturbances of the heart as well as blurry vision. *Digitalis* toxic symptoms cover all parts of the body system not just the heart because at the end of the day all body parts are related. In homeopathy, *Digitalis* is a great remedy described by Samuel Hahnemann in his book "Materia Medica Pura" to deal with a holistic picture of the disease where both objective and subjective symptoms are considered. Homeopathic practitioners believe that every living thing has got another electrical copy beside the biological one, and it uses this electrical copy of the living plant to convey remedies and heal the human body using the same concept. Pharmaceutical methods of preparing the drug follows the chemistry application of extracting the active ingredient in the plant and conveying it orally or via injection to the heart, using the blood as a vehicle, whereas, the homeopathic preparation follows the physics theory when they extract the energy or the electrical copy of the whole leaves, using the nervous system as a vehicle to convey the remedy to all affected parts of the body in a short period of time. This paper will discuss about the difference between the pharmaceutical drug digoxin and the homeopathic remedy Digitalis; both are derived from foxglove.

newlife555@hotmail.com

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ENHANCING THE REGULATION OF PHYTOALEXIN BIOSYNTHESIS IN PLANTS

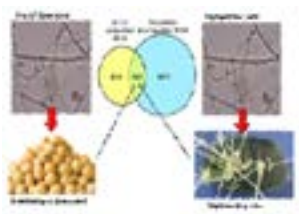
Nik Kovinich
West Virginia University, USA

Statement of the Problem: Phytoalexins are natural products (NPs) produced by plants that are biosynthesized in response to pathogen infection or abiotic stresses. Many phytoalexins have potent medicinal activities and are desirable for use as clinical therapeutics or as scaffolds for the semi-synthesis thereof. The major problem is that phytoalexins are absent from non-challenged plant tissues and may be present in challenged plant tissues at relatively low amounts rendering commercial production uneconomical. This is particularly problematic for phytoalexins that cannot be synthesized.

Methodology: Chemical and pathogen treatments in combination with RNA sequencing (RNA-seq) were used to identify treatments and genes that can be used to enhance the biosynthesis of the anticancer phytoalexin glyceollin in soybean.

Findings: A combination of the inorganic heavy metal silver nitrate (AgNO3) and the wall glucan elicitor (WGE) from the pathogen Phytophthora sojae demonstrated an additive effect on the elicitation of glyceollin in soybeans. The additive effect was due to distinct elicitation mechanisms of AgNO3 and WGE. Comparative transcriptome analyses by RNA-seq of pathogen and abiotic stress-treated soybean tissues identified three transcription factor (TF) genes that can enhance the production of glyceollin when overexpressed in soybean hairy roots. The TFs were of the WRKY, MYB, and NAC gene families.

Conclusion & Significance: Combined elicitor and gene engineering approaches can successfully enhance the biosynthesis of glyceollin phytoalexins in soybean. Our transcription factor data suggests the potential existence of a conserved regulatory network for phytoalexin regulation in plants.



Recent Publications

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2. Kovinich N, Kayanja G, Chanoca A, Otegui M and Grotewold E (2015). Abiotic stresses induce different localizations of anthocyanins in Arabidopsis. Plant Signaling & Behavior 10(7): e1027850.
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4. Kovinich N, Saleem A, Arnason J T and Miki B (2012a) Coloring genetically modified soybean grains with anthocyanins by suppression of the proanthocyanidin genes ANR1 and ANR2. Transgenic Research 21(4):757-71.
5. Kovinich N, Saleem A, Arnason J T and Miki B (2011a) Combined analysis of transcriptome and metabolite data reveals extensive differences between black and brown nearly-isogenic soybean (Glycine max) seed coats enabling the identification of pigment isogenes. BMC Genomics 12:381

Biography

Nik Kovinich is an expert in Genetics of Plant Metabolism. He is a Beginning Investigator at the West Virginia University since July 2015. His focus is on understanding the genetic regulation of the biosynthesis of medicinal natural products (NPs) in plants, enhancing NP bioproduction by genetic engineering, and improving the bioactivities of NPs using semi-synthesis. He teaches Genetics and Bioinformatics courses and had a major role in establishing an Undergraduate Program in Genetics at the West Virginia University.

nikovinich@mail.wvu.edu

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FORMULATION AND EVALUATION OF NOVEL HERBAL AEROSOL FOR ARTHRITIS

Rajasekaran Aiyalu[1], Ithyaventhan Subramaniam[2], Arulkumaran Govindarajan[1] and **Arivukkarasu Ramasamy[1]**

[1]KMCH College of Pharmacy, India
[2]Doctor Thangs Products, India

A novel herbal aerosol spray formulation containing methanol leaf extracts of *Cardiospermum halicacabum* (MLECH) and *Vitex negundo* (MLEVN) was formulated using MLECH and MLEVN (2% w/v each) and their quality control, stability and efficacy studies were carried out as per the United States Pharmacopoeia (USP), International Conference on Harmonization (ICH) and Organization for Economic Co-Operation and Development (OECD) guidelines, respectively. Complete Freund's adjuvant (CFA) induced arthritis method was employed for the evaluation of anti-arthritic activity. Assessment of body weight, biochemical parameters, hematological parameters, serum biomarker levels, photographic, radiographic analysis and histopathological investigations were carried out as a supportive evidence for the anti-arthritic efficacy of the developed novel herbal aerosol spray formulation. The results of the quality control test complied with USP standards and the stability study clearly revealed that the formulated topical herbal aerosol spray was found to be stable. Significant ($p<0.01$) alterations in rat paw volume, body weight, biochemical, hematological, serum biomarker levels and reduction in inflammation and hyperplasia of synovium of formulation treated rats were observed compared with arthritic rats. The study concluded that the formulated novel herbal aerosol spray exhibited good anti-arthritic activity.

Biography

Rajasekaran Aiyalu is a Professor of KMCH College of Pharmacy and has more than 28 years of teaching and research experience in the field of Pharmacy. He has received research grants from various Government agencies like DSIR, DST, DRDO and AICTE, etc. He has 5 patents to his credit. He has published 84 research papers in international and 134 research papers in national peer reviewed journals. He has visited Malaysia, Singapore, Thailand, Philippines, Sri Lanka, UAE and presented papers in various national and international conferences. He has received Best Teacher Award from the Tamilnadu Dr. M G R Medical University, Chennai.

rsekaran2001in@yahoo.co.in

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DETERMINING THE LEVEL OF SUBSTITUTION IN HERBAL PRODUCTS CONTAINING HARPAGOPHYTUM SPP. THROUGH A STANDARD REFERENCE BARCODE LIBRARY

E Pretorius[1], M van der Bank[1], R M Kabongo[1] and **A M Viljoen[2]**

[1]University of Johannesburg, South Africa
[2]Tshwane University of Technology, South Africa

Background: *Harpagophytum procumbens* (the preferred species) has traditionally been used as a treatment for inflammation, fever and in some cases malaria. Due to the commercial demand and unsustainable harvesting techniques, the industry is subjected to the possibility of substitution with the more inferior species, *H. zeyheri*. Granting that several pharmacopeias allow the use of either *H. zeyheri* or H. procumbens, the pharmacological effect on consumers (patients) and the equivalence of this interchangeable use has not been studied. The industry is starting to explore DNA barcoding as a method for quality control of botanical medicines.

Results: In this study, we explored the potential application of DNA barcoding to determine authenticity in commercial products. Authentic botanical reference material of both *H. procumbens* (n=30) and *H. zeyheri* (n=20) were obtained. A total of 10 commercial products were purchased on the internet in 2016 using the search term "Harpagophytum" or "Devil's Claw". The two barcoding regions *(rbcLa* and *matK*) and the additional plastid region trnL-F was first used to construct a standard reference barcode library for the genus Harpagophytum, and secondly to barcode the purchased herbal products claiming to contain Harpagophytum. The barcode library was able to authenticate all commercial products (query samples) up to species level. Furthermore, the character based (BRONX) analysis was performed to verify taxonomic identity of the query samples. BRONX results indicated that 69% of the commercial samples tested, labeled as *H. procumbens* were substituted with *H. zeyheri*.

Significance: Our study is the first to construct a reference barcode library for Harpagophytum. This approach of DNA barcoding could significantly support the authentication of herbal products containing *Harpagophytum* spp.

esthernap@uj.ac.za

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PULMONARIA MOLLIS WULFEN EX HORNEM SEED OIL — A PROMISING VEGETARIAN SOURCE OF POLYUNSATURATED FATTY ACIDS

S S Lyashenko[1], S G Yunusova[2], Z Yu Tleptserisheva[1], O N Denisenko[1], M S Yunusov[2] and **N I Fedorov[2]**

[1]Volgograd Medical State University, Russia
[2]Russian Academy of Sciences, Russia

Statement of the Problem: Polyunsaturated fatty acids (PUFAs) have been the subject of research due to their nutritional and physiological roles. The family, *Boraginaceae* Juss. is one of the sources of PUFAs. The lipids of seeds *Pulmonaria mollis* Wulfen ex Hornem of this family, widespread in the flora of Russia, have not previously been studied.

Methodology & Theoretical Orientation: The object of the study was mature seeds of wild *Pulmonaria mollis* from different climatic zones - Adygea (1) and Bashkortostan (2). Oil from seeds was extracted using the Soxhlet's procedure. Separation and identification of lipid classes was performed using a silica column chromatography, TLC and preparative TLC. The FA composition was determined by converting into FA methyl esters followed by GLC.

Findings: Oil content (%, seed weight) in samples was 33.8 and 19.1%, respectively, content of polar lipids was 0.4 and 0.9, including glycolipids was 0.4 and 0.5 and phospholipids was 0.1 and 0.4. The NL subclasses consisted of sterol esters – 1.7 and 1.7%, triacylglycerols – 92.2 and 86.4, free fatty acids – 0.8 and 6.4; diacylglycerols+ sterols – 3.2 and 3.2; monoacylglycerols – 2.2 and 2.3. FA composition 1 and 2 did not differ. Palmitic acid was the most abundant among the saturated FA (about 31%). Oleic acid was the single dominating among monoenoic FA. The PUFAs found were dominated by FA ω-6 (18:2 linoleic acid up 32%, 18:3 gamma-linolenic acid up 19%) and ω-3 (18:3 alpha-linolenic acid up 15%, 18:4 stearidonic acid up 5%). The amounts of PUFAs in NL were about 65%. The PUFAs was concentrated by the urea complexation method. The total concentration of PUFAs increased by up to 63% % of ω-6 PUFAs and 29% ω-3 PUFAs.

Conclusion & Significance: *Pulmonaria mollis* seeds could be considered potential additional sources of PUFAs and the plant is promising for its introduction.

Recent Publications

1. Yunusova S, Lyashenko S, Fedorov N and Yunusov M (2017) Lipids and lipophilic constituents of comfrey (*Symphytum Officinale* L.) seeds. Pharmaceutical Chemistry Journal 50:728–731.
2. Guil Guerrero J, Gómez-Mercado F, Ramos-Bueno R and González-Fernández M (2017) Sardinian *Boraginaceae* are new potential sources of gamma-linolenic acid. Food Chem. 218:435–439.
3. Guil Guerrero J, Gómez-Mercado F, Ramos-Bueno R and Rincón-Cervera M (2014) Restricted-range *Boraginaceae* species constitute potential sources of valuable fatty acids. J. Am. Oil Chem. Soc. 92:301–308.
4. Yunusova S, Khatmulina L, Fedorov N and Ermolaeva N (2012) Polyunsaturated fatty acids from several plant species of the family Boraginaceae. Chem. Nat. Compd. 48:361–366.
5. Yunusova S, Yunusov M, Karimova A and Mironov V (2007) Lipids of oenothera seeds from different habitats. Chem. Nat. Compd. 43:525–528.

Biography

S S Lyashenko is a candidate of Pharmaceutical Sciences (PhD in Pharmaceutical Sciences), and Senior Lecturer in the Department of Pharmacy Faculty of Post-graduate Education, Pyatigorsk Medical Pharmaceutical Institute of Volgograd Medical State University. In 2011 she defended her thesis on "Pharmacognosy study of Borage officinalis L.". Since several years (2008 to 2017), she has been performing fragments of scientific work at the Laboratory of Bioorganic Chemistry and Catalysis, Institute of Chemistry, Ufa Scientific Center, Russian Academy of Sciences. As a Researcher, she searches and analyzes plant sources of ω-6 and ω-3 polyunsaturated fatty acids, as well as studies of lipophilic components, exhibiting high biological activity. She investigates promising species of the Russian Federation for its introduction, particularly the family *Boraginaceae* Juss.

lanochka22@yandex.ru

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ACUTE TOXICITY AND ANTI-NOCICEPTIVE ACTIVITY OF METHANOLIC EXTRACT OF HYOSCYAMUS MUTICUS IN MICE

Hicham Boufous[1], Fatimazahra Marhoume[1], Abderrahman Chait[2] and **Abdellah Bagri[1]**

[1]Hassan 1st University, Morocco

[2]Cadi Ayyad University, Morocco

The objective of this study was to investigate the acute toxicity and potential activity of methanolic extract of Hyoscyamus muticus (Me-HM) to assess nociception in mice. The acute toxicity was studied in both oral and intraperitoneal route. LD50 was determined using Probit method and the effect of extract against nociceptive was studied by thermal stimulus (hot plate) and injection of chemical substances such as formalin (formalin test) and acetic acid (writhing test). Morphine was used as positive drug in hotplate test and acetylsalicylic acid was used in formalin and writhing test. The antinociceptive activity was determined by observed increase of latency time in hotplate test, decrease of abdominal constriction in writhing test and decrease of stretching in formalin test. The LD50 of intraperitonial administration of Me-HM was 1000±42, 89 mg/kg-1. Our extract produced a significant (P≤0.001) and dose dependent increase of latency time in hotplate test. The optimal effects were observed after 90 mins of oral administration of both doses. In the formalin test, the both doses reduce significantly (P≤0.001) the effect produced by intraplantar injection of formalin with maximum inhibition recorded in neurogenic phase with 49.36% and 42.67% successively for 100 and 50 mg/kg of Me-HM. Morphine and acetylsalicylic acid produced desired anti-nociceptive activity in tests used in this study. The antinociceptive effect of H. muticus extract can be explained probably by binding of scopolamine and hyoscyamine from extract to muscarinic receptors and 5- HT3 involved in pain pathways. It was concluded that Me-HM shows a remarkable antinociceptive activity in thermal and chemical model of nociception in mice

hicham221287@gmail.com

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Humaira Shaheen, Am J Ethnomed 2018, Volume 5
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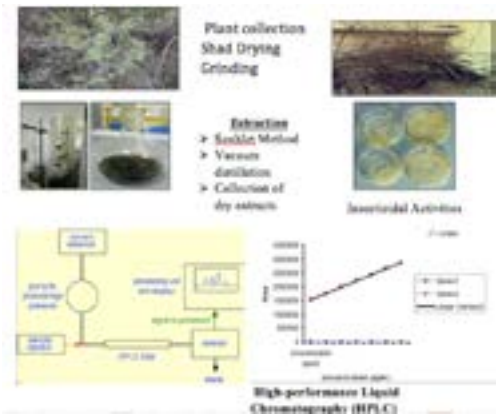
CHARACTERIZATION AND DETERMINATION OF CHEMICALS IN SUMBUL (BERBERIS LYCEUM ROYLE) THROUGH HPLC AND INSECTICIDAL ACTIVITIES AGAINST COMMON RESISTANT INSECT TRIBOLIUM CASTANEUM

Humaira Shaheen
COMSATS Institute of Information Technology, Pakistan

Medicinal plants have been found promising in treating diseases throughout the world. Herbal treatments are preferred over synthetic drugs due to fewer side effects as reported otherwise in terms of adverse drug reactions, drug-drug interactions and drug resistance so far. Pakistan has plenty of natural resources and is well known for their diverse and valuable medicinal plants. *Berberis lyceum* is a highly medicinal plant present widely in Pakistan and other countries. In this study, methanol and ethanol extracts of root, stem and leaves of *Berberis lyceum* were extracted through Soxhlet method. Alkaloids were isolated through high-performance liquid chromatography (HPLC) by using SilC18 column with acetonitrile and potassium dihydrophoshphate as mobile phase. The elution rate was 1.0 ml/min and the detection was monitored at 346 nm. High-performance liquid chromatography (HPLC) analysis showed berberine in crude extract of stem but root crude extracts contain high amount of berbamine and low amount of berberine, while leaf extracts showed negative results. Insecticidal activities in this study against the most common and pest resistant insect, *Tribolium castaneum*, showed good results with 20% concentration of ethanolic and methanolic crude extracts of *Berberis lyceum* with malathion combination. The insects were tested with 20% methanolic and ethanolic extracts of root stem and leaves alone and combination of extract with different concentrations of malathion. Combination of extracts of stem and root showed maximum mortality rate as compared to crude extracts alone. Our extracts do not actually kill the insects; it can make them sensitive to any insecticide. After applying our extracts, insects can be killed from any insecticide, but leaf extracts again showed no promising results.



humaira.shaheen@comsats.edu.pk

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TRADITIONAL MEDICINE AND ETHNOPHARMACOLOGY IN ALGERIA THROUGH HISTORY TO MODERNITY

A Bouzabata
Badji Mokhtar University, Algeria

Traditional medicine, occasionally called alternative medicine or complementary medicine, is presently experiencing significant development in Algeria. In the health care markets, several practice categories are being expressed in the name of traditional medicine and prophetic medicine. These practices, known as *"Rokya"* and *"Hijâma"*, are developing as a very fruitful business in Algeria. Many herbalists providing medical care, *"Achchab"* in Arabic, are appearing more prominently in the marketplaces. Arab Muslim medicine remains alive in the contemporary practices of traditional medicine. This review reflects an interest in the medicinal plant species and other materials cited in the sacred texts and used currently in traditional medicine in Algeria. The use of several traditional medicine indications have been supported on the basis of their safety and efficacy. This review analyzes the importance of these practices between popular and religious beliefs. Proposals were made for the development of the traditional medicine in Algeria based on the recommendations of the World Health Organization (WHO).

amelbouz2009@gmail.com

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WOUND HEALING PROPERTY OF SYZYGIUM MUNDAGAM BARK METHANOL EXTRACT IN DIABETIC RATS

Rahul Chandran and **Heidi Abrahamse**
University of Johannesburg, South Africa

Statement of the Problem: Diabetic foot ulcers are one of the major complications among diabetic patients. Wounds, under diabetic conditions show delayed healing due to microbial infection, generation of reactive oxygen species and reduced blood flow. A control over the blood glucose along with alternative therapies would be an ideal measure to treat diabetic foot ulcers and wounds. The search for cost-effective medication with maximum healing properties and minimal to no side effect has led scientists to investigate plants as an alternative source of medicinal products.

Methodology & Theoretical Orientation: This study features the use of *Syzygium mundagam* bark methanol (SMBM) extract in the treatment of wounds in streptozotocin-nicotinamide induced diabetic rats. The extract ointment base, at 1 and 2%, respectively, was applied to the wounded areas on the rats and monitored for 21 days. The wound closure, epithelialization period and histopathology of the wounds were evaluated during the study.

Findings: Both the concentrations of the extract (1% and 2%) healed the wounds even under diabetic conditions induced in rats on day 21 (99.69% and 100%, respectively). The 2% SMBM treated animals showed a higher rate of epithelialization of the wound (15±0.49 days). The histopathology of the wounded skin on 10th day revealed that the rats treated with SMBM extract could initiate the healing and re-epithelialization. This was evident from the migration of neutrophils and proliferation of fibroblasts. On the 21st day, complete healing of the skin could be observed in the rats treated with 2% extract which was evident from the newly formed epidermis, collagen fibres and fibroblast. The results compared well with those treated with betadine (5%).

Conclusion & Significance: The results of this study will support the use of this plant extract for diabetic healing over the use of commercially available synthetic drugs.

Recent Publications

1. Saikumar S, Chandran R, Sajeesh T, Abrahamse H and Parimelazhagan T (2018) Phytochemical composition, antioxidant and anti-bacterial activity of wild edible fruit *Syzygium calophyllifolium* Walp. Journal of Food Science and Technology 55(1):341–350.
2. Chandran R, George B P, Abrahamse H and Parimelazhagan T (2017) Therapeutic effects of *Syzygium mundagam* bark methanol extracts on Type-2 diabetic complications in rats. Biomedicine and Pharmacotherapy 95:167–174.
3. Chandran R, Abrahamse H, Parimelazhagan T and Gowtham D (2017) *Syzygium mundagam* bark methanol extract restores skin to normal in diabetic wounded rats. Biomedicine and Pharmacotherapy 94:781–786.
4. Chandran R, Parimelazhagan T and George B P (2017) Anti-hyperglycemic activity of the bark methanolic extract of *Syzygium mundagam* in diabetic rats. Alexandria Journal of Medicine 53(4):317–324.
5. Chandran R, Saravanan S, Sajeesh T and Parimelazhagan T (2016) Antidiabetic activity of *Syzygium calophyllifolium* in streptozotocin-nicotinamide induced Type-2 diabetic rats. Biomedicine and Pharmacotherapy 82:547–554.

Biography

Rahul Chandran is currently doing Post-doctoral Research under the supervision of Prof. Heidi Abrahamse in Laser Research Centre, Faculty of Health Sciences, University of Johannesburg, South Africa. His research focus is on the differentiation of stem cells to insulin producing cells for diabetic therapy. He has published 22 research articles in the field of Pharmacology and Nutritional Sciences in peer reviewed international journals. He has filed patent for the novel compounds isolated during Doctoral research. During his PhD in Botany, he was awarded with DST-INSPIRE fellowship from the Ministry of Science and Technology, Govt. of India and worked as Junior and Senior Research Fellow for the period of five years.

rahulcsr@gmail.com

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PRELIMINARY STRUCTURE ACTIVITY STUDIES ON HYAL1 INHIBITORS

J Addotey, M Lechtenberg, F Petereit, I Lengers, J Jose and **A Hensel**
University of Münster, Germany

Statement of Problem: Human hyaluronidase-1 (Hyal-1) is an enzyme strongly involved in the regulation of extracellular matrix by balancing the deposition and potential degradation of hyaluronic acid (HA) in the tissue. The inhibition of Hyal-1 by specific inhibitors might be a promising target for improved wound healing, tissue regeneration, and looking at renal function also for induction of diuresis. Following the discovery of the inhibitory effects of isoflavonoids from the roots of *Ononis spinosa* L. on Hyal-1 in our previous work, further studies have been conducted on selected flavonoid/isoflavonoid compounds from natural sources with the aim to study structure - activity relationships. Although glycosides of these compounds abound and some have been proven to show anti-hyaluronidase activity, the aglycones were chosen because generally they are known to exhibit higher anti-hyaluronidase effect.

Methodology: By using surface-displayed human Hyal-1 on ***Escherichia coli*** F470, HA as substrate and stains-all method for quantification of undegraded, high molecular polymer, the enzyme activity can be determined easily. Apigenin (flavonoid hyaluronidase inhibitor), Biochanin A (isoflavonoid present in roots of ***Ononis spinosa L***.) and Maackiain (pterocarpan present in roots of ***Ononis spinosa L***.) were used as representatives of the above classes. Glycyrrhizinic acid, a known Hyal-1 inhibitor was used as a standard.

Findings: At a concentration of 250 µM, Maackiain and Apigenin were found to be inactive. The IC50 values obtained for Glycyrrhizinic acid and Biochanin A were 181 µM and 126 µM respectively.

Conclusion & Significance: Strong inhibitory activity (comparable to standard) against Hyal1 was found in the isoflavonoid with the flavonoid and pterocarpan exhibiting virtually no activity. This information will serve as a guide toward more elaborate structure-activity studies.

Conclusion & Significance: The results of this study will support the use of this plant extract for diabetic healing over the use of commercially available synthetic drugs.

Recent Publications

1. Monica Mame Soma Nyansa, Patrick Doe Fiawoyife, Nana Ama Mireku-Gyimah and John Nii Adotey Addotey (2017) Stability-indicating HPLC method for the simultaneous determination of paracetamol and tramadol hydrochloride in fixed-dose combination tablets. International Journal of Biomedical Science and Engineering 5(4):41–47.
2. Addotey J N A and Adosraku R K (2016) Pilot production of 5-HTP from the seeds of Griffonia simplicifolia. World Journal of Pharmacy and Pharmaceutical Sciences 5(6)204–221.
3. Cudjoe E K, Addotey J N A, Okine N N A, Adosraku R K and Annan K (2016) Isolation and development of an HPLC method for the quantification of a biomarker in the roots of Paullinia pinnata. Int J Pharm Sci Res 7(8):3446–52.
4. John Nii Adotey Addotey and Monica Mame Soma Nyansah (2016) Quality assessment of some topical polyherbal preparations on the Ghanaian Market. World Journal of Pharmacy and Pharmaceutical Sciences 5(4)461–472.

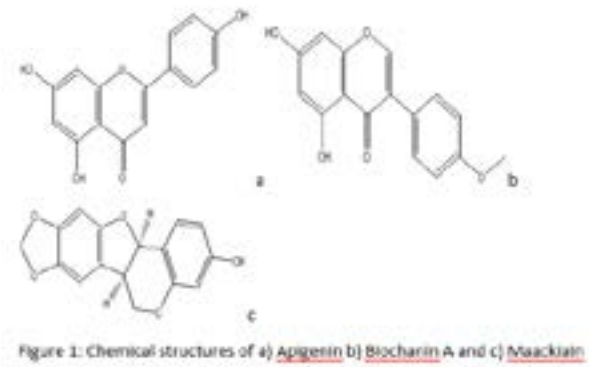

Figure 1: Chemical structures of a) Apigenin b) Biochanin A and c) Maackiain

Biography

J Addotey is a recipient of the German Academic Exchange Service (DAAD)/Government of Ghana joint scholarship for PhD studies. This scholarship is awarded to young Ghanaian researchers of superior academic and research achievement in order to obtain PhDs in Germany and to further their career goals. He is self-motivated Young Researcher and Lecturer looking to network and collaborate with other researchers worldwide towards solving emerging challenges in natural products research. His primary interests are bioactivity guided isolation and characterization of compounds from natural sources and method development for the analysis of drug substances of natural origin.

j_addo01@uni-muenster.de

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SCREENING OF 100 PLANT EXTRACTS AS TYROSINASE AND ELASTASE INHIBITORS, TWO ENZYMATIC TARGET OF COSMETIC INTEREST

Manuela Mandrone
University of Bologna, Italy

Statement of the Problem: Skin ageing processes are generally divided into intrinsic, irremediably tied to the passage of time, and extrinsic, which are caused by environmental factors (i.e. chronic exposure to sunlight, pollutants) and miscellaneous lifestyle components. Plants are a precious resource for skincare, both as antioxidants and inhibitors of enzymes involved in the ageing process. In this context, elastase and tyrosinase are target of remarkable importance, and their inhibitors find applications as skin whitening, anti-wrinkle, anti-sagging agents, and in the treatment of dermatological disorders.

Methodology: The plant sources were from: India (Rajasthan), Africa (Burkina Faso) and Mediterranean area. Hydroalcoholic extracts were prepared, dried and dissolved in water for the assays or in water-d2 phosphate buffer (90 mM; pH 6.0) for 1H–NMR analysis.

Findings: 17 plants resulted to be endowed with strong bioactivity and leaves of Pistacia lentiscus emerged as the most potent sample on both enzymes (IC50 of 7.18 ±1.37 and 42.04±1.94 µg/mL against elastase and tyrosinase, respectively). Interestingly, two, out of the 17 most active plants, are endemic of Sardinia Island (Italy), namely: Hypericum scruglii and Limonium morisianum. Moreover, the 17 most active extracts resulted also generally enriched in polyphenols and flavonoids, which confer them additional value, due to their antioxidant potential. Lastly, 1H NMR metabolomics profile of the extracts were measured, compared by multivariate data analysis and correlated to the abovementioned results by orthogonal projections to latent structures (OPLS) model, showing a positive correlation between spectral signal of aromatic compounds and the potency of enzymatic inhibition.

Conclusion & Significance: This bio-screening allowed the selection of 17 plant extracts, promising as cosmetic ingredients, which safety is also supported by the ethnobotanical uses. Nine of them proved active both against tyrosinase and elastase and as shown by the OPLS model their aromatic phytoconstituents play a key role in conferring these bioactivities.

Recent Publications

1. Liyanaarachchi G D, Samarasekera J K, Mahanama K R and Hemalal K D (2018) Tyrosinase, elastase, hyaluronidase, inhibitory and antioxidant activity of Sri Lankan medicinal plants for novel cosmeceuticals. Industrial Crops and Products 111:597–605.
2. Pillaiyar T, Manickam M and Namasivayam V (2017) Skin whitening agents: medicinal chemistry perspective of tyrosinase inhibitors. Journal of Enzyme Inhibition and Medicinal Chemistry 32:403–25.
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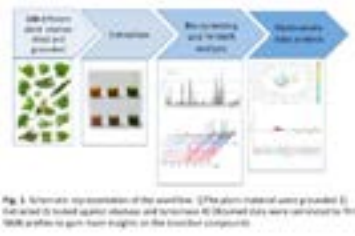

Biography

Manuela Mandrone works at Bologna University, Department of Pharmacology and Biotechnology, where she is a Junior Researcher since 2016. Her investigations are in the field of Plant Science, particularly focusing on natural-product based drug discovery inspired by traditional medicine knowledge and studies of plant-environment interactions, related to crops. She has expertise in identification of active principles responsible for biological activities of medicinal plants, finding of biomarkers and quality control of botanicals. These lines of research lie on canonical phytochemical studies as well as on novel approaches such as: metabolomics coupled with chemometrics, which has been a subject of her PhD thesis. She also has expertise in biological activities screening, antioxidant and enzymatic inhibitory assays.

manuela.mandrone2@unibo.it

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KNOWLEDGE OF TRADITIONAL MEDICINE TOWARD ENHANCEMENT OF COGNITIVE PERFORMANCE

Hamid-Reza Adhami
Tehran University of Medical Sciences, Iran

Enhancement of cholinergic function by inhibition of acetylcholinesterase (AChE) is considered as a rational approach for the treatment of neurological disorders such as Alzheimer´s disease and senile dementia. During the last two decades, the use of herbal medicinal substances in dementia therapy has been studied well. Iran is among those countries which has a long and rich history in traditional medicine. In this eight year project, 40 herbal drugs reported in Iranian traditional medicine (ITM) for the treatment of cognitive disorders were examined. In the first step, the bioactivities of the polar methanol and the non-polar dichloromethane extracts of all selected herbal samples were studied on AChE inhibition by TLC bioautography and in a microplate assay. The 8 most active herbal drugs were selected for further study. In detailed investigations, the active compounds were identified and isolated using several chromatographic techniques such as TLC, VLC, LC, SEC, SPE, HPLC, HPCCC and HPTLC. In total, from the selected herbal drugs, 25 active compounds were identified and isolated. The structures of the active components were characterized by one and two-dimensional NMR spectroscopy (COSY, TOCSY, HSQC, HMBC, NOESY), mass spectrometry and some other analytical methods. The IC50 values for active compounds were determined by a quantitative colorimetric assay. Additionally, the concentrations of active components in their sources were determined by HPLC analysis. The IC50 values of the isolated compounds were in correlation with their contents in their original sources. The achieved results confirmed that the compounds considerably contribute to the effects of these drugs and underline the plausibility of their use in the treatment of cognitive deficits in ITM.

Recent Publications

1. Kanama S K, Viljoen A M, Kamatou G P P, Chen W, Sandasi M, et al. (2015) Simultaneous quantification of anthrones and chromones in *Aloe ferox* ("Cape aloes") using UHPLC–MS. Phytochemistry Letters 13:85–90.
2. Adhami H R, Zehl M, Dangl C, Dorfmeister D, Stadler M, et al. (2015) Preparative isolation of major phenolic compounds from extra virgin olive oil by HPCCC. Food Chemistry 170:154–159.
3. Adhami H R and Viljoen A M (2015) Isolation of bio-markers from the leaf exudate of *Aloe ferox* (aloe bitters) by high performance counter-current chromatography. Phytochemistry Letters 11:321–325.
4. Adhami H R, Fitz V, Lubich A, Kaehlig H, Zehl M, et al. (2014) Acetylcholinesterase inhibitors from galbanum, the oleo gum-resin of *Ferula gummosa* Boiss. Phytochemistry Letters 10:32–87.
5. Adhami H R, Lutz J, Kaehlig H, Zehl M and Krenn L (2013) Compounds from gum ammoniacum with acetylcholinesterase inhibitory activity. Scientia Pharmaceutica 81(3):793–805.

Biography

Hamid-Reza Adhami graduated from the Faculty of Pharmacy, Tehran University of Medical Sciences with a PharmD Degree and worked for some years in the field of Health and Research Management. In 2008, he started his PhD study at the Department of Pharmacognosy, University of Vienna. After graduation, he passed short term research projects in Switzerland and UK and finally moved to South Africa for a one year Post-Doc Fellowship at Tshwane University of Technology in Pretoria. Since 2014, he is working as Assistant Professor at the Department of Pharmacognosy, Faculty of Pharmacy, Tehran University of Medical Sciences. His research interests include isolation, characterization and purification of biological active secondary metabolites from natural sources.

hr-adhami@tums.ac.ir

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CATECHIN FROM PINE NEEDLE ACT AS AN ANTI-HYPERTENSION AGENT

Jian He
Shanghai Jiao Tong University, China

Hypertension has been acknowledged as one of the highest risk factors leading to cardiovascular diseases (CVD). Angiotensin-converting enzyme (ACE) has been demonstrated as the therapeutic target for hypertension-based CVD treatment. Anti-hypertension bioactivity ingredients screening and development has become a pharmaceutical treatment for the CVD. Many kinds of herbal, such as pine needle, a traditional Chinese medicine, have been used for the treatment of hypertension since ancient, but the bioactive agent which is responsible for its therapeutic effectiveness remain unclear. Therefore, screening bioactive chemicals from natural sources is still the most straightforward strategy for novel ACE inhibitor-based anti-hypertension agent discovery. In this study, we demonstrated a bioactivity-guided fractionation strategy for identifying bioactive fractions and chemicals from pine needle based on LC/MS assay as well as elucidating their mechanisms of pharmacological activity. The compound in pine needle extracts being ACE-inhibitory active was found to be catechin. When ACE activity was assayed in rat tissue membranes, it was observed that catechin demonstrate ACE inhibition in kidney, lung and testes tissue. These observations indicate that catechin in pine needle could be a potential cardiovascular medicine.

jih003@sjtu.edu.cn

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MANAGEMENT — MARKETING CHANNELS ON THE PHARMACEUTICAL MARKET IN TRANSITION COUNTRIES

Veselin Dickov
University of Novi Sad, Serbia

Background: The main goal of research presented in this paper is to show development and verification of the model for the evaluation, selection and ranking of Management-Marketing channels through which products find their way to their final users, i.e. patients, entail less controversy compared to pricing issues, but there is still a range of specific features determining the activities and the intermediary chain in this process. Decision-making on marketing channels needs to be viewed in the light of the interaction of all marketing mix instruments.

Methods: The methodological approach is based on the general theory of supply chains, quality management system, business processes management and requirements of stakeholders.

Results: The main results of research aiming to the verification of the model for evaluation, selection and ranking of the task of marketing channels on the pharmaceutical market is similar to marketing channels tasks for any other type of products. The originality of this research is reflected that comes down to a clear and simple formula – that the right goods must be in the right place at the right time, in the right form and quantity, and with reasonable costs.

Conclusion: Pharmacies stretch their product range and assortment, especially in the sphere of OTC products and other auxiliary medicinal devices. Web presentations of pharmacies are a normal phenomenon in Serbia as well.

vdickov@hotmail.com

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DAY 2

Scientific Tracks & Abstracts

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DAY 2

April 17, 2018

Sessions

Natural Products of Medicinal Interest | Pharmacognosy Phytomedicine | Phytochemistry Natural Products in Cancer Prevention and Therapy | Medicinal Plant Chemistry Toxicological Studies of Plant Products | Natural Products in Medicines | Formulation and Manufacture of Plant Medicines Traditional Medicine | Analytical Methods for Natural Products EthnoPharmacology | Standardization of Herbal Drugs

Session Chair
Yiftach Vaknin
ARO Volcani Center, Israel

Session Chair
Ikram Mohamed Eltayeb Elsiddig
U M ST, Sudan

Session Introduction

Title: The *in vitro* antidiabetic activity of leaf and bark of matoa(*Pometia pinnata J.R. & G.Forst)* by alpha-glucosidase inhibitory activity
Tiah Rachmatiah, Institut Sains dan Teknologi Nasional, Indonesia

Title: Analysis of silymarin content and composition of the mediterranean milk thistle (*Silybum marianum*) in Israel reveals unique chemotypes as potential varieties for medicinal purposes
Yiftach Vaknin, ARO Volcani Center, Israel

Title: Anti-hyperglycemic effect of the extracts of *Allium sativum* bulbs growing in Sudan: With and without metformin drug in diabetes treatment
Ikram Mohamed Eltayeb Elsiddig, UMST, Sudan

Title: Protective effect of butanolic and ethyl acetate fractions of *Rubia tinctorum* extract against calcium oxalate induced urolithiasis in rats
Marhoume Fatima Zahra, Hassan I University, Morocco

Title: FTIR-Spectrophotometric analysis of cerberin in rat plasma
Prasanth S S, Al Shifa College of Pharmacy, India

Title: Polyherbal formulation of selected few medicinal plants having antidiabetic activity
Jhansee Mishra, V.B.S.P. University, India

Title: The effect of arbutin powder and *Arctostaphylos uvaursi* aqueous leaf extract on synthesis of melanin by *Madurella mycetomatis*
Amina Saadeldin Abdelmotalab Omer, UMST, Sudan

Title: Anti-hypothyroidism activity of *Lepidium sativum* ethanolic extract
Reham Sharafeldin Osman Hajomer, U M S T, Sudan

Title: Gas chromatographic–mass spectroscopic analysis of *Citrus reticulata* fruit peel, *Zingiber officinale* Rhizome and *Sesamum indicum* seed ethanolic extracts possessing antioxidant activity and lipid profile effects
Samar Saadeldin Abdelmotalab Omer, UMST, Sudan

Title: *In vitro* susceptibility of isolated *Shigella flexneri and Shigella dysenrery* to the ethanolic extracts of *Trachyspermum ammi and Peganum harmala*
Ibrahim Siddig Hamid Humedia, UMST, Sudan

Title: A Comparative study of Anti-Inflammatory activity and chemical analysis of *Ziziphus spina-christi* leaves and *Boswellia serrata* gum dry distillates
Sara Nadi Joseph Wisa, UMST, Sudan

Title: Safety and toxicity evaluations of *Xanthium strumarium Linn*
Bhanu Sagar, IEC College of Engineering & Technology, India

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THE IN VITRO ANTIDIABETIC ACTIVITY OF LEAF AND BARK OF MATOA (POMETIA PINNATA J. R. & G. FORST) BY ALPHA-GLUCOSIDASE INHIBITORY ACTIVITY

Tiah Rachmatiah and **Christine E Poputra**
Institut Sains dan Teknologi Nasional, Indonesia

Pometia pinnata **is a plant belonging to the *Sapindaceae* family that is found in eastern Indonesia such as Papua, Sulawesi and Maluku with the local name of matoa. Empirically, matoa is used as a traditional used as an antidiabetic. The purpose of this study was to determine the *in vitro* antidiabetic activity of aqueous and ethanol extract from the leaf and bark of matoa. The material used in this study was obtained from Manado, North Sulawesi, Indonesia. The aqueous extract was prepared by boiling the powder of the material in water at 90°C for 15 minutes, and ethanol extract by maceration in 70% ethanol. Phytochemical analysis showed that leaf and bark of matoa contains saponins, tannins, flavonoids and triterpenoids. The *in vitro* antidiabetic activity test was performed by the α-glucosidase inhibitory activity method with p-nitrophenyl-α-D-glucopyranoside substrate and measured by UV-V spectrophotometer at 400 nm. The α-glucosidase enzyme was obtained from Saccharomyces cerevisiae. The results showed that the leaf and bark aqueous extract of matoa had antidiabetic activity by α-glucosidase inhibition with IC50 value of 9.74 µg/ml and 10. 65 µg/ml, while the ethanol extract of leaf and bark of matoa 10.32 µg/ml and 8.34 µg/ml.**

Recent Publications

1. **T Rachmatiah, et al. (2009) (+)-n-(2-hydroxypropyl) lindcarpine: A new cytotoxic aporphine isolated from *Actinodaphne pruinosa* Nees. Molecules 14(8):2850–2856.**
2. **Tiah Rachmatiah, et al. (2009) Bisbenzylisoquinoline alkaloids from the bark of *Actinodaphne pruinosa* Nees. Malaysian Journal of Science 28:75–80.**
3. **Soleh Kosela, Li-Hong Hu, TiahRachmatia, et al. (2000) dulxanthones f–h, three new pyranoxanthones from *Garcinia dulcis*, Journal of Natural Products 63(3):406–407.**
4. **Soleh Kosela, Li-HongHu, See-Chung Yip, Tiah Rachmatia, et al. (1999) Dulxanthone E: A pyranoxanthone from the leaves of *Garcinia dulcis*, Phytochemistry 52(7):1375–1377.**

Biography

Tiah Rachmatiah is working at the Faculty of Pharmacy, Institut Sains dan Teknologi Nasional, Indonesia as a Lecturer in several courses including Organic Chemistry and Phytochemistry. She is interested in the field of Natural Products and the research that she did cover the fields related to natural products such as chemical content of plants and bioactivities of plants.

tiahrachmatiah@yahoo.com

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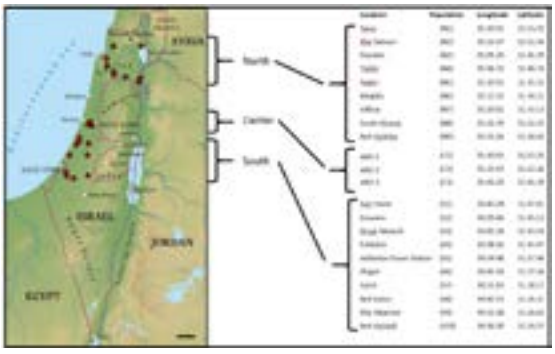
ANALYSIS OF SILYMARIN CONTENT AND COMPOSITION OF THE MEDITERRANEAN MILK THISTLE (SILYBUM MARIANUM) IN ISRAEL REVEALS UNIQUE CHEMOTYPES AS POTENTIAL VARIETIES FOR MEDICINAL PURPOSES

Yiftach Vaknin
ARO Volcani Center, Israel

Milk thistle (*Silybum marianum*) is a ruderal, nitrophilous plant, native to the Mediterranean basin with natural adjacent-desert populations. It is usually utilized for its hepatoprotective activity due to its high content of silymarin; a complex of seven flavonolignans: silybin A, silybin B, isosilybin A, isosilybin B, silychristin, isosilychristin, silydianin, and one flavonoid, taxifolin. In Israel, it grows in almost all regions, from the upper Galilee in the north to the edge of the Negev desert in the south, including the Jordan Valley and around the Dead Sea. The aim of the current study was to analyze *S. marianum* populations from three Mediterranean regions; in northern, central and southern Israel, adjacent to the Negev desert, for silymarin content and composition, in order to evaluate their potential significance as sources for medicinal purposes. Seeds collected from all regions were planted in a screen-house under Mediterranean conditions in central Israel. The resulting F1 progeny was planted in an open field and their seeds were evaluated for silymarin content and composition. Silymarin concentration and content per plant highly varied among all populations, ranging from 21 to 36 (gr/Kg) and 3.3 to 12.3 (gr), respectively. In general, the highest silymarin concentration was measured for plants originated from central populations and the highest silymarin content per plant was measured for the central and northern populations. Analysis of silymarin composition revealed unique chemotypes in all regions, and particularly in central Israel, combining significantly elevated levels of the most potent compounds according to Polyak et al. (2010; PNAS 107:5995-5999) of taxifolin, isosilybin A, silybin A, silybin B and a mixture of silybin A and silybin B. We concluded that the high variation in climatic conditions across Israel contributed to the appearance of unique chemotypes, having great potential for future varieties cultivated for silymarin.

Recent Publications

1. Degani A V Dudai, N Bechar A and Vaknin Y (2016) Shade effects on leaf production and essential oil content and composition of the novel herb *Eucalyptus citriodora* hook. Journal of Essential Oil Bearing Plants 19(2): 410–420.
2. Cohen-Zinder, H Leibovitz, Y Vaknin, G Sagi, A Shabtay, et al. (2015) Effect of feeding *Moringa oleifera* Lam. silage to lactating cows on digestibility and efficiency of milk production. Animal Feed Science and Technology 211:75–83.
3. Vaknin Y Dudai, N Murkhovsky, L Gelfandbein, L Fischer R and Degani A (2009) Effects of pot size on leaf production and essential oil content and composition of *Eucalyptus citriodora* hook. (Lemon-scented gum). Journal of Herbs Spices and Medicinal Plants. 15:1–13.
4. Steinitz B, Tabib Y, Gaba V, Gefen T, Vaknin Y (2008) Vegetative micro-cloning sustaining biodiversity of threatened Moringa species. ***In Vitro*** Cell. Dev.Biol.-Plant 45:65–71.
5. Vaknin Y Hadas, R Schafferman, D Murkhovsky L and Bashan N (2007) The potential of milk thistle (*Silybum marianum* L.), an Israeli native, as a source of edible sprouts rich in antioxidants. International Journal of Food Sciences and Nutrition 20:1–8.



Biography

Yiftach Vaknin completed his PhD from Tel-Aviv University and Post-doctoral studies from UC Davis, Pomology Department, CA, and UMR INRA/UAPV Ecologie des Invertébrés, France. He is currently a Senior Researcher at the Department of Natural Resources, Volcani Center in Israel. He has published more than 35 papers in reputed journals and has developed new crops and innovative agro-technological methodologies for the food, medicinal and bioenergy industries. His work on medicinal plants was mainly focused on the following: Lemon eucalyptus for herbal infusions, *Moringa oleifera* as food supplement for elevated milk production and milk quality in lactating cows and milk thistle for therapy of liver ailments.

yiftachv@volcani.agri.gov.il

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ANTI-HYPERGLYCEMIC EFFECT OF THE EXTRACTS OF ALLIUM SATIVUM BULBS GROWING IN SUDAN: WITH AND WITHOUT METFORMIN DRUG IN DIABETES TREATMENT

Ikram Mohamed Eltayeb and **Amina Djamila Yacouba**
University of Medical Sciences and Technology, Sudan

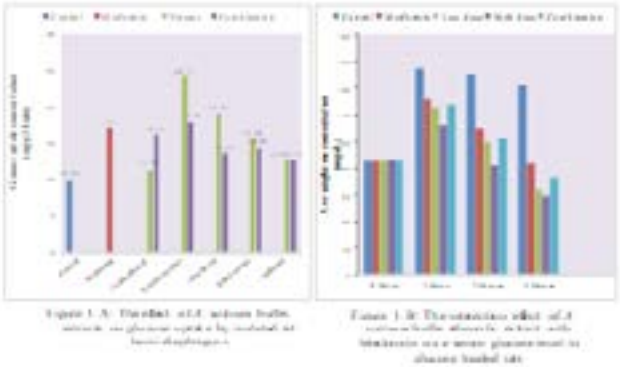
Statement of the Problem: Diabetes is now one of the major health problems prevailing in the world. Diabetic people have been treated with conventional synthetic drugs for a long time result in many side effects. Therefore, the search for more effective and safer anti-diabetic agents derived from plants has become an interest area of active research. Today millions of people use herbs either with prescription and non-prescription medications; the increasing use means that there is potential for more interactions between herbal products and conventional medicines; causing either potentially dangerous side effects and/or reduced benefits from the medication. As the incidence and severity of herb-drug interactions is increasing due to a worldwide rise in the use of herbal preparations, more research regarding herb-drug interactions are needed. The purpose of this study is to investigate the hypoglycemic effect of *Allium sativum* bulbs growing in Sudan, and to determine their interaction with metformin drug used in diabetes treatment.

Methodology: The Soxhlet apparatus was utilized during extractions. The hypoglycemic effects were evaluated *in vitro* and *in vivo* by glucose reuptake using isolated rats hemi-diaphgrams tissue and by estimate glucose tolerance in glucose-loaded Wistar rats. GC-MS was used for chemical analysis.

Findings: The *A. sativum* extracts in this study have *in vitro* hypoglycemic effect on rat's hemi-diaphgrams tissue. Petroleum ether extract has the highest effect, even more than metformin due to the presence of well-known anti-diabetic compounds; its effect was reduced following metformin combination. Chloroform extract has activity less than petroleum ether, but still more than metformin; its combination also showed an antagonistic action. The ethyl acetate extract effect is less than chloroform and was reduced with combination. Methanolic extract has less activity than ethyl acetate and was not affected with combination. The lowest effect was obtained when ethanoic crude extract was used; combination potentiates its effect but is still less than metformin. Petroleum ether extract has *in vivo* hypoglysimic effect greater than metformin drug; decreased with metformin combination.

Conclusion & Significance: The extract alone was significantly anti- diabetic agent; the effectiveness was decreased with Metformin combination.

Recommendations: Further studies are required to elucidate the mechanisms of interactions.



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Biography

Ikram Mohamed Eltayeb has her expertise in evaluation and passion in research, search and discovery of natural drugs from plant origin. Her open and contextual evaluation model based on responsive constructivists creates new drugs for improving and treating of chronic diseases. She has built this model after years of experience in research, evaluation and teaching of medicinal plants in universities.

kramela_07@yahoo.com

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F Marhoume et al., Am J Ethnomed 2018, Volume 5
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PROTECTIVE EFFECT OF BUTANOLIC AND ETHYL ACETATE FRACTIONS OF RUBIA TINCTORUM EXTRACT AGAINST CALCIUM OXALATE INDUCED UROLITHIASIS IN RATS

F Marhoume[1, 2], A Alioua[3], H Boufous[1, 2], Y Zaid[4], A Chait[2] and **A Bagri[1]**

[1]Université Hassan I, Morocco
[2]Université Cadi Ayyad, Morocco
[3]Mohammed V University, Morocco
[4]Mohammed VI University of Health Sciences, Morocco

Objective: The current study investigated the antiurolithiatic effect of some fractions of methanolic whole plant extract of *Rubia tinctorum* (RT) in rats.

Methods: The RT was successively extracted with, ethyl acetate, butanol and water to obtain fractions. Calcium oxalate urolitihiasis was induced in rats by ethylene glycol–ammonium chloride feeding in drinking water for 10 days. These rats were treated with two doses (1000 and 2000 mg/kg) of the fractions. Antiurolithiatic activity was assessed by estimating biochemical changes in serum, urine and histological changes in kidney tissue.

Results: Sodium oxalate administration caused biochemical alterations in urine which was found to be prevented significantly by the butanolic and ethyl acetate fractions. Supplementation with butanolic and ethyl acetate fraction prevented the elevation of serum creatinine, urea, uric acid, phosphor and calcium levels. The butanolic and ethyl acetate fractions also caused significant decrease in lipid peroxidation activity, accumulation of calcium oxalate deposits and histological changes in the kidney tissue.

Conclusion: The results showed that the antiurolithiatic component of the methanolic *Rubia tinctorum* extract of the plant is contained in the butanolic and ethyl acetate fractions. The effect is associated to its diuretic, antioxidant, nephroprotective properties and effect on lowering the concentration of urinary stone-forming constituents.

marhoume.fatimazahra@gmail.com

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FTIR-SPECTROPHOTOMETRIC ANALYSIS OF CERBERIN IN RAT PLASMA

Prasanth S S[1] and **Rajasekaran A**[2]
[1]Al Shifa College of Pharmacy, India
[2]KMCH College of Pharmacy, India

Cerberin (2-o-Acetyl neriifolin) is the principal cardiac glycoside present in the seeds of ***Cerbera odollam*** belonging to the Apocyanaceae family. The seeds of ***Cerbera odollam*** are used as a poison for suicidal as well as homicidal purpose by people around the world. Its detection in the body fluids is somewhat difficult. The aim of this study was to develop a FT-IR spectrophotometric procedure for the analysis of cerberin in rat plasma3. A Fourier transform infrared (FT-IR) spectrometric method was developed for the rapid, direct determination of cerberin in rat plasma. The universal ATR spectra was recorded and used for this study. Multiple linear regressions (MLR), with a restricted set of absorption band were used for calibration. Beer-Lambert law was used for data processing. A recovery of 98.8% of cerberin from rat plasma with a correlation coefficient of 0.9980 was obtained. The linear regression equation for cerberin was calculated to be y = -1.0943–1.5875 x, where x and y are concentration and integrated peak area, respectively. The method had excellent reproducibility for the standard of 0.2 mg, 0.19±0.107% (n=6). The recovery test is an experimental design to verify the relationship between the amount of substance added and the amount quantified by this assay. In this test, the observed concentrations of pure cerberin in rat plasma were not significantly different from the stated concentrations by Student's t-test, P=0.05% (100.06±1.28%, n=3). The method gave rise to linear data in the range 0.1–0.8 mg with accuracy and precision in the range 0.86–1.4%. Therefore, this FT-IR-spectrophotometric assay was accurate, and may be recommended for the simple quantification of cerberin.

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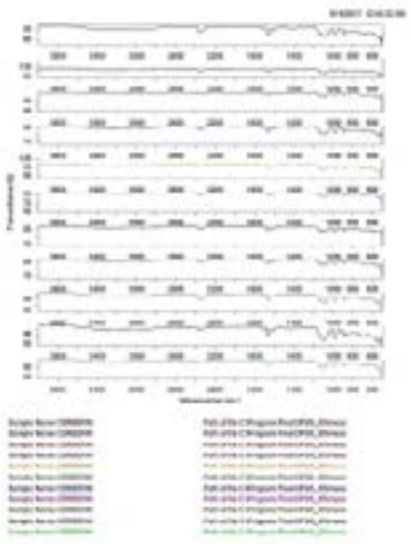

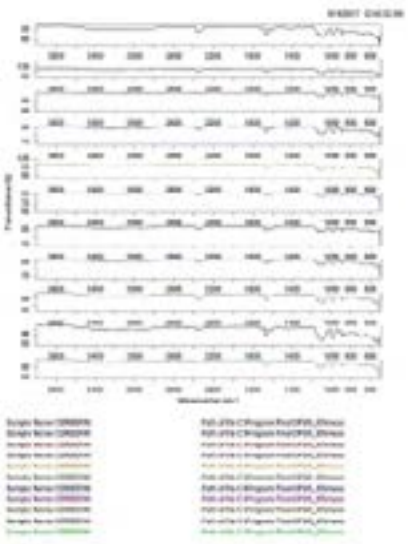

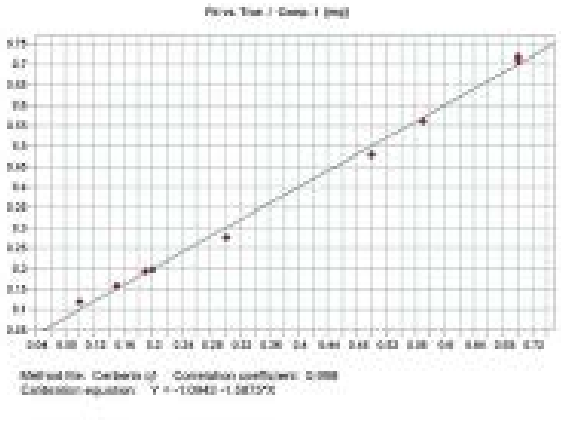

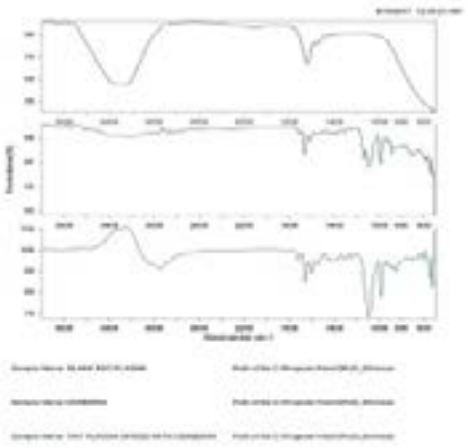

Biography

Prasanth S S is a Professor in Al Shifa College of Pharmacy, Kerala and has been awarded PhD on his research thesis entitled 'Novel analytical techniques for quantification of the toxic phytochemical of *Cerbera* species'. His broad area of research interest includes development of analytical techniques for bulk drugs, formulations and natural products. During his Postgraduate studies, he was trained at the Toxicology Department, Medical College, and Trivandrum. He is experienced in analyzing drugs and toxins in various biological fluids of human body. His researches lead to the development of some analytical methods for detection and quantification of cerberin in rat plasma and serum.

nakulprasanth@gmail.com

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POLYHERBAL FORMULATION OF SELECTED FEW MEDICINAL PLANTS HAVING ANTIDIABETIC ACTIVITY

Jhansee Mishra
Veer Bahadur Singh Purvanchal University, India

In the present study, the antihyperglycemic, hypolipidemic and antioxidant properties of the specially formulate polyherbal formulation in streptozotocin induced diabetic rats was determined. Diabetes was induced in albino rats by administration of streptozotocin (55mg/kg, I.P). The formulation F1 (N:G:S=2:2:1) 200 mg/kg body weight was administered to diabetes induced rats for a period of 28 days, which possess better effect than formulation F2 (N:G:S=2:1:2) 200 mg/kg and formulation F3 (N:G:S=2:1:1) 200 mg/kg. Additional biochemical parameters such as serum cholesterol, triglycerides, HDL-cholesterol, LDL-cholesterol levels were also measured at the ending of study. After verifying the antidiabetic property, the F1 (N:G:S=2:2:1) 200 mg/kg in blood glucose was observed for the finest one; in order to justify it we have to check its oxidative parameter, i.e. SOD, TBAR, GSH and LPO, which enzyme indicates its oxidative stress. From the above outcome, it was concluded that the formulation F1 (N: G: S =2:2:1) 200 mg/kg on blood glucose possesses significant antidiabetic, hypolipidemic and antioxidant effects in streptozotocin induced diabetic rats.

Biography

Jhansee Mishra received her BPharm and MPharm from Indira Gandhi Institute of Pharmaceutical Sciences (IGIPS), Bhubaneswar, Odisha. She was awarded PhD Degree in Pharmaceutical Sciences from Suresh Gyan Vihar University (SGVU), Jaipur, Rajasthan, India. She is working as an Assistant Professor at the Institute of Pharmacy, Veer Bahadur Singh Purvanchal University, India. Her present research projects are focused on "polyherbal formulation and standardization of selected few medicinal plants having antidiabetic activity". She has more than 30 national and international publications and two books to her credit. She has nine years of experience in research and teaching. She is Regional Editor in *International Research Journal of Pharmacy*, Member of the Central Executive Committee Journal of Scientific Letters. She is life member of Indian Community Pharmacy and has organized many national and international conferences and workshops.

email2jhansi@yahoo.co.in

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THE EFFECT OF ARBUTIN POWDER AND ARCTOSTAPHYLOS UVAURSI AQUEOUS LEAF EXTRACT ON SYNTHESIS OF MELANIN BY MADURELLA MYCETOMATIS

Amina Saadeldin Abdelmotalib Omer and **Ikram Mohamed Eltayeb**
University of Medical Sciences and Technology, Sudan

Background: Mycetoma is a devastating, slow-growing bacterial or fungal infection, which develops into a chronic infection of the skin tissues and if left untreated, eventually results in amputation. With existing anti-fungal and surgery, only 35% of people living with the fungal form of the disease, known as eumycetoma, are cured, *Madurella mycetomatis* has been found to shield itself against the antifungal therapy through the production of melanin decreasing the effectiveness of the therapy, *Arctostaphylos uva-ursi* has proven antimicrobial effect and is known for it's content of arbutin which is a potent inhibitor of melanin synthesis in humans, can hopefully potentiate the action of the present therapy and optimize its effect. The purpose of this study is to investigate the effect of arbutin powder and *A. uva-ursi* aqueous leaf extract on synthesis of melanin by *Madurella mycetomatis*.

Methodology & Theoretical Orientation: Aqueous extract of *A. uva-ursi* was prepared by dissolving 50 g of *A. uva-ursi* leaves in 1000 ml of water:methanol ratio of 95:5. The arbutin solution was prepared by dissolving 0.5 g of arbutin powder in 20 ml of sterile distilled water. The study of the effect of aqueous extract of *A. uva-ursi* and arbutin on the synthesis of melanin by *M. mycetomatis* was carried out as described by van de Sande.

Findings: The inhibitory effect of arbutin on melanin synthesis by *M. mycetomatis* was found to be dose dependent. *A. uva-ursi* aqueous leaf extract containing arbutin was also found to decrease melanin production by M. *mycetomatis*.

Conclusion & Significance: Inhibition of melanin synthesis was observed in the arbutin powder as well as the aqueous extract containing arbutin

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aminaomer9@gmail.com

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ANTI-HYPOTHYROIDISM ACTIVITY OF LEPIDIUM SATIVUM ETHANOLIC EXTRACT

Reham Sharfeldeen Osman and **Ikram Mohamed Eltayeb**
University of Medical Sciences and Technology, Sudan

Statement of the Problem: Hypothyroidism is a condition in which the thyroid gland does not produce enough thyroid hormones [triiodothyronine (T3) and thyroxine (T4)] which is commonly caused by iodine deficiency. It is a potentially serious disorder and if left untreated it can lead to memory loss or mental slowing as well as depression and may become more severe over time. The current medical therapies for hypothyroidism are often deemed inadequate because of difficulties in regulating the level of thyroid hormones through use of conventional drugs. Herbal drugs have proven to be useful in number of diseases, and they have the capacity to cure such metabolic disorders synergistically at different steps. Therefore, more research must be done for effective and safer anti-hypothyroidism agent from plants. The purpose of this study is to know whether *Lepidium sativum* would affect the level of thyroid hormones.

Methodology: The extract was prepared by Soxhlet apparatus. The anti-hypothyroidism activity was tested using thirty male Wistar rats. They grouping into five groups, Group 1: Normal group=administered only distilled water. Then 10 mg/kg propylthiouracil was added to the drinking water of all other groups to induce hypothyroidism. Group 2: Negative control without any treatment; Group 3: Test group=treated with oral administration of 500 mg/kg extract; Group 4: Treated with oral administration of 250 mg/kg of the extract; Group 5: Standard group (positive control)=treated with intraperitoneal levothyroxine. All rats were incubated for 20 days at animal house with room temperature of proper ventilation provided with standard diet.

Findings: The results show that the *L. sativum* extract was found to increase the T3 and T4 in the propylthiouracil induced rats with values (0.29 ng/dl T3 and 0.57 U T4) for the 500mg/kg and (0.27 ng/dl T3 and 0.517 U T4) for the 250mg/kg in comparison with standard with values (0.241 ng/dl T3 and 0.516 U T4) so that *L. sativum* can be stimulatory to thyroid function and possess significant anti-hypothyroidism effect with p-values ranges from (0.000006*–0.893472).

Conclusion & Significance: *L. sativum* extract was found to possess anti-hypothyroidism effects and act as an agent that stimulates thyroid hormone secretion.

Recommendations: Further investigation should be carried to investigate the anti-hypothyroidism effect of *L. sativum* extract at the compound level.

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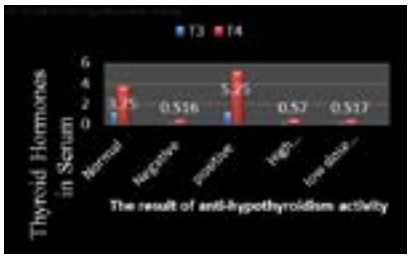

Biography

Reham Sharfeldeen Osman has her expertise in evaluation and passion in research, search and discovery of natural drugs from plant origin. Her open and contextual evaluation model based on responsive constructivists creates new drugs for improving and treating of infectious diseases

Rehamhajomer4444@gmail.com

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GAS CHROMATOGRAPHIC – MASS SPECTROSCOPIC ANALYSIS OF CITRUS RETICULATA FRUIT PEEL, ZINGIBER OFFICINALE RHIZOME AND SESAMUM INDICUM SEED ETHANOLIC EXTRACTS POSSESSING ANTIOXIDANT ACTIVITY AND LIPID PROFILE EFFECTS

Samar Saadeldin Abdelmotalab, Sudan Ikram Mohammed Eltayeb and **Saad Hussein Ayoub**
University of Medical Sciences and Technology, Sudan

Statement of the Problem: Cardiovascular diseases play a central role in mortality and morbidity rates around the world. Dyslipidemia and oxidative stress are considered modifiable risk factors of cardiac diseases. Pharmacologic activities of the plants' extracts were demonstrated in previous researches. The purpose of this study is to analyze extracts using GC-MS to identify active principles and percentages of their occurrence in analytes.

Methodology: Analysis of the crude 96% ethanolic extracts was performed using (GS-MS QP) type Schimadzu 2010 with capillary column RTX-50 (restec), (length 30 mm, diameter 0.25 mm, and thickness 0.25 mm). Helium used as carrier gas, temperature programmed at 200°C for 5 minutes at rate of 15ml/minute, extracts were injected using split injection mode. Identification of different components was from their mass Spectra and retention time, compared with those on NIST library.

Findings: Revealed presence of 80 compounds in extract of locally grown C. reticulata, abundant in monoterpenoid compounds including limonene (3.03%), alpha and gamma–terpinenes (2.61%), linalool (1.38%), citral (1.72%) having anti-oxidant effects. Sesquiterpenoids, humulene (0.26%) and caryophyllene (1.97%) were identified. Locally grown S. indicum oil and water soluble portions of extract revealed presence of 64 compounds with high percentage of monounsaturated fatty acid ester methyl oleate (66.99%), methyl stearate (9.35%) and palmitate (15.71%) in oil portion, whereas, plant sterols; Gamma-sitosterol (13.5%), fucosterol (2.11%), stigmasterol (1.95%) and gamma-tocopherol (1.16%) occurred in water-soluble portion. Z. officinale rhizome analysis revealed presence of 93 compounds, including alpha-zingeberine (16.5%), gingerol (9.25%), alpha- sesquiphellandrene (8.3%), zingerone (6.78%), beta-bisabolene (4.19%), alpha-farnesene (3.56%), ar-curcumene (3.29%), gamma- elemene (1.25%) and other compounds.

Conclusion & Significance: The study demonstrated presence of compounds having antioxidant activity, effects on intestinal cholesterol absorption and regulation of serum cholesterol levels which reflects activities of extracts. Evaluation of the extracts' pharmacologic activities at individual compound level is required to assess their potential as prospective therapeutic agents.

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Biography

Samar Saadeldin Abdelmotalab has her passion in improving the health and well-being in Sudan. Her research was based on the evaluation of the pharmacologic properties of locally grown and imported plants and analysis of the active constituents of these plants. The research which she conducted won the university prize as the best one held in Faculty of Pharmacy in the year of her graduation, 2015. Since then she has been conducting her national country service at the National Medicines and Poisons Board. She wishes to continue her studies in attaining Master's Degree and further development in the field of Pharmaceutical Sciences

samar.omer1994@gmail.com

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IN VITRO SUSCEPTIBILITY OF ISOLATED SHIGELLA FLEXNERI AND SHIGELLA DYSENTERIAE TO THE ETHANOLIC EXTRACTS OF TRACHYSPERMUM AMMI AND PEGANUM HARMALA

Ibrahim Siddig Hamid and **Ikram Mohamed Eltayeb**
University of Medical Sciences and Technology, Sudan

Statement of the Problem: Bacillary dysentery which is caused by one or more types of *Shigella* species, highly prevalent in hot countries with poor sanitation like Sudan especially in children is a potentially serious disorder if left untreated. It can lead to dehydration in children or liver abscess if it is spread from intestine to the liver stream. Options of treating Shigellosis with antimicrobials are becoming limited because of globally emerging antimicrobial resistance and the long use of these synthetic drugs causing many side effects. Therefore, the search for effective and safer antimicrobial agents from plants has become an area of interest in active research. The purpose of this study is to investigate the antimicrobial activity of the ethanol extracts of *Peganum harmala* and *Trachyspermum ammi* against isolated ***Shigella flexneri and Shigella dysenteriae*** causing bacillary dysentery.

Methodology: *T. ammi* and *P. harmala* were extracted by 96% ethanol using Soxhlet apparatus. The antimicrobial activity of the extracts was investigated according to the disc diffusion method and the minimum inhibitory concentrations of the extracts were determined.

Findings: All tested bacteria (*Shigella flexneri and Shigella dysenteriae*) were found to be sensitive against *T. ammi* seed extracts, while the same bacteria were resistant for amoxicillin and amoxicillin + clavulanic acid and insensitive for P. harmala. The tested bacteria were also sensitive to gentamycin 5 mg/ml, but it has a lower inhibition zone than that of T. ammi 100 mg/ml.

Conclusion & Significance: *T. ammi* ethanolic extract possessed antimicrobial activity as stated in literature.

Recommendations: Further investigations should be carried out to find the bioactive compounds for developing new antibiotic.

Recent Publications

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Figure 1: Minimum inhibitory concentration of *T. ammi* ethanol extract against A(*Shigella dysentery*) and B(*Shigella flexneri*)

Biography

Ibrahim Siddig Hamid has his expertise in evaluation and passion in research, search and discovery of natural drugs from plant origin. His open and contextual evaluation model based on responsive constructivists creates new drugs for improving and treating of infectious diseases

ibrahimsiddig95@gmail.com

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A COMPARATIVE STUDY OF ANTI-INFLAMMATORY ACTIVITY AND CHEMICAL ANALYSIS OF ZIZIPHUS SPINA-CHRISTI LEAVES AND BOSWELLIA SERRATA GUM DRY DISTILLATES

Sara Nadi Joseph Wisa and **Ikram Mohamed Eltayeb**
University of Medical Sciences and Technology, Sudan

Statement of the Problem: Inflammation is the succession change occurring in a living tissue when it is injured by physical trauma, noxious chemicals or microbiological agents. Most of the synthetic drugs used for treatment of inflammation cause many side effects and toxic effects. Thus, many researches was undertaken to find the anti-inflammatory activity with less adverse effects. The objective of the present study to investigate and compare the anti-inflammatory potential of *Ziziphus spina-christi* and *Boswellia serrata* dry distillates.

Methodology: The dry distillates were prepared by dry distillation method. Anti-inflammatory activity of the distillates had been tested in rats by Carrageenan-induced paw edema model. Acute inflammation was produced by injecting 1% solution of Carrageenan into the plantar surface of the rat right hind paw at the dose of 0.1mL per 100g body weight. The rats were divided into six groups of five rats each. Group I received normal saline control (P.O) at a dose of 10ml/kg. Group II was treated with the standard drug sodium diclofenac (20 mg/kg, P.O.). Group III and \ IV were treated with extracts of *Z. spina-christi* 200 and 400 mg/kg P.O doses, respectively. Group V and VI were treated with extracts of *B. serrata* 200 and 400 mg/kg P.O doses, respectively. After 60 minutes, Carrageenan solution was injected to the animals of all groups. The paw size was measured using a digital clipper and compared with control animals which received only the vehicle. GC-MS was used for chemical analysis.

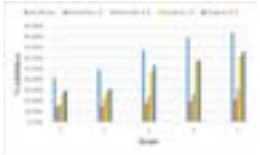
Findings: The results showed significant anti-inflammatory effect with p-values (0.000–0.009) and (0.002–0.45) for *Z. spina-christi* and B. serrata, respectively which were found be dose and time dependent. GC/MS analysis revealed the presence of 90 compounds in *Z. spina-christi* distillate and hundred compounds were identified in *B. serrata* with major compounds well known for their anti-inflammatory effect.

Conclusion & Significance: The dry distillate of *Z. spina-christi* and *B. serrata* were found to have anti-inflammatory activity and the activity was found to be higher in Z. spina-christi.

Recommendations: Further investigations regarding the pharmacokinetics and pharmacodynamics of active constituents of these plants should be done.

Recent Publications

1. Setorki M (2016) Effect of hydro-alcoholic extract of Ziziphus spina-christi against scopolamine-induced anxiety in rats. Bangladesh Journal of Pharmacology 11(2):421–427.
2. Boonyarikpunchai W, Sukrong S and Towiwat P (2014) Antinociceptive and anti-inflammatory effects of rosmarinic acid isolated from Thunbergia laurifolia Lindl. Pharmacol Biochem Behav 124:67–73.
3. Kumar S, Bajwa B, Kuldeep S and Kalia A (2013) Anti-inflammatory activity of herbal plants: A review. Int J Adv Pharm Biol Chem. 2(2):272–281.
4. Siddiqui M (2011) *Boswellia serrata*, a potential anti-inflammatory agent: an overview. Indian Journal of Pharmaceutical Sciences 73(3):255–261.
5. Aman U and Balu G (2009) Pharmacological activities of *Boswellia serrata* Roxb. —Mini review. Journal of Ethnobotanical Leaflets 13:766–74.



Biography

Sara Nadi Joseph Wisa has her expertise in evaluation and passion in research, search and discovery of natural drugs from plant origin. Her open and contextual evaluation model based on responsive constructivists creates new drugs for improving and treating of infectious diseases

sara.wisa@yahoo.com

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SAFETY AND TOXICITY EVALUATIONS OF XANTHIUM STRUMARIUM LINN

Bhanu P S Sagar and **Srishti Singh**
IEC Group of Institutions, India

Xanthium *strumarium* L. is poisonous to mammals due its toxic principle which is a diterpenoid glycoside i.e., atractyloside found in the roots and seeds. It was thought worthwhile to carry out the hepatotoxic assessments and safety and toxicity evaluations of oral administration of atractyloside and methanolic extracts of *X. strumarium* L. in albino Wistar rats. So, the present investigation was undertaken with following objectives: to develop standardized protocols for extraction, isolation, purification, characterization and quantitative estimation of atractyloside; hepatotoxic assessments of oral administration of atractyloside in albino Wistar rats and to study the safety and toxicity evaluation of methanolic extract in albino Wistar rats. Xanthium *strumarium* Linn. roots and seeds were found to contain alkaloids, anthraquinones, flavonoids, atractyloside, phenolics, steroids, terpenoids, and resin etc. In the present investigation, an attempt was made to separate the atractyloside by using instant preparative thin layer chromatography (IPTLC) technique. Purified atractyloside was chemically characterized by IR, mass and NMR spectral analysis. Atractyloside concentrations were found to be 2.9 and 4.3 mg/ml in plant root and seeds respectively using HPLC techniques. During hepatotoxic assessment, atractyloside produced severe hepatotoxicity in albino Wistar rats. Observations of the sub-acute and acute toxicity studies had indicated that methanolic extract of *X. strumarium* had shown a narrow safety margin in animals. On the basis of sub-acute and acute toxicity evaluation studies, it was established that both atractyloside and methanolic extract of *X. strumarium* L. possess a narrow safety margin in rats used in *in vivo* experimental and pre-clinical pharmacological studies.

Biography

Bhanu P S Sagar completed his PhD from Jamia Hamdard, Postdoctorate from National Institute of Immunology .Presently, he is the Director of Pharmacy College at IEC-GI and Former Vice-Chancellor of IEC University. He has published 47 papers and presented 30 papers. He has also presented two papers in AAPS 2006, National Biotechnology Conference in Boston, USA. He is the Reviewer for various international journals and was also selected for "Marquis Who's Who in Asia" and "Marquis Who's Who in World". He has received many awards in his prime areas of research include plant tissue culture, phytochemical and pharmacological investigations of natural products

bpssagar@gmail.com