Journal of Research in Pharmacy
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SCNC 2023 INTRODUCTION

This symposium series has been organized jointly by Near East University (formerly by Anadolu University) and the S. Yu. Yunusov Institute of Chemistry of Plant Substances (ICPS) of the Uzbekistan Academy of Sciences biennially since 1994 in Uzbekistan and Türkiye. Only the 9th SCNC was held in 2011 at Urumqi, Xinjiang-Uyghur Autonomous State, and the 13th SCNC in 2019 in Shanghai, P.R. China. Since 2011, Xinjiang Technical Institute of Physics and Chemistry of the Academy of Sciences of People's Republic of China became one of the organizers of this scientific forum.

SCNC deals with a number of relevant topics presented by the most reputed scientists in the field. In addition, the symposium is open to relevant contributions covering chemical, pharmacological, and biological activity-related aspects of natural products to be presented either orally or as a poster. We, therefore, would highly appreciate your participation and expect your earliest registration. Previous SCNC symposia were organized in Türkiye in Eskisehir (1996, 2009), Ankara (2005), Isparta (2001), and Antalya (2015). The others were held in Uzbekistan and China.

We are ready to welcome you on November 2-5, 2023 in the centennial year of the Republic of Turkiye, to get together with fellow scientists and share knowledge in this global event in Antalya, Türkiye.

We look forward to meeting you all in Antalya, Türkiye.

Prof. Dr. K. Hüsnü Can Baser (Türkiye) Chairman
Prof. Dr. Shomansur Sh. Sagdullaev (Uzbekistan) Co-chairman
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Previous SCNC MEETINGS

- 1st Uzbek-Turkish Symposium on the Chemistry of Natural Compounds, 5-7 October 1994, Tashkent, Özbekistan
- 2nd International Symposium on the Chemistry of Natural Compounds (SCNC), 22-24 October 1996, Eskişehir, Türkiye
- 3rd International Symposium on the Chemistry of Natural Compounds (SCNC), 19-22 October 1998, Bukhara, Özbekistan
- 4th International Symposium on the Chemistry of Natural Compounds (SCNC-2001), 6-8 June 2001, Isparta, Türkiye.
- 5th International Symposium on the Chemistry of Natural Compounds (5th SCNC), 20-23 May 2003, Tashkent, Özbekistan
- 6th International Symposium on the Chemistry of Natural Compounds (SCNC), 28-29 June 2005, Ankara, Türkiye
- 7th International Symposium on the Chemistry of Natural Compounds (7th SCNC), 16-18 October 2007, Tashkent, Özbekistan
- 8th International Symposium on the Chemistry of Natural Compounds (8th SCNC),15-17 June 2009, Eskişehir, Türkiye
- 9th International Symposium on the Chemistry of Natural Compounds (9th SCNC), October 16-19, 2011, Urumqi, Xinjiang, Çin Halk Cumhuriyeti
- 10th International Symposium on the Chemistry of Natural Compounds (10th SCNC), November 21-24, 2013, Tashkent, Özbekistan
- 11th International Symposium on the Chemistry of Natural Compounds (11th SCNC), October 1-4. 2015, ANTALYA, Türkiye
- 12th International Symposium on the Chemistry of Natural Compounds (12th SCNC), September 7-8. 2017 Tashkent, Özbekistan
- 13th International Symposium “Actual problems of Chemistry, Biology and Technology of Natural Compounds” November 16–19, 2019, Shanghai, China
- 14. International Symposium “Actual problems of Chemistry, Biology and Technology of Natural Compounds” November 7–8, 2021, Tashkent, Özbekistan

SCNC 2023 Topics

We invite you to submit an abstract of 250-300 words including main parts of your study and to share your experience and research relating to main topics

1. Chemistry, pharmacology, biological activities and technology of natural compounds
2. Natural compounds as ingredients in the formulation of cosmetics and pharmaceuticals
3. Dietary supplements and functional foods in phytotherapy and aromatherapy
4. Developments in the field of extracts, essential oils and phytochemicals
5. Regulatory aspects of natural compounds and their formulations

Scientific Program: 15th International Symposium on the Chemistry of Natural Compounds (SCNC 2023)

November 2, Thursday	
09.00-9.30	**Welcome speech – Symposium opening** **K. Hüsnü C. Başer** **Shamansur Sagdullaev**
Session I	
Chair: K. Hüsnü C. Başer	
09.30-10.00	**Plenary 1 –** Innovative Technologies in The Field of Creating Effective Plants from Avicenna Recipes **Shamansur Sagdullaev**
11.00-11.30	**Tea /coffee Break**
Session II	
Chair: Shamansur Sagdullaev	
11.30-12.00	**Plenary 2** – A Review of Alkaloids in African Plants, with Emphasis on Cape Legumes **Ben Erik Van-Wyk**
12.00-12.15	OP 1- Novel Cycloartane Glycoside from *Astragalus mucidus* **Manzura Agzamova**
12.15-12.30	OP 2- Biological Activities of the Secondary Metabolites of Endophytic Fungi Isolated from the Medicinal Plant *Hyssopus officinalis* **Farkhod Eshboev**
12.30-12.45	OP 3- Extraction of Polysaccharides From Natural Resources **Salikhjan Mauljanov**
12.45-14.00	Lunch Break
Session III	
Chair: K.H.C. Başer	
14.00-14.30	**Plenary 3 –** Study of the Immunogenicity of Combination of Recombinant RBD (Omicron) and Nucleocapsid Proteins of SARS-CoV-2 Expressed in *Pichia pastoris* **Azimova Shahnoz**
14.30-14.45	OP 4- Components of Plants *Haplophyllum griffithianum* of The Rutaceae Family **Dilobarkhon Kodirova**
14.45-15.00	OP 5- Comparative Study on the Essential Oil and Lipids of *Ferula kyzylkumica* Korovin **Khayrulla Bobakulov**
15.00-15.15	OP 6- Study On Chemical Constituents of Two Edible Plants From Xinjiang **Zuopeng Li**
15.15-15.30	OP 7- Evaluation of the Antiviral Potential of *Marrubium vulgare* Extracts **Ayşe Esra Karadağ**
15.30-16.00	Tea /coffee Break

Session IV	
Chairs: N. Ramazanov	
16.00-16.30	**Plenary 4 –**Chemical Composition and Biological Activities of *Lycium ferocissimum* Miers. **Müberra Koşar**
16.30-16.45	OP 8- Elemental Composition of the *Anabasis aphylla* from Qazaqstan **Zharkyn Ibatayev**
16.45-17.00	OP 9- Synthesis of Derivatives of 1-Aryl Tetrahydroisoquinoline Alkaloids and Their Biological Activity **Sherzod Zhurakulov**
17.00-17.15	OP 10- Determination of Vitamin Content and Medicinal Properties of Black Raisin Grapes **Bakhrom Babaev**
17.15-17.30	OP 11- GC-MS Analysis of Essential Oils and Fatty Acids of Lipids from *Ferula* species Growing in Uzbekistan **Khayrulla Bobakulov**
17.30-17.45	OP 12- Pharmacological Properties and Technology of the Diterpenoid Alkaloid Ranaconitine from Rhizomes with Roots of the *Aconitum* genus plants **Alim Sadikov**
November 3, Friday	
Session V	
Chairs: Shakhnoz Azimova, Ben Erik Van-Wyk	
9.30-10.00	**Plenary 5**– Phytochemical and Antileismanial Activity Studies on the Tubers of *Cyclamen rohlfsianum* Asch. **İhsan Çalış**
10.00-10.30	**Plenary 6-** *Cannabis sativa* Constituents, Cannflavins: Chemistry and Biological Activities **Mahmoud A. ElSohly**
11.00-11.30	**Tea /coffee Break**
Session VI	
Chairs: Salimakhon Aripova, Temel Özek	
11.30-12.00	**Plenary 7-** Recent Advances of Targeted Synthesis, Modifications and Bioactivity of Quinazoline Alkaloids and Their Analogues **Elmuradov Burkhon**
12.00-12.15	OP 13- *In vitro* Biological Activities and Phytochemical Ingredients of Two *Heptaptera* species: *Heptaptera anisoptera* (D.C.) Tutin and *H. cilicica* (Boiss. & Bal.) Tutin **Ceylan Dönmez**
12.15-12.30	OP 14- Toxicological Impact and aAkaloid Diversity of Southern African *Senecio sp.* (Asteraceae) **Nicholas Sadgrove**

12.30-14.00	Lunch Break
Session VII	
Chair: Erkin Botirov	
14.00-14.30	**Plenary 8-**Prospects for the Use of Medicinal Products Based on Plants of the Genus *Ferula* of the Flora of Uzbekistan **Salimakhon Aripova**
14.30-14.45	OP 15- Application of Deep Eutectic Solvents for Rosmarinic Acid Extraction in Some Medicinal Plants **Tuğba İduğ**
14.45-15.00	OP 16- Evaluation of Antioxidant and Enzyme Inhibitory Activity of Four *Echium* Species **Nuraniye Eruygur**
15.00-15.15	OP 17- Alkaloids and Polyphenols with Antibacterial, Antioxidant, Anti-inflammatory and Anticholinesterase Activities from *Atractylis cancellata* **Hamada Haba**
15.15-15.45	Tea /coffee Break
Session VIII	
Chair: S. Sasmakov, Hasan Kırmızıbekmez	
15.45-16.15	**Plenary 9-** From Medicinal Plant to Herbal Drug Preparation: R&D Case Study **İrem Çankaya**
16.15-16.30	OP 18- Study on The Diterpenoid Alkaloids from *Aconitum barbatum var. puberulum* and *Delphinium aemulans* **Bo Zhao**
16.30-16.45	OP 19- Biological Effects of *Cyperus rotundus* and It's Chemistry **Ömerül Faruk Tavlı**
16.45-17.00	Poster Session
November 4, Saturday	
Session IX	
Chairs: İhsan Çalış, Alexander Crawford	
09.00-09.30	**Plenary 10-** Receptor Related Pharmacological Activities of *Hypericum perforatum* L. **Emre Hamurtekin**
09.30-10.00	**Plenary 11-** Enzymatic Synthesis of Nucleoside Analogues of 1,2,4-Triazole and Their Antiviral Activity **Sobirdjan Sasmakov**
10.00-10.30	**Plenary 12-** Properties, Structure and Biological Activity of Arabinogalactans and Galactomannans of Some Plant Species of Uzbekistan **Rakhmanberdiyeva Rano Karimovna**
11.00-11.30	Tea /coffee Break

Session X	
Chairs: B.T. Salimov	
12.00-12.15	OP 20- Mechanistically Evaluation of the Anti-inflammatory Potential of CarvenS Syrup – A Commercial Herbal Product **Ayşe Esra Karadağ**
12.15-12.30	OP 21- *In vitro* and *in silico* Evaluation of the Antiviral Potential of *Eucalyptus* Essential Oils **Ezgi Ak-Sakallı**
12.30-12.45	OP 22- Development of a Technology for Obtaining a Substance Based on Polysaccharides of *Ferula kuhistanica* Prebiotic Action **Munirakhon Mamatkhanova**
12.45-14.00	Lunch Break
Session XI	
Chair: Burkhon Zh. Elmuradov, M. A. ElSohly	
14.00-14.30	**Plenary 13**– Phytotherapy in Europe and Türkiye **Funda Yalçın**
14.30-15.00	**Plenary 14-** Alkaloids of *Consolida ajacis* and *C. ambiqua* Introduced into Around Tashkent City **Salimov Bakhadir**
15.00-15.15	OP 23- Isolation of Secondary Metabolites from *Valeriana tuberosa* L. through *in vitro* Anti-inflammatory Activity-guided Fractionation **Cansel Çelik**
15.15-15.30	OP 24- Isoquinoline Alkaloids as a Promising Framework for Chemical Modifications to Enhance Bioactivity **Negar Maafi**
15:30-16.00	OP 25- Synthesis, Characterization and Biological Studies of Oxamides **Maira Naz**
16.00-17.00	Tea /coffee Break
Session XII	
Chair: F. Tursunkhodzhaeva, E. Hamurtekin	
17.30-17.45	OP 26- Study of the Non-polar Components of the Endophytic Fungus *Ovatospora senegalensis* from Flowers of *Vernonia anthelmintica* **Abulimiti Yili**
17.45-18.00	OP 27- Construction of QSAR Models to Predict Potency on a Series of substituted Imidazole Derivatives as Anti-fungal Agents **Beghdadi Sara El Mansourai**
November 5, Sunday	
Session XIII	
Chairs: Müberra Koşar, Rakhmanberdiyeva Karimovna	
09.30-10.00	**Plenary 15**-Terpenoids and Phenolic Compounds of Plants of The Genus *Perovskia* Flora of Uzbekistan

	Erkin Botirov
10.30-11.00	OP 28- From bench to industry and beyond: Medicinal and Aromatic Plant Laboratory Complex, Batı Akdeniz Agricultural Institute **Müslime Tanrıseven**
11.00-11.30	Tea /coffee Break
Session XIV	
Chair: K.H.C. Başer	
11.30-12.15	**Plenary 16**- Phytoecdysteroıds: Chemıstry, Bıology and Theır Applıcatıons **N. Ramazanov**
12.15-13.00	**Plenary 17-** Pharmacology of 1,2,3,4-Tetrahydroisoquinolines **Firuza Tursunkhodzhaeva**
13.00-13.15	OP 29-New Drugs from Old Medicines: Identification of Anti- epileptic Natural Products from Medicinal Plants **Alexander D. Crawford**
13.15-13.30	OP 30- Method and System Design for the Production of Natural Substances **Süleyman Kınacı**
13.30	CLOSING Ceremony Speech **K.Hüsnü C. Başer, Shamansur Sagdullaev, Aisa Haji Akber**
	Announcement of 16th SCNC
Social Organization	
14.00-17.30	Antalya Excursions / Sightseeing (BATEM/EXPO)

15th International Symposium on the Chemistry of Natural Compounds (SCNC 2023) – POSTER PRESENTATIONS

NO	TITLE	PRESENTER
1.	Prospects and Significance of A New Drug from *Astragalus* sp	Manzura Agzamova
2.	2-Methylquinazolin-4-ylidenecyanoacetic Acid Ethyl Ester	Muborak Tulyasheva
3.	Phenolic Compounds of *Rhus glabra*	Nodira Abdulladjanova
4.	On Nootropic Properties of Donsumin	Ergash Ruzimov
5.	Synthesis of New Derivate of Mercapto-3-Phenyl-1,3,4-Thiadiazol-2-Thione and Estimation of Its Biological Activity on Pass.	Gulnara Shakirzyanova
6.	New Benzimidazole 3′-Deoxynucleosides	Aleksanda Arnautova
7.	Biostimulators Based on Natural Saponins and Cytokinins	Alimjon Matchanov
8.	Research of Complexes of Gossypol Derivatives	Kuralbay Zhadigerovich Rezhepov
9.	Preparation and Physico-Chemical Characteristics of The Water-Soluble Complex of The Gossypol Derivative	Kuralbay Rezhepov
10.	Complexes of Water-Soluble Local Plant Polyphenol Derivatives and Their Biological Activity	Kuralbay Zh. Rezhepov
11.	Dependence of the Growth-Stimulating Activity of Cycloartans on Their Chemical Structure	Rano Zakirova
12.	Manchurian Scorpion Tissues Protein Extraction with Chaotropic Solution and Tandem Ion-Exchange Chromatography	Gafurjon Mavlonov
13.	*Artemisia austriaca* Jacq. Essential Oil Composition, Biological Activity	Darkhan Nurkadyrov
14.	Biologically Active Terpenoids *Achillea tianschanica* Kupr. et Kulemin	Asel Amanzhan
15.	Optimization of the Technology of a New Drug Based on Furanoeremophilan-14β,6α-olide	V.L. Ugai
16.	Isoprenoids of *Populus balsamifera* L. Essential Oil and Their Biological Activity	Aruzhan Sabitova
17.	New Supramolecular Complexes with Specified Properties Based on Phytoecdysteroids	Bakhtiyar Temirgaziev
18.	Application of Polyprenols *Paulownia tomentosa* in the Cultivation of Winter Wheat in Kashkadarya Region	Saida Turaeva
19.	Method of Combating the Quarantine Pest of Cotton *Helicoverpa armigera*	Saida Turaeva
20.	Flavonoids from The *Artemisia porrecta*	Khayrulla Bobakulov

21.	Influence of Polyprenol of *Paulovnia tomentosa* on Formation of Winter Wheat Yield	Elvira Kurbanova
22.	Plant Lignin and Their Application	Botir Abduazimov
23.	Acute Toxicity and Analgesic Activity of 4-(4-((4-(Methoxy-carbonyl)Phenoxy)Methyl) -1H-1,2 ,3-Triazol-1-Yl)Benzoic Acid	Azizbek Azamatov
24.	Influence of the Combination of Cytizine and Succinic Acid on the Acute Alcoholic Intoxication	Shahlo Latypova
25.	Acute Toxicity and Analgesic Activity of Some 1,2,3,4-Tetra-hydroisoquinoline Derivatives in the Acetylcholine Writhing Test	Fazilat Miskinova
26.	Chemical and Elements Content of Hydrolysis Lignin of Cottonseed Hulls	Botir Abduazimov
27.	Syntheses Based on Substituted Phenylethylamines	Sherzod Zhurakulov
28.	Lipids of Halophyte Fruit Plant *Suaeda paradoxa*	Nigora Yuldasheva
29.	Protein Profile of Medicinal Plants	Shakhnoza Rakhimova
30.	Nitration Reaction of the Quinoline Alkaloid Haplophyllidine	Azizjon Ubaydullayev
31.	Polysaccharides of *Crocus sativus*	Fotimakhon Kodiralieva
32.	Oxidation of Foliosidine with Iodic Acid	Jadra Namazbayeva
33.	Chemical Modification of Bucharaine Alkaloid	Elmurod Baynazarov
34.	Synthesis of Heterocyclic Amides of The 18 βH – Glycyrrhizic Acid	Khabibulla Yuldashev
35.	Synthesis Some of 3,11-Dioxo-18βH-Glycyrrhetic Acid Amides	Mahmud Gafurov
36.	Determination of Carbohydrate Content in Black Raisin Grapes	Bakhrom Babaev
37.	Triterpenoids from the Plant *Astragalus transoxanus*	T.N. Kaypnazarov
38.	Benzodioxols From *Ferula lapidosa*	Kh. I. Khasanova
39.	Ethyl β-*D*-Glucopyranoside from *Rumex tianschanicus*	N.M. Ashirmatova
40.	Alkaloids from *Lindelofia macrostyla*	R.M Ruzibaeva
41.	Water-Soluble Polysaccharides of *Scutellaria comosa*	A. A. Siddikova
42.	Biological Efficiency of Extract of *Haplophyllum perforatum* Against *Schizaphis graminum* in Winter Wheat Crops	Parvina Nurmakhmadova
43.	Influence of Pre-Sowing Treatment with Biostimulants on Yield of Phytomass of *Astragalus babatagi* and *Astragalus xanthomeloides*	Elvira Kurbanova
44.	Volatile components of *Daphne* sp. from Türkiye	Gözde Öztürk
45.	Synthetic Derivatives Based on Tropane Alkaloids	S.F. Aripova
46.	Amino Acid and Mineral Compositions of Flowers of Plant Crocus sativus L.	Sh.R. Makhmudova

47.	Isolation and Biological Activity of *Nitraria sibirica* Polysaccharides	N. Berdievc
48.	Qualitative Analysis of Chemical Constituents in *Hyssopus cuspidatus* Boriss. By Q-Orbitrap–HRMS	Rahima Abdulla
49.	Nine New Piperidine Alkaloids from *Anacyclus pyrethrum*	Haji Akber Aisa
50.	Oral Administration of Turmerones Reduces Seizures in Mouse Models of Epilepsy	Alexander Crawford
51.	Phytochemical and Biological Evaluation Study of *Artemisia vachanica* Krasch. Ex Poljakov	Parviz Sukhrobov
52.	Glucoside Coumarins from the N-Buoh Part of the Roots of *Prangos pabularia*	Sunbula Atolikshoeva
53.	Mangiferin Accumulation Stimulated by Tissue Culture Propagation as Compared with Wild Collection in a Model of Four *Hypericum* species	Antoaneta Trendafilova
54.	The Study of The Chemical Constituents of Kuokeamuti Based on UHPLC-QE-MS	Adila Abudurexiti
55.	Determination of Functional Components and Antioxidant Activity of Kuokeamuti	Adila A budurexiti
56.	Microbial Transformation of Curcumin by 25 Different Microorganisms	S.Koray Yetim
57.	Cytotoxic Studies on Two *Scabiosa* Species in Türkiye	Temel Özek
58.	Phytochemical Profile of *Rosa Iliensis* Chrshan.	Gülmira Özek
59.	Evaluation of bioautographic antioxidant and antilipase activities of some *Boswellia* L. oleogum resins by HPTLC-Effect Directed Analysis	Burak Temiz
60.	Synergistic Potential of *Pinus nigra* J.F. Arnold and *Thymus* L. Essential Oils Against Different Human Pathogens	Sümeyye Elif Kahya
61.	Total Content Analysis, In vitro Antioxidant, and Enzyme Inhibition Tests on *Myrtus communis* L.	Zeliha Parlar
62.	Organization of Production of Natural and Synthetic Substances of Drugs and Biologically Active Substances in Accordance with GMP Requirements	M.E. Tursunova
63.	In Vitro Screening for Acetylcholinesterase Inhibitory Activity of *Dysphania botrys, Lotus corniculatus, Noaea mucronata, Vicia cracca*	Çiğdem Kahraman
64.	Aspects of phytoecdysteroids	N. Sh. Ramazanov
65.	Isolation of hederagenin from the *Saponaria officinalis*	L. N. Ashurova
66.	Natural compound from the aerial part of *Silene tomentella* Schischk.	U. Yu. Yusupova
67	Pregnane glycoside of *Silene claviformis* Litv.	U. Yu. Yusupova

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SPECIAL SYMPOSIUM ISSUE
BOOK OF ABSTRACTS

Editor: K.H.C. BAŞER

FOREWORD

The abstract book on the 15th International Symposium on the Chemistry of Natural Compounds (SCNC 2023) November 2-5, 2023,in Antalya, Türkiye, was prepared according to the scientific program.

The 21 invited plenary and 30 oral presentations along with 77 poster presentations were included in the SPECIAL ISSUE of the Journal of Research in Pharmacy, formerly Marmara Pharmaceutical Journal.

The efforts of Prof. F. Demirci, Dr. Ayşe Esra Karadağ and Pharm. S. Elif Kahya are acknowledged during the editorial.

Editor: K.H.C. BAŞER

15th International Symposium on the Chemistry of Natural Compounds (SCNC 2023)

ABSTRACTS OF PLENARY (PL), ORAL (O) and POSTER (P) PRESENTATIONS

PL1. INNOVATIVE TECHNOLOGIES IN THE FIELD OF CREATING EFFECTIVE PLANTS FROM AVICENNA RECIPES

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Abu Ali ibn Sina (980-1037) was born in the village of Afshana, Bukhara region in August 980. After studying medicine at Nuqs al-Qumri, at the age of 16-17, he becamea renowned physician due to his keen mind and memory.

Ibn Sina wrote 280 works, 40 of them were devoted to medicine. His works had a great influence on the development of medicine and pharmacy in the modern world. Ibn Sina's main work on medicine and pharmacy is the Canon of Medical Science, which was widely circulated in Europe for many centuries and was used as a textbook for future doctors.

Ibn Sina was one of the first scientists to develop a systematic approach to the study of medicines and he described and classified plants.

In the "Canon of Medicine" Ibn Sina gives characteristics of medicinal raw materials, methods of manufacturing medicines and their use in the idea of infusions, decoctions,raw extracts, pills, etc. He described the use of more than 500 medicinal plants, 176 ofthem grow in Uzbekistan. These plants belong to various families and genera, many of them have been used to treat a wide range of diseases.

As a result of the work of the Institute of Chemistry of Plant Substances named after.acad. S.Yu. Yunusov isolated 1200 alkaloids, 500 flavonoids, coumarins, lactones and proanthocyanidins, 350 glycosides, 50 lipids, 30 polysaccharides from the flora of Central Asia. The chemical structures of 625 new alkaloids, 180 glycosides, 300flavonoids, coumarins, lactones and proanthocyanidins have been established. Pharmacological tests were carried out on 2000 natural and synthetic substances, 60 compounds underwent preclinical and clinical trials. 35 drugs have been introducedinto medical practice.

Currently, the Institute continues fundamental chemical and pharmaceutical research on secondary metabolites of medicinal plants included in the "Canon of Medicine" of Abu Ali ibn Sina, with the aim of creating new highly effective medicines based on them.

Traditional technologies for the extraction and purification of biologically active substances (BAS) from medicinal plants have a number of disadvantages that do notallow the extraction of many BAS in their native form. These disadvantages are: long time and multi-stage process, the use of toxic and explosive extractants, large losses oftarget products and solvents. Therefore, traditional technologies are constantly beingimproved.

In recent years, the technology for extracting non-polar and mid-polar biologically active substances using liquefied gases in subcritical and supercritical states (fluid extraction), which is a promising alternative to overcome the above-mentioned disadvantages, has become widespread.

The advantages of supercritical fluids (CO_2, refrigerant, freon, propane, etc.) include properties such as high diffusion, low viscosity, high selectivity and high dissolving ability. Among them, carbon dioxide (CO_2) is considered the preferred extractant dueto its non-toxicity, inertness, low cost, non-flammability and non-corrosiveness. FluidCO_2 extraction is

effective for extracting such non-polar compounds as lipids, fatty and essential oils, lipophilic flavonoids, steroids, etc. The use of CO_2 simplifies the technological scheme of the extraction process by eliminating the extractant regeneration stage; the extraction process is several times faster compared to other extractants due to changes in pressure, leading to a rapid transition of the liquid extractant into a fluid state. The resulting extracts often do not contain water-soluble ballast substances and traces of organic solvent. These factors make fluid extraction more economical and environmentally friendly.

As a rule, crude extracts of plant biologically active substances require purification from high-molecular ballast impurities. A modern method for purifying solutions and liquid extracts is the separation of substances using semi-permeable membranes. Membrane separation is used in technologies for obtaining polysaccharides, enzymes, nucleic acids and other protein products from plant materials.

Ultrafiltration is a process of membrane separation of liquid mixtures under pressure, based on the difference in molecular weights or molecular sizes of the components of the mixture being separated. The result of separation is two solutions, one of which is enriched and the other depleted of the solute contained in the original mixture. The use of this process in the separation of temperature-sensitive substances is of great importance, since during ultrafiltration the solutions are not heated and are not subjected to chemical attack, as is the case when filtering hot solutions or during distillation. Therefore, the ultrafiltration process has very low energy costs, approximately 20-60 times lower than distillation. Using ultrafiltration, you can not only fractionate, but also concentrate liquid extracts.

To purify extracts by ultrafiltration, membranes with a pore size of 0.001-0.02 microns are used. Ultrafiltration is used when one of the components of the liquid system has a molecular weight of 500 or higher. In many cases, ultrafiltration of the extract through a membrane that is permeable to the product but impermeable to contaminants produces a clear, clarified solution from which a crystalline product of high purity can be easily obtained.

An effective method for preparative liquid chromatography under pressure is flash chromatography. This method is successfully used for the purification of plant extracts, purification of intermediate and final products, isolation and purification of peptides and oligosaccharides. In terms of the speed of separation of multicomponent mixtures and the quality of their purification, flash chromatography is not inferior to expensive HPLC, but uses lower pressure (from 5 to 50 bar), which significantly saves consumables and energy.

The use of new innovative controlled technologies - environmentally friendly fluid extraction, ultrasonic extraction, ultrafiltration, flash chromatography for the production of drugs, biologically active substances and concentrated extracts from medicinal and food plants, including plants described by Abu Ali Ibn Sina in the "Canon of Medical Science", allows eliminate the use of organic flammable and toxic solvents from technological processes, reduce energy costs, increase the concentration of target products in extracts, and improve their purity and quality.

In conclusion, it should be said that Abu Ali ibn Sina (Avicenna) was one of the greatest scientists of his time and had a huge influence on the development of medical sciences and pharmacy. His works and achievements remain relevant to this day and continue to influence modern medicine.

Keywords: Avicenna, Canon of Medicine, Abu Ali ibn Sina

PL2. A REVIEW OF ALKALOIDS IN AFRICAN PLANTS, WITH EMPHASIS ON CAPE LEGUMES

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The purpose of this review is to explore the medicinal, toxicological and chemophenetic importance of alkaloid-bearing African plant species. More than 20 000 alkaloids have been described in plants, and many of them contribute to the biological and therapeutic activity of important African traditional medicines and stimulants, such as *Catha edulis*, *Catharanthus roseus*, *Coffea arabica*, *Mesembryanthum tortuosum*, *Pausinystalia johimbe*, *Physostigma venenosum* and *Voacanga africana*. From a global selection of 817 of the most relevant medicinal plant species, 174 (21%) accumulate alkaloids and 33 (4%) of them are of African origin. The top five families amongst medicinal plants globally are the Fabaceae (15 spp.), Solanaceae (13), Apocynaceae (10), Rutaceae (9) and Papaveraceae (8). In Africa, the largest numbers of species are from the Fabaceae (5), Apocynaceae (4), Amaryllidaceae (3), Asteraceae (2), Rubiaceae (2) and Solanaceae (2). The alkaloid classes with the highest frequency among medicinal species globally are indole (27), isoquinoline (27) amine (13) and pyrrolizidine (11) derivatives, while in Africa indole (7), isoquinoline (5), amine (2) and purine (2) derivates are the most common. Macrocyclic pyrrolizidine alkaloids of the genus *Senecio* are of toxicological importance due to fatal liver poisoning in humans and animals, as well as contamination of commercial herbal products. Although unrelated plant species often produce the same compounds, alkaloids have been useful as chemophenetic and chemosystematic markers. Quinolizidine alkaloids have been particularly helpful in unravelling generic delimitations in Cape genistoid legumes, with unusual esters and both qualitative and quantitative discontinuities between genera and species.

Keywords: Alkaloids, African medicinal plants, chemophenetics, *Senecio* alkaloids toxicology.

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REFERENCES

[1] Van Wyk B-E, Stander M, Long HS. *Senecio angustifolius* as the major source of pyrrolizidine alkaloid contamination of rooibos tea (*Aspalathus linearis*). S African J Bot. 2017; 110: 124. https://doi.org/10.1016/j.sajb.2017.01.013

[2] Van Wyk B-E, Wink M, Medicinal Plants of the World, second ed., CABI, Boston, MA, USA 2018.

[3] Van Wyk B-E, A family-level floristic inventory and analysis of medicinal plantsused in Traditional African Medicine. J Ethnopharmacol. 2020; 249, 112351. https://doi.org/10.1016/j.jep.2019.112351

[4] Van Schalkwyk FJ, Stander MA, Nsizwane M, Mathee A, Van Wyk, B-E. Fatal pyrrolizidine alkaloid poisoning of infants caused by adulterated *Senecio coronatus*. Forensic Sci. Int. 2021; 320,110680. https://doi.org/10.1016/j.forsciint.2020.110680

[5] Wink M, Van Wyk B-E, Mind-altering and Poisonous Plants of the World, Briza Publications, Pretoria, South Africa 2008.

PL3. STUDY OF THE IMMUNOGENICITY OF COMBINATION OF RECOMBINANT RBD (OMICRON) AND NUCLEOCAPSID PROTEINS OF SARS-COV-2 EXPRESSED IN *PICHIA PASTORIS*

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SARS-CoV-2 is the virus responsible for the COVID-19 pandemic. It is a novel coronavirus belonging to the *Coronaviridae* family, which includes other coronaviruses known to infect humans, such as SARS-CoV and MERS-CoV. SARS- CoV-2 is an enveloped, single-stranded RNA virus with a positive-sense genome. Itis a beta-coronavirus, characterized by its crown-like appearance under electron microscopy due to spike proteins on its surface. These spike proteins play a crucial role in the virus's entry into host cells.

Obtaining recombinant RBD and Nucleocapsid proteins of SARS-CoV-2 in the *Pichia pastoris* system is a strategy that has been explored for the development of vaccines against COVID-19. *Pichia pastoris* is a yeast expression system widely used for the production of recombinant proteins due to its ability to perform post-translational modifications and produce high yields of protein.

In this research, the genes encoding the RBD and Nucleocapsid proteins of SARS- CoV-2 were successfully inserted into the yeast *Pichia pastoris*. Additionally, protocols for isolating and purifying the desired RBD and Nucleocapsid proteins were established. To assess their immunogenicity, the purified proteins were administered to mice, and the specific IgG antibody responses were analyzed using ELISA. These findings suggest that the expressed proteins have the potential to be utilized as candidates for the development of vaccines or diagnostic tools targeting the Omicron variant of SARS-CoV-2.

Keywords: SARS- CoV-2, *Pichia pastoris,* Omicron

PL4. CHEMICAL COMPOSITION AND BIOLOGICAL ACTIVITIES OF *LYCIUM FEROCISSIMUM* MIERS.

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Lycium genus belongs to Solanaceae uses as food and medicinal purposes. Named almost 80 *Lycium* species widely grow in subtropical region of the world. Lycium species are generally known and use in Traditional Chinese Medicine. Especially, *Lycium barbarum* and *Lycium chinense* widely use in Traditional Chinese Medicine for a long time and Lycium barbarum also cultivated in China. This genus representedin 8 species in Türkiye, but *Lycium ferrocissimum* species growing in Cyprus in limited area. *Lycium* species generally traditionally use in eye diseases, cough, gastrointestinal system problems, headache, rheumatoid problems, and kidney diseases, etc. in Türkiye.

In this study, extracts of ripe and unripe fruits, and leaves of *Lycium ferocissimum* Miers. were used in antioxidant and antiinflammatory activity assays. Chemical compositions of the extracts were identified by High Performans Liquid Chromatography (HPLC). Methanol extract of unripe fruit was found as most active extract and its IC50 value was recorded 0.57 mg/mL in DPPH● assay. It's inhition in ABTS+● assay also found as 88.73% in 3 mg/mL concentration. In addition, ethanol extract of unripe fruit was found as active in LPS induced (31.25 mg/mL) inflamationafter measured TNF-α, IFN-γ, PGE 2 ve NO levels. In HPLC analyses, p-OH-benzoic acid, caffeic acid and rutin were identified in the extracts. Antioxidant and antiinflammatory activities of *L. ferocissimum* were studied at the first time in this study.

Keywords: Lycium ferocissimum, antioxidant, antiinflammatory, HPLC.

Acknowledgements: This research supported by Erciyes University, Project no: TSA-2021-11267.

PL5. PHYTOCHEMICAL AND ANTILEISMANIAL ACTIVITY STUDIES ON THE TUBERS OF *CYCLAMEN ROHLFSIANUM* ASCH.

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Leishmaniasis is vector-borne disease caused by a protozoan endo-parasite species belonging to the genus *Leishmania* that live in the blood and tissues of the host. Basically the animals are infected. However, human population who live in the same environment are under risk. Destructive results on the skin, mucous membranes, and visceral organs are clinical manifestations mostly observed. Overall annual prevalence of theLeishmaniasis is approximately 12 million people and the size of the populationat risk is approximately 350 million. On the other hand, it is expected that global warming will cause to increase in the number of vectors of the disease and probablyin the number of countries.

Many plant extracts and the natural compounds isolated from the terrestrial plants and marine organisms have been evaluated for their antileismanial activities.

The genus *Cyclamen* is one of the flowering plants that belongs to the family Primulaceae, and comprises numerous species, many of which are well-known for their ornamental value. Beyond their aesthetic appeal, some of the *Cyclamen* speciesare used traditionally for their potential biological activities. Triterpene-type saponins, flavonoids, and alkaloids are the major groups among the phytochemical constituents reported.

This study focused on the chemical constituents and antileismanial activities of the tubers of *C. rohlfsianum* which is an endemic plant in the flora of Libya. It grows especially in limestone cracks, up to 450 m altitude, and the tuber extracts aretraditionally used against *Leishmania* infections. The ethanolic extract of the tubers has been fractionated using reversed-phase silica gel (LiChroprep-C18). The antileishmanial activities of the fractions and as well as pure compounds isolated fromthe fractions have been studied. The structures of the isolated potent leishmanicidal compounds were established using 1D (^{1}H, and ^{13}C-NMR, DEPT-135) and 2D-NMR (COSY, HSQC, and HMBC) experiments and HR-MS measurements.

Keyword: *Cyclamen*, antileishmanial, NMR

PL6. *CANNABIS SATIVA* CONSTITUENTS, CANNFLAVINS: CHEMISTRY AND BIOLOGICAL ACTIVITIES

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More than 550 compounds were reported in cannabis plant. Besides cannabinoids and terpenes, flavonoids are one of the major classes of compounds that were isolated from *C. sativa*. More than 30 flavonoids belonging to seven basic chemical structures which can be glycosylated (C- or O-glycosides), prenylated, geranylated, or methylated. Orientin, vitexin, isovitexin, apigenin, luteolin,kaempferol and quercetin derivatives constitute the cannabis flavonoids. Cannflavinsare prenylated methoxy luteolin derivatives. Four cannflavins have been isolated from cannabis, namely cannflavin A, cannflavin B, cannflavin C and isocannflavin B. In this presentation, focus will be on biosynthesis, pharmacology, and analysis of cannaflavins.

Keywords: Cannabis; Cannflavins; Biosynthesis; Pharmacology; Analysis.

Acknowledgements: This work was supported in part by National Institute on Drug Abuse (NIDA), contract # N01DA-15-7793.

REFERENCES

[1] Radwan MM, Chandra S, Gul S, et al. Cannabinoids, phenolics, terpenes and alkaloids of cannabis. Molecules 2021; 26: 2774. https://doi.org/10.3390/molecules26092774

[2] Abdel-Kader MS, Radwan MM, Metwaly AM, Eissa IH, Hazekamp A, Sohly MA. Chemistry and Biological Activities of Cannflavins of the Cannabis Plant. Cannabis and Cannabinoid Research. 2023 Sep 27. https://doi.org/10.1089/can.2023.0128

PL7. RECENT ADVANCES OF TARGETED SYNTHESIS, MODIFICATIONS AND BIOACTIVITY OF QUINAZOLINE ALKALOIDS AND THEIR ANALOGUES

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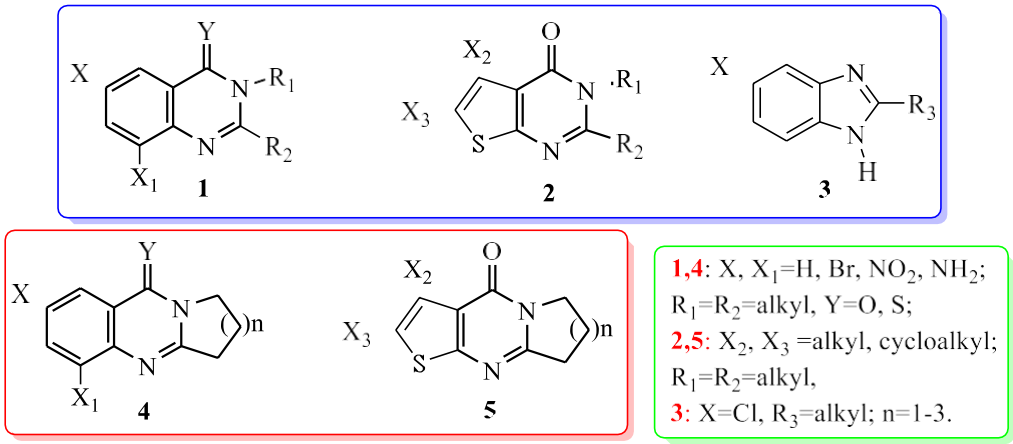
It is important to create targeted synthesis methods of highly effective pharmacologically active compounds and to successfully use them in various fields of the national economy. In this regard, it is important to create cheap and effective local preparations, to further improve their physico-chemical and biological properties. Bi- and tricyclic quinazolines are considered as important objects for medicinal chemists, because they are the scaffold of several potent anticancer drugs. Leading examples are the well-known *erlotinib, vandetanib, lapatinib, icotinib* and *gefitinib*. Several new annulated pyrimidines and imidazoles were selected by the National Cancer Institute (USA) for the treatment of different types of human cancercell lines. The analysis of research conducted in the field of organic, bioorganic and medical chemistry shows that very extensive scientific and practical research is being conducted with compounds containing the pyrimidine and imidazole rings in the molecule, and the number of drugs created on their basis is increasing [1-4]:



In this work, targeted synthesis, modification and application of bi- and tricyclic quinazolines (**1,4**) and their heterocyclic analogues (thienopyrimidines – **2,5** and benzimidazoles - **3**) will be discussed.

Keywords: Quinazoline; analogue; anticancer

REFERENCES

[1] Shakhidoyatov Kh. M, Elmuradov B Zh. *Chem. Nat. Compd.* 2014; 50: 781.

[2] El-Subbagh, HI, Hassan GS, El-Messery SM, Al-Rashood ST, Al-Omary FAM, Abulfadl YS, Shabayek MI. *Eur. J. Med. Chem.* 2014; 74; 234-245.

[3] Bozorov KhA., Jiang-Yu Zhao, Elmuradov B Zh, Apar Pataer, Haji A. Aisa. *Eur.J. Med. Chem.* 2015; 102: 552-573 (Review).

[4] Al-Suwaidan IA, Alanazi AM, Abdel-Aziz AAM, Mohamed MA, El-Azab AS. *Bioorg. Med. Chem. Lett.* 2013;23: 3935-3941.

PL8. PROSPECTS FOR THE USE OF MEDICINAL PRODUCTS BASEDON PLANTS OF THE GENUS *FERULA* OF THE FLORA OF UZBEKISTAN

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Ferula tadshikorum is a perennial, unpleasant-smelling herbaceous plant of the celery family – Apiaceae (Umbelliferae). In Uzbekistan, it grows in Kashkadarya, Surkhandarya regions. In folk medicine of the East, *F. tadshikorum* is used as an antiparasitic, anticonvulsant, antispasmodic, expectorant, for tuberculosis, syphilis, malignant tumors and to improve digestion. Of all the varieties of known types of feruleæactivity, a promising direction of use in medicine is their antiparasitic, namely anti-lambliosis activity. It is known that giardiasis is a widespread disease, especially in children, which is promising for the Central Asian region.

It is known from the literature that in the East, thetis resin ("smelly resin"), obtained from fresh *Ferula* roots by cutting, is used as a spice. Currently, industrial preparationsof this resin, which is exported by tons as a spice to India, Iran, Pakistan, Afghanistan,lead to depletion of stocks of these plants.

The creation of new estrogenic herbal preparations based on the domestic *Ferula* species for the treatment of gynecological diseases is justified. Almost half of womenwith menopausal syndrome have a severe course of the disease (51%). In this regard,the development of a phytopreparation for the correction of menopausal syndrome based on the aboveground part of *F. tenuisecta* is relevant. The drug Tefestrol based on finely dissected Ferula (roots), which is used for the treatment of gynecological diseases in the form of 0.005 g tablets, has been introduced into medical practice in the Yunusov Institute of Plant Chemistry of the Academy of Sciences of the Republic of Uzbekistan (ICPS). But today, other medicinal forms of the drug are necessary and in demand in gynecological practice.

One of the effective forms are: injection (oil solution), as well as ointment, which are especially effective in gynecology as a birth aid. It is known that cases of non-openingof the cervix are observed during childbirth, which leads to the need to use a caesarean section to prevent the death of the fetus. For the first time, we experimentallyestablished the effective use of an injectable oil solution of Tefestrol, which causes a smooth and complete opening of the cervix and successful natural childbirth.

Within the framework of this scientific and technical project it is planned: on the basisof an alcohol extract and *Ferula tadshikorum* resin, to develop a technology of medicines with antiparasitic (anti-lambliosis) activity, estrogenic drugs (Tefestrol + oil solution for injection) as a birth aid (instead of "cesarean section"), a new phytopreparation forthe correction of menopausal syndrome and hormonal therapy from the aboveground part of the finely dissected ferula, an anti-inflammatory dietary supplement (dietary supplement) based on *F. tadshikorum* resin, proposed for use in gastrointestinal tract problems, as well as the development of a modern method of standardization of *F. tadshikorum* resin exported abroad.

Keywords: Ferula; Uzbekistan flora; Apiaceae

PL9. FROM MEDICINAL PLANT TO HERBAL DRUG PREPARATION: R&D CASE STUDY

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Medicinal plants were used in healthcare since time immemorial. More than 90% of traditional medicine recipes contain medicinal plants, and medicinal plants are the main materials associated with preventive or treatment strategies for some diseases. Studies were carried out globally to verify their efficacy and some of the findings have led to the production of plant-based medicines. The global market value of medicinal plant products exceeds a hundred billion dollars *per annum*. The products containing herbal preparations as active ingredients are referred to as "traditional herbal medicinal products" in Türkiye. Especially in Traditional and Complementary Medicine Practices, the consumption of these herbal products by society is quite common.

Venous insufficiency is a circulatory dysfunction that usually occurs in the lower extremities. While this condition causes many complaints in the daily life of the patient, it can also cause much more serious problems unless it is treated and controlled. Although it is a preventable and treatable disease, it has become an important economic and social problem today. Since the number of people affected by venous circulation problems is very high, investments in treatment will be an important problem.

Anatolia has very rich flora in terms of medicinal plants. *Ruscus aculeatus* L. (Asparagaceae) also known as Butcher's broom, is naturally growing in Türkiye. The venotonic activity of *R. aculeatus* L. has been reported for several years in both animals and humans. The plant extracts administered either systemically or orally increased venular tone. This activity means that the plant *Ruscus* considerably benefits patients with venous diseases, including peripheral venous disease (PVD) and hemorrhoidal disease. Patients with PVD presenting with the main symptoms of leg edema and the sensation of heavy legs reported they had ameliorated after taking *R. aculeatus* L. extract. The bioactive compounds identified in the plant extract include saponins (ruskogenin, neuroruskogenin), flavonoids, coumarin, and sterols.

In our studies, *Ruscus aculeatus* was collected from the areas where it is distributed in the Flora of Türkiye, and extraction and optimization processes was carried out. The contents of the extracts of the species collected by High Pressure Liquid Chromatography had been compared qualitatively and quantitatively and standardization was carried out based on the active and/or highest amount of substances. With this study, we will eliminate a significant deficiency in the field of health, improve the quality of life of patients with venous circulation disorders, and pave the way for the development of economically low-cost, high-potential local traditional herbal medicinal products.

Keywords: Ruscus, ruscogenin, venous problems

PL10. RECEPTOR RELATED PHARMACOLOGICAL ACTIVITIES OF *HYPERICUM PERFORATUM* L.

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Hypericum perforatum L. (St. John's Wort) is a medicinal herb which contains numerous active molecules with different pharmacological activities. Many studies showed that some of those mentioned pharmacological actions of *H. perforatum* and its active constituents occur via the interaction of this herb or its chemical ingredients with the related receptors. Additional to its well-known monoamine re-uptake inhibitor activity, *H. perforatum*. extract, hypericin and hyperforin have been shown to have some affinity on various receptors with different concentration ranges. Sigma receptors, GABA-A and GABA-B receptors, NMDA receptors and weak affinity to benzodiazepine receptors have been shown to play some role in the central nervous system actions of this herb and its active constituents. Recently, some affinity to cholinergic receptors have also been observed in radioligand binding studies. Hypericum also regulates carbohydrate and lipid metabolism via the peroxisome proliferator-activated receptor (PPAR-γ). Additional to binding affinities of *H. perforatum*, it has also been shown that Hypericum and/or some of its active components can regulate the functions of some receptors like β-adrenergic, 5-HT1A and 5-HT2 serotonergic, GABA and dopaminergic type-2 receptors. Recently, *H. perforatum* has also been shown to effect on the expression of activated GPIIbIIIa receptors on the platelets and can show antiplatelet action. As a result, it can be concluded that various receptors may play a role in the central nervous system as well as peripheral actions of *H. perforatum* and its active constituents.

Keywords: Hypericum perforatum; St. John's wort; Receptor; Hypericin; Hyperforin.

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REFERENCES:

[1] Nicolussi S, Drewe J, Butterweck V, Meyer Zu Schwabedissen HE. Clinicalrelevance of St. John's wort drug interactions revisited. Br J Pharmacol. 2020;177(6):1212-1226. https://doi.org/10.1111/bph.14936.

[2] Cott JM. In vitro receptor binding and enzyme inhibition by Hypericumperforatum extract. Pharmacopsychiatry. 1997;30 Suppl 2:108-112. https://doi.org/10.1055/s-2007-979529.

PL11. ENZYMATIC SYNTHESIS OF NUCLEOSIDE ANALOGUES OF1,2,4-TRIAZOLE AND THEIR ANTIVIRAL ACTIVITY

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Nucleoside analogues (or modified nucleosides) are heterocyclic nitrogenous bases of natural or synthetic origin, structurally similar to naturally occurring nucleosides, containing cyclic pentoses - ribose, deoxyribose and arabinose. Modified nucleosidesare used as antiviral, anticancer and antibacterial drugs [1-3]. Recently, the role of nucleoside analogues of 1,2,4-triazole as antiviral agents has increased. Synthesis ofsuch compounds is possible either by methods of chemical synthesis or with biocatalysis. A long multi-stage chemical synthesis has a number of significant drawbacks. "One-pot" enzymatic reactions using recombinant nucleoside phosphorylases (NP) provide an alternative way of making some nucleoside analogues and has proved to be highly effective [4]. NP catalyzes the reversible phosphorolysis of ribo- or 2'-deoxyribonucleosides to form a free heterocyclic base and ribose or 2-deoxyribose-1-phosphate (transglycosylation reaction).

In this work, we studied the substrate specificity of recombinant *E. coli* purine nucleoside phosphorylase (*EcPNP*) to 3,5-substituted-1,2,4-triazoles and evaluated the antiviral effect of the obtained nucleosides on two strains of *Herpes simplex virus* type-1 (HSV-1), including a strain resistant to the antiherpetic drug acyclovir.

The main result of study was that for the first time the new 3,5-alkyl/aryl-substituted-1,2,4-triazole nucleosides have been synthesized using enzymatic transglycosylation. The surprising ability of *EcPNP* to synthesize ribo- and 2'-deoxyribonucleosides having structurally diverse hydrophobic substituents at the 3 and 5 position of 1,2,4- triazole has been discovered. 3,5-Alkyl-substituted-1,2,4-triazole nucleosides showed remarkable anti-herpes viral effect, which is expressed in the inhibition of the development of a virus-induced cytopathic effect in a culture of *Vero E6* cells infected with various strains of HSV-1.

Keywords: Antiviral, Herpes, nucleoside analouge

REFERENCES

[1] Kataev VE. et al. *Chem Heterocycl Comp.* 2021, 57, 326-341.

[2] Guinan M. *Molecules* 2020, 25, 2050. https://doi.org/10.3390/molecules25092050.

[3] Thomson JM. et al. *Front. Microbiol.* 2019, 10:952. doi: https://doi.org/10.3389/fmicb.2019.00952.

[4] Fateev IV et al. *Biomolecules* 2021; 11: 586.https://doi.org/10.3390/biom11040586.

PL12. PROPERTIES, STRUCTURE, AND BIOLOGICAL ACTIVITY OF ARABINOGALACTANS AND GALACTOMANNANS OF SOME PLANT SPECIES OF UZBEKISTAN

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At present, the flora of Uzbekistan presents practically unlimited possibilities for studying various classes of polysaccharides. In this regard, water-soluble polysaccharides, galactomannans and arabinogalactans, are of great interest, since they are generally non-toxic and have a wide range of biological activity. The Apiaceae, Asteraceae and Fabaceae families, in particular, plants with the content of various groups of biologically active compounds with a wide range of pharmacological activity are ofconsiderable interest. We isolated homogeneous arabinogalactans with Mm 38-40 kDa from two species *Ferula* and *Silybum marianum* and established their structures. It was shown that they are branched polysaccharides with a main polymer chain consisting of 1,6-linked β-galactopyranose residues, where α-arabinofuranose residues and its 1,5-linkedoligomers, as well as β-GlcpA- 4-OMe-(1→6)-β-Galp-(1→ fragments were located in the C-3 position. It has been established for the first time that a small portion of themain chain of the *F. kuhistanica* arabinogalactan macromolecule carries β- galactopyranose residues in the C-2 position. Pharmacological research revealed that Ferula arabinogalactans have prebiotic activity. Based on the water-soluble polysaccharide *F. kuhistanica*, Arbifilan was created, which is recommended as a feed additive in animal husbandry to normalize the gastrointestinal activity of animals. WSPS isolated from the roots of *F. kuhistanica* have antibacterial activity. From the seeds of *Gleditsia, Crotalaria alata* and *Gumnogladius dioca*, galactomannans with high Mm from 760 to 3000 kDa were isolated. It has been established by chemical and spectral methods that the isolated galactomannans consist of β-1,4-linked polymannans, in which some mannopyranose residues are replaced by α-1,6 linked galactopyranose residues, their molecular weight, the ratio of monosaccharide residues and the substitution sequence β- D-mannan α-D-galactose. Together with Research Institute of Hematology and Blood Transfusion Ministry of Health of the RUz on the basis of *Gleditsia triacanthos* galactomannan, the blood substitute "Reoambrosol" was developed. Pharmacological studies have shown that galactomannan is an integral part of the polyfunctional blood substitute of hemodynamic action rheoambrosol, which has hemodynamic antiacidotic andantioxidant effects in hemorrhagic shock.

Keywords: Arabinolactan; glucomannan; Ferula

REFERENCES

[1] Rakhmanberdyeva RK, Zhauynbayeva KS, Senchenkova SF, Shashkov AS, Bobakulov Kh M. Structure of arabinogalactan and pectin from the *Silybum marianum*. Carb. Research. 2019; 485: 107797. https://doi.org/10.1016/j.carres.2019.107797

[2] Boymatov Sh O, Rakhmanberdyeva RK. Scien. Conf. Actual problems of the chemistry of Natural Compounds. Tashkent. March 17. 2022, P. 48.

[3] Kodiralieva FA, Shashkov AS, Rakhmanberdyeva PK. Chem. Nat/ Compds. 2015; 3: pp.355-358.

PL13. PHYTOTHERAPY IN EUROPE AND TÜRKİYE

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Phytotherapy is commonly defined as the study of using extracts of natural origin as medicines or health-promoting agents. According to European regulatory framework Directive 2004/24/EC (2001/83/EC), herbal medicinal products can be registered in Europe through their "Traditional use; Efficacy of the product plausible on the basis of long-standing use and experience (30 years/15 years)" or "Well-established medicinal use; Recognised efficacy and acceptable level of safety (10 years)". Although there are some differences between Türkiye and European Community member countries, the same rule is accepted. Herbal products registered as "Traditional medicinal herbal products", "Medical devices", and "Cosmetic products" by the Republic of Türkiye, Ministry of Health, Turkish Medicines and Medical Devices Agency or as "Food supplements" by the Ministry of Agriculture and Forestry in Türkiye. Herbal medicinal products are registered as Traditional herbal medicines are intended to be taken without a doctor's prescription, diagnostic tracking, or therapeutic monitoring.

Keywords: Phytotherapy; herbal medicine; food supplement; medical device.

PL15. TERPENOIDS AND PHENOLIC COMPOUNDS OF PLANTS OF THE GENUS *PEROVSKIA* FLORA OF UZBEKISTAN

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The genus *Perovskia* Kar. belongs to the *Lamiacaeae* family and has only 9 species of shrubs, most of which grow wild in mountainous areas in Southwest and Central Asia. *Perovskia angustifolia* Kudr. grows in Tashkent, Samarkand, Surkhandarya regions and in the Ferghana Valley of the Republic of Uzbekistan, is a honey plant. A decoction of the leaves is used as an anthelmintic, infusion and tincture has anantibacterial, wound-healing effect, is used for skin diseases, indigestion, and as a diuretic. In order to search for new biologically active compounds, we studied the chemical composition of the phenolic compounds of *P. angustifolia* collected in the Namangan region of the Republic of Uzbekistan during the flowering period.

From the ethanol extract of the aerial part of the plant, caffeic and rosmarinic acids flavones luteolin, diosmetin, cirsimaritin (5,4′-dihydroxy-6,7-dimethoxyflavone), flavanones hesperetin, hesperidin, (2S)-neoponcirin (isosacuranetin 7-O-rutinoside), and flavanonol taxifolin (dihydroquercetin) were isolated. In order to establish the spatial structure and absolute configuration of hesperetin, X-ray diffraction analysis of its crystals was performed. Hesperetin, has a single C-2 chiral center and turned out to be (S)-hesperetin.

As a result of pharmacological studies, a high anti-inflammatory property of rosmarinic acid has been established.

We have also studied the composition of the essential oil of the aerial part of *P. botschantzevi* Kovalevsk. & Koczk collected during the flowering period. By GC-MS, 43 compounds were identified in the composition of the essential oil from the air- dried plant, while 47 substances were found in the composition of the essential oil from the fresh plant, which is 98.5 and 97.4% of the total amount of the essential oil,respectively.

The main components of the essential oil of both the air-dry and fresh aerial parts are1,8-cineole, its content is 34.8 and 40.7%, respectively. The composition of the essential oil from the air-dry plant also contains bornyl acetate (12.3%), alloaromadendren (5.5%), endo-borneol (5.4%), Δ-3-karene (5.3%), β-caryophyllene(5.2%), o -cymene (4.9%) and camphor (4.1%) and other compounds. The dominantcomponents in the composition of the essential oil from a fresh plant, in addition to 1,8-cineole, are Δ-3-karene (8.6%), endo-borneol (7.7%), bornylacetate (7.0%), α-terpineol (4.1%), alloaromadendren (3.6%), β-caryophyllene (3.2%).

The results of *in vitro* antimicrobial tests showed that all studied microorganisms aresensitive to the action of P. *botschanzevii* essential oil.

Keywords: Perovskia; terpenoid; flavonoid

PL.16. PHYTOECDYSTEROIDS: CHEMISTRY, BIOLOGY AND THEIR APPLICATIONS

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Ecdysteroids are a class of steroids of natural origin that are structurally similar to the molting hormones of arthropods and have high biological activity.

Ecdysteroids are among the most widely distributed steroid compounds in nature. They are found in more than 90% of species of the animal world, namely in arthropods, the number of species of which reaches 1 million, as well as in some other invertebrates.

The role of these compounds in the body of lower animals, where they regulate a number of extremely important life processes as hormones, is well known. When assessing the role of ecdysteroids in the life of plants, one should keep in mind the close ecological relationship and interdependence between the plant world and insects. Unlike plants, most invertebrates do not have an enzyme apparatus for the complete synthesis of steroids. The necessary material for the construction of cell membranes and insect hormones in the form of sterols is supplied by plants.

Ecdysteroids in both the animal and plant worlds, as has now been established, play an extremely important role in regulating vital processes in their organisms, despite the fact that they are far apart from each other in evolutionary terms. This circumstance led to a significant scope of scientific research, during which important results were obtained that have both fundamental theoretical and practical significance.

In recent years, in the field of chemistry and pharmacology of plant steroids, most of the work has been devoted specifically to phytoecdysteroids, as the most original and promising group of compounds with metabolic activity.

Numerous studies have established that phytoecdysteroids are quite common secondary metabolites of plants; more than 550 compounds of this series have already been identified. Based on them, more than 300 ecdysteroid-containing substances have been created, on the basis of which biologically active additives and preparations are developed for use in various areas of human activity.

Since a combination of any individual modifications can occur, one can theoretically expect the existence of more than 1000 different structures. It can be assumed that the phytoecdysteroids identified to date represent only a small fraction of those compounds that exist in nature.

Keywords: Phytoecdysteroids; steroid; activity

PL17. PHARMACOLOGY OF 1,2,3,4-TETRAHYDROISOQUINOLINES

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The 1,2,3,4-tetrahydroisoquinoline (THIQ) derivatives have been reported to possess a wide range of pharmacological activities like anti-inflammatory, antibacterial, antiviral, antifungal, antileishmanial, anticancer, antimalarial, antialzheimer, antiparkinson, antidepressant, anticonvulsant, antiarrhytmic, hypotensive and hypertensive, and inhibition NO production.

We have investigated 1-aryl-1,2,3,4-THIQ derivatives synthesized at the Alkaloids Laboratory of Institute of the Chemistry of Plant Substances, Uzbekistan. Among 32 studied substances we have identified potent substances with local anesthetic, analgesic, anti-inflammatory, antiarrhytmic, psychotropic, antihypoxic, antioxidant and anticonvulsant activity. Structure-toxicity and structure-activity relations were analysed and discussed.

Keywords: Tetrahydroisoquinoline; structure; activity

OP1. NOVEL CYCLOARTANE GLYCOSIDE FROM *ASTRAGALUS MUCIDUS*

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Plants containing triterpenoids and flavonoids growing in Uzbekistan attract the attention of chemists and pharmacologists with different chemical structures and a variety of high physiological activity and promising possibilities of creating drugs based on them. The sources of triterpene glycosides of the cycloartane series are plants of the genus *Astragalus* of the Fabaceae family. The plant *Astragalus mucidus* was harvested during the flowering period at the end of April 2018 in the Yunusabad district of the Tashkent city, Uzbekistan. Our research on the isolation, purification of the desired triterpene glycosides and the establishment of new chemical structures continues. New glycosides was isolated from the aerial part of this plant and called by uscyclomucidoside C. Sequentially purifying the fractions by chromatography on a silica gel column using system of solvents - chloroform-methanol, (4:1), we isolated a compound designated on Fig.

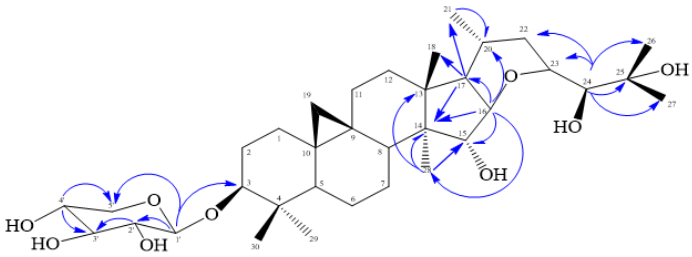

Fig. Structure of cyclomucidoside C

The presence of two one-proton doublets of AX system and also signals for seven methyl groups in the high field in the ^{1}H NMR spectrum of a new compound had allowed us to relate this substance with cycloartane triterpenoids. Elementary composition of cyclomucidoside C is $C_{35}H_{58}O_9$. In the mass sprctrum of this compound peaks of an ions were marked at *m/z* (%): M + 622, 473 (25), 455 (75), 437 (100), 419 (38). IR spectrum, ν^{KBr} $см^{-1}$: 3450-3200 (OH), 3045 (cyclopropane ring). The chemical shift of the anomeric carbon atom of the D-xilopyranoside residue showed that it was attached to C-3 hydroxy group. On the basis biogenetic facts that we have previously isolated cyclomucidoside A fromthe *A. mucidus*, and the values of the chemical shifts proton signals and carbon atomsof which are close to those glycoside, it can be assumed that proton shifts at the δ 5.37 and its doublet cleavage due to H-16. The carbon C-16 is bound with C -23 oxygen, and the proton signal resonates at δ4.06. Thus, on the basis of the experimental data of ^{1}H and ^{13}C NMR, COZY, HMQC, HMBC, IR spectrum, mass spectroscopy, the chemical structure of cyclomucidoside Cwas established as (23R)-3-O-β-D-xylopyranoside-16β, 23-epoxycycloartane-3β, 15, 24, 25-tetraol.

Keywords: Astragalus, cycloartane, isolation.

OP2. BIOLOGICAL ACTIVITIES OF THE SECONDARY METABOLITE OF ENDOPHYTIC FUNGI ISOLATED FROM THE MEDICINAL PLANT *HYSSOPUS OFFICINALIS*

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According to the World Health Organization, it is estimated that by 2050, drug- resistant infections could cause up to 10 million deaths annually. Therefore, finding a new generation of antibiotics is crucial. Natural compounds from endophytic fungi are considered a potential source of new-generation antibiotics. The antimicrobial and cytotoxic effects of ethyl acetate extracts of nine endophytic fungal isolates obtained from *Hyssopus officinalis* were investigated for bioassay-guided isolation of the natural compounds. Extract of isolate VII showed the highest antimicrobialactivities against Gram-positive bacteria *Bacillus subtilis* and *Staphylococcus aureus* (30.12±0.20 mm and 35.21±0.20 mm) and Gram-negative bacteria *Escherichia coli* and *Pseudomonas aeruginosa* (30.41±0.23 mm and 25.12±0.25 mm) among the tested extracts of isolates. Molecular identification of isolate VII confirmed it as *Chaetomium elatum* based on sequencing of its ITS genes, and it was discovered that this was thefirst time *C. elatum* had been isolated from *H. officinalis.* This isolate was cultured in a largescale for the isolation and identification of the active compound. Penicillic acid (Figure 1) was isolated for the first time from *C. elatum* and its chemical structure was established by the NMR spectroscopy. The penicillic acid showed strong antibacterial activities against *Bacillus subtilis* and *Staphylococcus aureus* with 20.68 mm and 25.51 mm inhibition zones respectively. In addition, MIC and MBC values and antibiofilm activities of penicillic acid were determined. It was found that penicillic acid reducedthe level of biofilms in proportion to antibacterial activity (Figure 2).

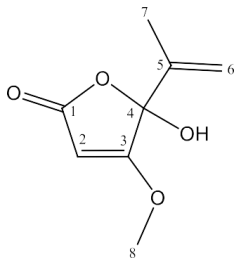

Figure 1. The chemical structure of thecompound 1 (penicillic acid)

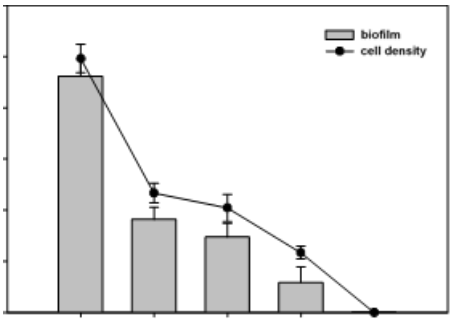

Figure 2. Biofilm formation of *E. coli* atdifferent concentrations of penicillic acid

OP3. EXTRACTION OF POLYSACCHARIDES FROM NATURAL RESOURCES

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The article presents the results of a study of the polysaccharide composition of cucumismelo peels. It has been established that the carbohydrate complex of *Cucumis melo* represented by water-soluble polysaccharides, pectins and hemicellulose, their monosaccharide composition has been established.

Polysaccharides are common biomacromolecules in nature and are widely found in plants, animals and microorganisms. In recent years, numerous studies had revealed that polysaccharides from natural sources had various bioactive functions. Therefore, the chemical study of the composition of this plant is one of the relevant topics.

Uzbekistan the largest zones of melon cultivation in Central Asia. Sugar content in Central Asian melons can reach up to 14–16%. This fact adds to relevance to the use of melons asa health food and as medicinal plants. Pharmacologically it has a stimulating, diuretic, choleretic, anti-inflammatory, laxative, normalizes metabolism in the body [1]. For our scientific work, we chose Torpedo (summer variety) and Kassaba (winter variety), then various polysaccharides were sequentially isolated from melon peels: alcohol-soluble sugars (ASS), water-soluble polysaccharides (WSP), pectin substances (PS), hemicelluloses (HMC).

The presence of glucose, fructose and sucrose was detected in the alcohol extract of melon. Sucrose in smaller quantities. Water-soluble polysaccharides (WSP) were isolated in two ways: by extraction of raw materials with cold water (WSP-c) at room temperature andhot water at a temperature of 80-90 ºC (WSP-h). Pectin substances (PS) were isolated bya mixture of 0.5% solutions of oxalic acid and ammonium oxalate, hemicellulose (HMC) – 5% KOH solution [2]. Among Torpedo polysaccharides, PS was dominant (3.7%), whilethe content of WSP-c was 3.5%, WSP-h and HMC were 2% and 1.95%, respectively, among Kassaba polysaccharides, WSP was dominant (9.4%), while the content of PS was 5%, and HMC was in smaller quantities – 2%.

Abbreviations: WSP: water-soluble polysaccharides; PS: pectin substances; HMC: hemicellulose.

REFERENCES

[1] Lin H, Zhang J, Li S, Zheng B, Hu J. Polysaccharides isolated from Laminaria japonica attenuates gestational diabetes mellitus by regulating the gut microbiota in mice.Food Frontiers. 2021; 2 (2): 208–217. https://doi.org/10.1002/fft2.79

[2] Маликова МХ, Сиддикова АА, Рахманбердыева РК. Сезонная динамика содержания и состава углеводов Stachys hissarica (сем. Lamiaceae). Растительные ресурсы. 2016. Т. 52. №3. С. 116- 121.

OP4. COMPONENTS OF PLANTS *HAPLOPHYLLUM GRIFFITHIANUM* OF THE RUTACEAE FAMILY

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Chemical investigation on aerial parts of *H. griffithianum* collected from two growing place of Uzbekistan, led to the isolation of a new quinolin-2-one type alkaloid, griffinine,as well as 12 quinoline alkaloids, identified to be dubinine, dubinidine, dictamnine, skimmianine, evoxine, gerphytine, gerphytinine, dubamine, N-methylhaplofoline, flindersine, folimine, griffithine, wherein, 4 compounds, dictamnine, skimmianine, folimine, and griffinine were obtained from the roots extract of this material.

The carbohydrate complex of aerial parts of *Haplophyllum griffithianum* plants has been studied. As a result of the study, the presence of alcohol-soluble sugars, water-soluble polysaccharides, pectin substances and hemicelluloses were established.

As a result of the study, it was found that alcohol-soluble sugars of the plant *Haplophyllum griffithianum*, represented by hexose - glucose, ketosaccharides fructose and sucrose.

The yield of water-soluble polysaccharides (WSPS) was 6.5%. The isolated polysaccharides are beige amorphous powders, readily soluble in water, giving color with an iodine solution, which indicates the presence of a starch-type glucan in the studied raw material. In the monosaccharide composition of water-soluble polysaccharides were identified: galactose and arabinose.

The yield of pectin substances (PV) was 3.1%. HP is a white amorphous powder, highly soluble in water. A solution of HP gives with iodine a barely noticeable blue color that quickly disappears. It is shown that the monosaccharide composition of pectin substances is represented by galacturonic acid, galactose, arabinose and, in small amounts, xylose.

The HMC yield was 4.5%. Hemicelluloses are light brown amorphous powder, insolublein water, readily soluble in dilute alkalis. As a result of chromatographic analysis, the presence of glucuronic acid, galactose, arabinose, xylose, in smaller amounts of glucose,was found in the composition of hemicelluloses.

HP and HMC are also characterized by the presence of arabinose and xylose. This is characteristic of HMC, which are based on xylans.

Thus, the presence of VRPS, PV, HMC in the plant *Haplophyllum griffithianum* was established. It is shown that these biopolymers predominate in the aerial part.

Keywords: Rutaceae; isolation; pectin

OP5. COMPARATIVE STUDY ON THE ESSENTIAL OIL AND LIPIDS OF *FERULA KYZYLKUMICA* KOROVIN

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There are about 40 species of wild *Ferula* L. (Apiaceae family) in Uzbekistan. Ten of its species, including *Ferula kyzylkumica* Korovin, grows in Kyzyl-Kum. This species is apolycarpic plant and listed in the Red Book.

The goal of the present research was to compare essential oil and lipid profiles isolated from root and aerial part of *F. kyzylkumica*. The plant materials from Navoiy region(Uzbekistan) were collected in 2022. The samples were powdered and subjected to hydrodistilation using a Clevenger-type apparatus to isolate the essential oils. The lipids were extracted with chloroform-methanol. Fatty acids was isolated from the product of hydrolysis of lipid extracts and methylated. The essential oil and fatty acidmethyl esters were analyzed by GC–MS and GC-FID using two different capillary columns (HP-5 and HP-Innowax), data in electronic libraries and related retention indices of individual components which were determined using a standard solution of n-alkanes (C9–C32).

The results showed that essential oil from root of *F. kyzylkumica* is enriched in sesquiterpene hydrocarbons and oxygenated sesquiterpenes (GC-MS, %,), such as δ-cadinene (19.1), germacrene D (4.4), α-muurolene (3.5) and germacrene D-4-ol (24.7),
α-cadinol (16.2), T-muurolol (5.8). α-cadinol (22.1), T-muurolol (7.3), germacrene D-4- ol (6.1), germacrene D (5.7), α-muurolene (3.5) also dominated in the essential oil obtained from aerial part. Analysis of the lipids and fatty acids from aerial part showed that the main components form a mixture of free fatty acids, monogalactosyl- and digalactosyldiacylglycerols. Linolenic acid predominated among acyl fragmentation of these lipids. The dominant lipids of the roots were free fatty acids, where the mainones are linoleic and palmitic.

Thus, a comparative study of the root and aerial part of *F. kyzylkumica* showed thatthey contain similar oxygenated sesquiterpenes, but lipids differ both in compositionand in the profile of fatty acids.

Keywords: GCMS; Ferula; essential oil

OP6. STUDY ON CHEMICAL CONSTITUENTS OF TWO EDIBLE PLANTS FROM XINJIANG

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Hops (*Humulus lupulus* L.) and figs (*Ficus carica*) are two kinds of edible plants widely distributed in Xinjiang. Hops is cultivated worldwide for commercial use as raw material in the brewing in dustry since it adds bitterness and aromatic flavors to the beer. These characteristics are mainly ascribed to hop's soft resins. However, its soft resin components are rarely studied and the structures of their derivatives remain unclear. Figs is an Asian species of flowering plant belonging to the genus Ficus of the family Moracese, native to Western Asia and the Middle East. Its fruits, usually knownas common figs, have been consumed as a very popular health promoting fruit worldwide since ancient times.

To investigate the potential health-promoting chemical constituents of two edible pants, a phytochemical study on its fruits were therefore carried out, which might provide deeper insight into material basis of them.

These two plants were collected, dried, powdered, and extracted with ethanol. The extraction solutions were combined and concentrated to yield a crude extract, whichwas suspended in water and then partition successively with petroleum ether, chloroform, ethyl acetate, and butanol extract, respectively. Different fraction was isolated and purified by silica gel, RP-18 gel, Sephadex LH-20 column chromatographies and semipreparatives HPLC to afford more than 200 compounds. The racemates were separated by chiral column. Their planner structures wereestablished based on the comprehensive investigation of (1D, 2D) NMR and HR-ESI- MS data. The absolute configurations of compounds were determined by comparing chemical chemical of their chiral carbon atoms and the experimental ECD and calcualted ones.

In total, more than 200 compounds were isolated from two edible plant. The irrepresentative structures are as shown in Figure 1. The anti-inflammatory effects andanti-microbial activities of these isolated prenylated compounds were test. Some of these compounds show good activity and are superior to positive control.

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Keywords: Ficus; Humulus; NMR

REFERENCES

[1] Erkin Tursun, B. Zuopeng Li, C. Haji Akber Aisa, Ind. Crop. Prod., **172**, 114014 (2021).

[2] Yanping Liu, B. Jiaming Guo, C. Mingming Zhang, E. Yanhui Fu, J. Agric. Food. Chem., **67**, 4817 (2019).

[3] Jiayuan Li, B. Xuezheng Li, C. Gang Chen, D. Cungang wang, and E. Yue Hou, J. Nat. Prod., **80**, 3081 (2017).

OP7. EVALUATION OF THE ANTIVIRAL POTENTIAL OF *MARRUBIUM VULGARE* EXTRACTS

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Marrubium vulgare L. (horehound) is a member of the Lamiaceae, represented also with Marrubii herba as an EMA monograph with traditional medicinal uses as an expectorant in patients having cough associated with a cold.

In this present study, the antiviral potential of different *M. vulgare* extracts was compared using in vitro angiotensin converting enzyme 2 (ACE2), transmembrane serine protease (TMPRSS), and neuraminidase enzyme (NA) assays, respectively.

Standardized dried extract, aqueous ethanol and other liquid extracts of the European Pharmacopoeia quality Marrubii herba were prepared using different extractionmethods. ACE2, TMPRSS and NA enzyme inhibitions were performed usingcommercial kits at 20-50 µg/mL concentrations.

Among the tested extracts, the 30% ethanol extract inhibited the ACE2 enzyme by 78%, the TMPRSS enzyme by 69%, and the NA enzyme by 75%, respectively. The comparative experimental results showed that the best inhibitory activity was observed by the 30% ethanol extract. To the best of our knowledge, this is the first report on the antiviral activity potential of different *M. vulgare* extracts.

As a conclusion, in line with the experimental data from this study, *Marrubium* aqueous ethanol extracts can be utilized against cold and flu due to its antiviral potential. More *in vivo* and clinical work is needed to verify the safe and efficient use of horehound preparations.

Keywords: *Marrubium*; extraction; antiviral; in vitro enzyme assay.

Acknowledgments: This work was supported by TÜBİTAK TEYDEB 7210646.

OP8. ELEMENTAL COMPOSITION OF THE *ANABASIS APHYLLA* FROM QAZAQSTAN

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We have determined the ash content of the *Anabasis aphylla*, which grows in the south part of Qazaqstan. The ash composition was analyzed by ICP-MS. A comparative analysis of data for approximately 50 years shows a relative constancy of the composition [1-3]. The data indicate that *Anabasis aphylla* is a stress-resistant plant, since the climate and ecological situation in the region have changed a lot over 50 years. The modern analysis method also made possible to determine trace elements that were previously unavailable. The ash content of the plant is quite high (about 18% of the dry aerial part) compared to other plants (usually in average 5- 10%). The ash contains elements such as K - 12.9%, Na-11.3%, Ca-6.2%, Mg-5.1%, P-0.7%, Fe- 0.1%, Sr-0.05%, Al-0.03%, Ti -0.025%, Mn-0.015% etc.

Thus, *Anabasis aphylla* can be considered a valuable complex raw material that can be used to obtain alkaloids, organic acids, pectins, potash, soda and other microelements. The amount and variety of mineral elements in the ash composition makes it a promising source in producing fertilizers and additives for feed.

Keywords: *Anabasis aphylla*; ash content; elemental composition; ICP-MS.

Acknowledgment: The work was financially supported by the Science Committee, Ministry of Science, Republic of Qazaqstan (Grant No. AP13067774).

REFERENCES

[1] Klyshev LK. Biologiya anabasisa bezlistnogo [Biology of Leafless Anabasis] (Academy of Sciences of the Kazakh SSR, Alma-ata, 1961, 350 p.) [in Russian].

[2] Orekhov AP. Khimiya alkaloidov [Chemistry of alkaloids] (Academy of Sciences of theSSSR, Moskow, 1955, 655p [in Russian].

[3] Sadykov AS. Khimiya alkaloidov Anabasis aphylla [Chemistry of alkaloidsAnabasis aphylla] (Academy of Sciences of the Uzbek SSR, Tashkent, 1956, 224p.) [in Russian].

OP9. SYNTHESIS OF DERIVATIVES OF 1-ARYL TETRAHYDROISOQUINOLINE ALKALOIDS AND THEIRBIOLOGICAL ACTIVITY

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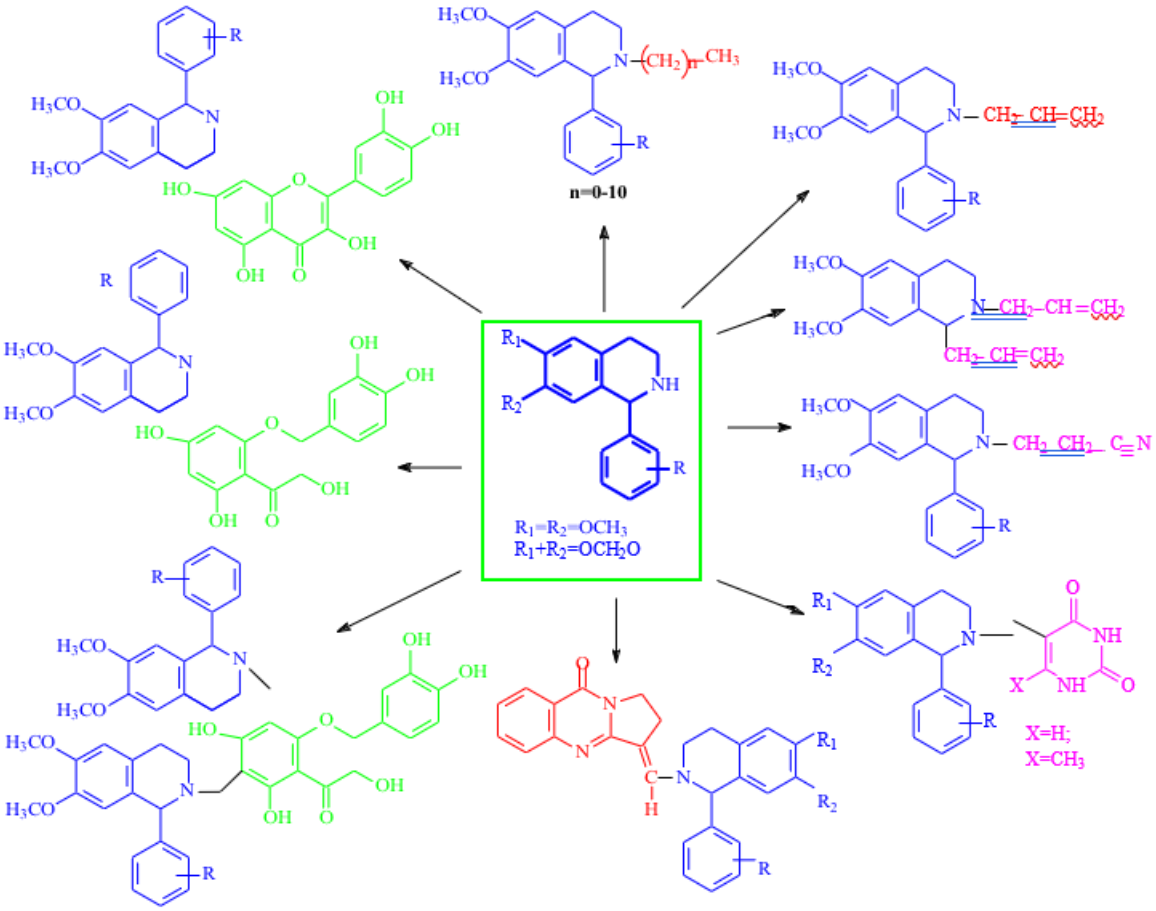
Among the nitrogenous heterocycles, isoquinoline compounds are among the most important and biologically interesting. Of particular interest among isoquinolines is a small group of 1-aryltetrahydroisoquinolines that exhibit sedative-anxiolytic, neuroleptic, cardioprotective, antiarrhythmic, anti-inflammatory, etc. effects. Cytotoxic activity of 1-aryltetrahydroisoquinoline derivatives against laryngeal cancer and cervical carcinoma was also revealed. The groups responsible for the manifestation of the biological properties of synthesized substances according to the scheme are determined:



OP10. DETERMINATION OF VITAMIN CONTENT AND MEDICINAL PROPERTIES OF BLACK RAISIN GRAPES

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In this thesis, the amount of vitamins contained in grape molasses is determined and information about its medicinal properties is given.

Currently, molasses made from grapes without various chemical additives isvery rich in carbohydrates. The content of grape juice is more than 60% carbohydrate, 20-25% water. Grape molasses gives energy, stimulates appetite; increases blood, is of great benefit in pregnancy. Depending on thetype of grapes, all vitamins of group B, vitamins E, A, RR, K, C and D are also sufficiently preserved. In addition, grapes also contain micro and macro elements such as iron, copper, potassium, calcium, magnesium, zinc, boron, vanadium, aluminum molybdenum, selenium, titanium, cobalt, radium,chlorine, silicon and sulfur. Grapes contain water, glucose, pectin, protein, carbohydrates, saturated and unsaturated fatty acids, essential oil, and dyes [1-3].

Grape molasses has a dark reddish color. When the chemical composition of grape molasses contains water-soluble vitamins, it is determined by high- performance liquid chromatography that V2=0.194487 mg., V6=0.194487 mg., V9=3.666393 mg., (RR) V3=0.063445 mg. was found to exist.

Molasses is rich in vitamins, it is a medicine that gives energy, increases appetite, increases blood and is used in anemia diseases. The amount of water- soluble vitamins in molasses was determined.

Keywords: Vitamin; grape; molasse

REFERENCES

[1] Temurov Sh. Viticulture. Tashkent. 2002. B. 199.

[2] Djavakyants YuM, Gorbach VI. Vinograd to Uzbekistan. Tashkent.2001.g. S.240

[3] Mirzaev MM, Rizaev RM. Rekomendachii po sushke vinograda v fermerskikh hozyaystvax. Tashkent. 2011. B. 6-21.

OP11. GC-MS ANALYSIS OF ESSENTIAL OILS AND FATTY ACIDS OF LIPIDS FROM *FERULA* SPECIES GROWING IN UZBEKISTAN

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Many higher plants including the species of the Apiales order (Umbelliferae) produce economically important organic compounds that are in demand to the production of pharmaceuticals, food and cosmetic products. Our investigations is devoted to the study of essential oils (as volatile compounds) and lipids (as nonvolatile fixed oils) ofApiaceae plants growing Uzbekistan. More than 200 species of the Apiaceae family aredistributed in the flora of our region, as well as about 40 species of wild-growing *Ferula* L. The species of this genus are resinous, essential oil, melliferous, fodder, medicinal plants.

Essential oil composition and fatty acid profile of lipids from *F. foetida* (Bunge) Regel, *F. karatavica* Regel & Schmalh., *Ferula kuhistanica* Korovin, *Ferula moschata* (H.Reinsch) Koso-Pol., *Ferula prangifolia* Korovin, *Ferula olgae* Regel & Schmalh., *Ferula tenuisecta* Korovin, *Ferula tschimganica* Lipsky ex Korovin and *Ferula ugamica* Korovin were analyzed. Differences and similarities in the composition of these substances depending on various factors have been revealed. Monoterpenes were considered tobe the main constituents responsible for the aroma of essential oil of *Ferula kuhistanica,Ferula tenuisecta, F. tschimganica* and *F. olgae*. Other studied species except *F. foetida* were more enriched with sesquiterpene constituents. High percentage of octadecenoic acids consisting (*Z*)-octadec-6-enoic (petroselinic) and (*Z*)-octadec-9-enoic (oleic) isomers was detected in the fruit lipids.

We can conclude that generalization of studies the essential oil composition and fattyacid profile of lipids could be useful for the taxonomy of the Apiales species.

Keywords: Apiaceae; Ferula; GCMS

OP12. PHARMACOLOGICAL PROPERTIES AND TECHNOLOGY OF THE DITERPENOID ALKALOID RANACONITINE FROM RHIZOMES WITH ROOTS OF THE *ACONITUM* GENUS PLANTS

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Plants of the *Aconitum* genus contain a significant amount of diterpenoid alkaloids, the main of them is the alkaloid lappaconitine, on the basis of which a new antiarrhythmic drug allapinin was developed. In *A. septentrionale* and *A. sinomontanum* plants alkaloids composition contains a significant amount of ranaconitine. During the production process of the drug substance allapinin from these plants, ranaconitine accumulates as a waste product. Ranaconitin is similar in structure to lappaconitine, unlike the latter, it contains an additional hydroxyl group at C-7.

We have developed a technology for obtaining the alkaloid ranaconitine from the waste of the drug allapinin. Methods for the analysis of the drug substance have been developed, stable samples of the alkaloid ranaconitine of high purity have been obtained.

Our pharmaco-toxicological studies of the alkaloid ranaconitine showed that the LD_{50} of ranaconitine in mice *intravenous* was 5.8 mg/kg, intraperitoneally - 11.6 mg/kg, and in rats intravenously - 6.2 mg/kg. Ranaconitine at doses of 0.05-0.5 mg/kg (i.v.) has a pronounced antiarrhythmic and antifibrillatory effect in supraventricular and ventricular forms of arrhythmias of various origins and mechanisms of occurrence caused in various animals by aconitine, barium chloride, electrical stimulation of the atria and ventricles, and coronary artery occlusion. The ED_{50} of antiarrhythmic action *i.v.* is 0.05 mg/kg, which is not inferior to lappaconitine. The mechanism of antiarrhythmic action is associated with the blocking of fast sodium channels. On isolated rabbit intestine, ranaconitine at a concentration of 10^{-5}-10^{-4} reduces tone, the amplitude of spontaneous contractions and suppresses spasm caused by barium chloride and aconitine with an EC_{50} of $2 \cdot 10^{-5}$ g/ml.

Thus, the alkaloid ranaconitine is close to lappaconitine in antiarrhythmic activity and toxicity.

Keywords: Alkaloid; diterpene; Aconitum

OP13. *IN VITRO* BIOLOGICAL ACTIVITIES AND PHYTOCHEMICAL INGREDIENTS OF TWO *HEPTAPTERA* SPECIES: *HEPTAPTERA ANISOPTERA* (D.C.) TUTIN AND *H. CILICICA* (BOISS. & BAL.) TUTIN

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Heptaptera species (*H. anisoptera* (D.C.) Tutin and *H. cilicica* (Boiss. & Bal.) Tutin) areApiaceae plants which are naturally grown in Türkiye. These species, which have been previously studied morphologically and cholinesterase enzyme inhibitor activity buthave limited biological activity and phytochemical content studies, have been selectedin this study. It was determined that different enzyme inhibition activities and antioxidant capacities and group of compounds responsible for these activities of different extracts of *Heptaptera species*. Enzyme inhibition activities (acetylcholinesterase, butyrylcholinesterase, *a*-glucosidase, *a*-amylase, and tyrosinase) as well as antioxidant activities were evaluated and compared two plants and theirfour extracts (petroleum ether, dichloromethane, ethyl acetate, ethanol). The antioxidant activities of each extracts were determined by using 2,2-diphenyl-1- picrylhydrazyl (DPPH), 2,2′-azino-di-3-ethylbenzthiazoline sulfonic acid (ABTS) and iron chelating method. And total phenol and flavonoid contents were analyzed by spectrofotometric method. Enzyme inhibitory potential was evaluated with Eliza test. According to the experimental results, ethyl acetate *H. anisoptera* extract and petroleumether extract of *H. cilicica* showed significant cholinesterases inhibitor effects. The polar
H. cilicica extracts demonstrated higher *a*-amylase inhibitor activity. The highest tyrosinase inhibitory activity was found in the ethanolic *H. anisoptera* extract with the lowest phenol and flavonoid content. Considering the three antioxidant activity parameters, it was concluded that endemic *H. cilicica* has more antioxidant capacitythan *H. anisoptera*. It has been concluded that there is a need for more studies on theendemic *H. cilicica*, which has many potential activities, especially for the elucidationand protection of the phytochemical content of the plant.

Keywords: *Heptaptera species*, *H. cilicica*; enzyme inhibition, antioxidant activity, phytochemical content of *Heptaptera.*

OP14. TOXICOLOGICAL IMPACT AND ALKALOID DIVERSITY OF SOUTHERN AFRICAN SENECIO (ASTERACEAE)

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With 1462 recognized species of *Senecio* (Asteraceae), the chemical diversity of the genus is exhaustive, yet largely unstudied. The dominant chemical families are cacalols (sesquiterpene lactones), flavonoids (flavans, flavones, isoflavones & flavanones), and macrocyclic pyrrolizidine alkaloids. These latter alkaloids are the cause of natural product toxification, either through adulteration or contamination inmultiple settings, ranging from honey to medicines and tea plantations. Most countries of the world include species of *Senecio* in their native flora, but issues of product toxification are commonly caused by invasive species from Africa. About a third of all *Senecio* are from Africa, most of which are among the southern African flora. As part of an ongoing investigation into the toxicity of southern African *Senecio*, our group has sampled over a hundred specimens from the wild and screened for toxic alkaloids. Our findings are that 5 – 10% of species sampled contain lethal quantities of retrorsine N-oxide, some exceeding 2% (g.g-1 dry weight). Unfortunately, some of these species have a similar appearance to those used in traditional medicine, which constitutes a risk to human health. Furthermore, where accidental cases of poisoning have occurred, it is possible that the toxic species we have identified were involved. With 1462 recognized species of Senecio (Asteraceae),the chemical diversity of the genus is exhaustive, yet largely unstudied. The dominant chemical families are cacalols (sesquiterpene lactones), flavonoids (flavans, flavones, isoflavones & flavanones), and macrocyclic pyrrolizidine alkaloids. These latter alkaloids are the cause of natural product toxification, either through adulteration or contamination in multiple settings, ranging from honey, to medicinesand tea plantations. Most countries of the world include species of *Senecio* in their native flora, but issues of product toxification are commonly caused by invasive species from Africa. About a third of all *Senecio* are from Africa, most of which are among the southern African flora. As part of an ongoing investigation into the toxicity of southern African *Senecio*, our group has sampled over a hundred specimens from the wild and screened for toxic alkaloids. Our findings are that 5 – 10% of species sampled contain lethal quantities of retrorsine N-oxide, some exceeding 2% (g.g-1 dry weight). Unfortunately, some of these species have a similarappearance to those used in traditional medicine, which constitutes a risk to human health. Furthermore, where accidental cases of poisoning have occurred, it is possible that the toxic species we have identified were involved.

Keywords: Toxic; pyrrolizidine alkaloids, Senecio.

OP15. APPLICATION OF DEEP EUTECTIC SOLVENTS FOR ROSMARINIC ACID EXTRACTION IN SOME MEDICINALPLANTS

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The use of conventional organic solvents, such as hexane, ethyl acetate, chloroform, acetone, and methanol, has limited the application of green chemistry principles. Green solvents, which are non-toxic, biodegradable, and biocompatible, have been proposed as alternatives to these organic solvents. As a prospective environmentallyfriendly solvent, deep eutectic solvents (DES) have been developed as a replacement for organic solvents **[1]**.

The purpose of this study is to compare the application of green chemistry and traditional extraction methods on various medicinal plants containing rosmarinic acid. Three different choline chloride based deep eutectic solvents (DES) in molar ratio were used for extraction of rosmarinic acid from *Rosmarinus officinalis, Ocimum basilicum* and *Ocimum minimum*. The solvents were choline chloride-phenol (1:3), choline chloride- lactic acid (1:3) and choline chloride-fructose (1:3) and water %40. To reduce the viscosity of the prepared DES systems, it is suggested that water be added. Methanolwas used for comparison. Quantitation of rosmarinic acid in extracts obtained by DES was carried out using HPLC analysis. Since each DES yielded comparable results, itwas decided to continue the study with lactic acid-containing DES. It was determined through analysis that DES extracted rosmarinic acid more effectively than methanol.For the extraction of rosmarinic acid from medicinal plants, our results indicate that deep eutectic solvents are a safe and effective alternative to methanol.

Keywords: Rosmarinic acid, deep eutectic solvents, medicinal plants, extraction methods, HPLC.

REFERENCE

[1] Barbieri, J. B., Goltz, C., Batistão Cavalheiro, F., Theodoro Toci, A., Igarashi- Mafra, L., & Mafra, M. R. (2020). Deep eutectic solvents applied in the extractionand stabilization of rosemary (*Rosmarinus officinalis* L.) phenolic compounds. *Industrial Crops and Products*, *144*(August 2019), 112049. https://doi.org/10.1016/j.indcrop.2019.112049.

OP16. EVALUATION OF ANTIOXIDANT AND ENZYME INHIBITORY ACTIVITY OF FOUR *ECHIUM* SPECIES

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Herbal medicine has proven to be effective in the treatment of a variety of disorders and has aided in the development of new medications. The genus *Echium* belongs to Boraginaceae family[1], have been used for different purposes in Turkish Folk Medicine[2], however some species have not been examined in detail in terms of enzyme inhibition activity.

We aimed to evaluate the antioxidant activity, inhibiting effect on digestive enzymes linked to diabetes and Alzheimer disease related acetylcholinesterase and butyrylcholinesterase, skin whitening effect related enzyme tyrosinase of ethanol extracts obtained from four different *Echium* species namely *E. italicum, E. vulgare, E.angustifolium* and *E. parviflorum*.

The antioxidant effect of extracts was investigated with DPPH• (1,1-diphenyl-2- picryl-hydrazil), ABTS•+ (2,2'-azino-bis(3-ethylbenzothiazoline-6-sulphonic acid) radical scavenging and iron chelating tests. Total phenol and flavonoid contents were determined with Folin-Ciocalteu and aluminum chloride colorimetric methodrespectively. The anticholinesterse activity related with Alzheimer's disease wastested with Ellman's methods on acetylcholinesterase (AChE) and butyrylcholinesterase (BChE)

In a result the highest total phenolic (43.58±3.56mgGAE/g extract) was found in *E. italicum* herba extract and total flavonoid content (105.59±2.93 mgQE /g extract) was found in *E. parviflorum* aerial part extract. The highest AChE and BChE inhibitory activity were found in aerial part extract of *E. italicum* (IC_{50}=46.39±0.35 µg/mL and IC_{50}=11.59±0.52 µg/mL). However, the highest tyrosinase inhibitory activity was found in *E. parviflorum* aerial part extract (IC_{50}=1.83±1.06 mg/mL).

This is the first report that these biological activities investigated in four *Echium* species and theses are thought that these studies could contribute to the advanced pharmacological activity studies and chemotaxonomy of the genus.

Keywords: Echium; antioxidant; total phenolic

REFERENCE

[1] Albreht A, Vovk I, Simonovska B, Srbinoska M. Identification of shikonin andits ester derivatives from the roots of Echium italicum L. *J Chromatogr A*. Apr 10 2009;1216(15):3156-62. https://doi.org/10.1016/j.chroma.2009.01.098.

[2] Bošković ID, Đukić DA, Mašković PZ, Mandić LG. Phytochemical composition and biological activity of Echium italicum L. plant. *Bulgarian Chemical Communications*. 2017;49(4):836 – 845.

OP17. ALKALOIDS AND POLYPHENOLS WITH ANTIBACTERIAL, ANTIOXIDANT, ANTI-INFLAMMATORY AND ANTICHOLINESTERASE ACTIVITIES FROM *ATRACTYLIS CANCELLATA*

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Atractylis cancellata L., belonging to the Asteraceae family is used in folk medicine for the treatment of skin disorders, it is an herbaceous endemic plant growing in semi- arid zone of Mediterranean area. We report herein the isolation and identification ofone new alkaloid type pyrroloquinolone A, together with twelve known compounds. Moreover, the antioxidant activity of extracts (PE, EtOAc and *n*-BuOH) and some phenolic compounds were detremined by DPPH, ABTS, CUPRAC, and reducing power methods. Furthermore, the acetylcholinesterase and butyrylcholinesterase inhibitory activities of extracts and the two alkaloids were tested. In addition, the antibacterial activity was determined using the agar disk diffusion assay against fivebacterial strains and the anti-inflammatory activity was evaluated by the ovalbumin method. The ethanol extract (70%) of dried whole plant *A. cancellata* was partitioned by liquid/liquid chromatography into three extracts PE, EtOAc and *n*-BuOH. Purification of the PE, EtOAc and *n*-BuOH soluble parts using diverse chromatographic methods (VLC, CC, HPLC and TLC) provided thirteen secondary metabolites **1-13**. Their structures were determined using 1D- and 2D-NMR and HR-ESI-MS techniques, and comparison with data reported in the literature. The antioxidant activity, evaluated by DPPH, ABTS, CUPRAC, and reducing power methods, showed that some compounds exhibit good antioxidant activity. Furthermore, the *n*-BuOH extract, and the two alkaloids pyrroloquinolone A**,** and 4- methoxy-1-methyl-2-quinolone displayed good AChE and BChE inhibitory activities. This study describes for the first time the occurrence of alkaloids in *Atractylis* genus.Moreover, all the tested extracts displayed an antibacterial effect at least against threebacterial strains. The petroleum ether extract inhibited the growth of all the tested bacteria in a dose-dependent manner except *E. coli* ATCC 25922 and it revealed astrong anti-inflammatory activity (81.77± 0.05%). As a conclusion, *A. cancellata* could be an important source of natural pharmacological candidates against oxidative stress, inflammatory and microbial diseases.

Keywords: *Atractylis cancellate*, alkaloid, polyphenol, NMR, biological activities.

OP18. STUDY ON THE DITERPENOID ALKALOIDS FROM *ACONITUM BARBATUM* VAR. *PUBERULUM* AND *DELPHINIUM AEMULANS*

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Diterpenoid alkaloids are a kind of nitrogen-containing organic compounds with wide range of biological activities and medicinal value, especially in the aspects of antiarrhythmic and analgesia. Four diterpenoid alkaloids have been used in clinical. At present, more than one thousand natural diterpenoid alkaloids have been found, which are mainly from genera *Delphinium* and *Aconitum* of Ranunculaceae family. It was found that the diterpenoid alkaloids from the characteristic *Delphinium* and *Aconitum* plants in Central Asia have the characteristics of diverse skeleton types, high novelty and great potential for medicine, which have a great value for in-depth research and development.

On the basis of the existing research, *Aconitum barbatum var. puberulum* and *Delphinium aemulans* grown in Central Asia were chosen as the research objects. The isolation, purification, structure identification and bioactivity screening of diterpenoid alkaloids were carried out. 60 compounds, including 37 diterpenoid alkaloids were isolated from these two plants. Of which 13 of diterpenoid alkaloids were newcompounds, see Fig. 1. Compound **AB-1** is the first discovered new skeleton type of C20-diterpenoid alkaloid, while compounds **AB-6** and **AB-7** are the first discovered rearranged of C18-diterpenoid alkaloids. The isolated diterpenoid alkaloids involve 3types of skeletons and 9 subtypes of skeletons. The activity screening results showed that some compounds exhibited moderate potential for anti-arrhythmia, anti-tumor,and antibacterial activities.

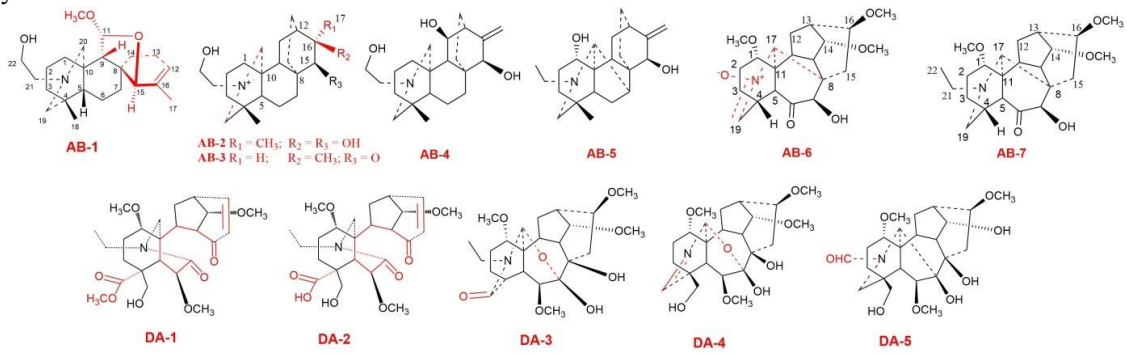

Fig. 1 Structures of new diterpenoid alkaloids

Keywords: Alkaloid; Aconitum; Delphinium

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OP19. BIOLOGICAL EFFECTS OF *CYPERUS ROTUNDUS* AND IT'S CHEMISTRY

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Cyperus rotundus (Cyperaceae) is a wild plant spread worldwide in tropical and subtropical areas, and it is known widely for its uses in conventional medicine to treat many ailments. In this research, the seeds of *C. rotundus* were subjected to extraction processes involving petroleum ether ***(a)***, dichloromethane ***(b)***, ethyl acetate ***(c)***, and methanol ***(d)***using a Soxhlet apparatus. Additionally, the seeds were macerated with methanol ***(e)***,and an infusion ***(f)*** was prepared using water. These extracts were used to investigate the plant's antimicrobial, antioxidant, and enzyme-inhibitory activity. The antimicrobial activity of plant extracts was evaluated against ten pathogenic microorganisms, where inhibitory effect was observed against *Candida tropicalis* with 78.12 µg/mL MIC in ***(a)***.Total phenolic and total flavonoid contents were performed, and it is shown that ***(c)***had high phenolic and flavonoid contents (62.32±1.21 μg PEs/mg extract, 25.07±0.57 μg QEs/mg extract, respectively). On the other hand, the antioxidant potential of the extracts was evaluated by DPPH and ABTS radical scavenging and CUPRAC activity methods. ***(d)*** was the most active (IC_{50}=17.63±0.35 µg/mL, and IC_{50}=12.44±0.19 µg/mL, $A_{0.5}$=26.11±0.21 µg/mL) regarding the DPPH, ABTS, and CUPRAC assays respectively. Acetylcholinesterase, butyrylcholinesterase, and tyrosinase enzyme inhibitoryactivities were conducted. ***(c)*** was the most active against acetylcholinesterase enzyme (IC_{50}=49.29±1.44 µg/mL) compared with galantamine as a standard molecule (IC_{50}=8.53±0.20). ***(d)*** showed high butyrylcholinesterase, and tyrosinase inhibitory activity (IC_{50}=13.40±0.14, and 136.79±1.66 respectively) compared with galantamine (IC_{50}=38.66±0.49), and kojic acid (IC_{50}=21.70±0.97) respectively. Phenolic compounds of the extracts were conducted by LC/HR-MS. While a high value of phenolics was detected as an ingredient of ***(c)*** compared to other extracts, kaempferol was detected from ***(c)*** as a major compound. Chlorogenic acid was detected as the major phenolic in ***(d)***, which showed the high antioxidant effect. *C. rotundus* which has high therapeutic potential, showed notable anticandidal, antioxidant, anti-butyrylcholinesterase, and anti-tyrosinase effects.

Keywords: Cyperus; enzyme; antioxidant

OP20. MECHANISTICALLY EVALUATION OF THE ANTI-INFLAMMATORY POTENTIAL OF CARVENS SYRUP – A COMMERCIAL HERBAL PRODUCT

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CarvenS™ (Thyme & Liquorice Extract Stevia Syrup) is used as a food supplementation in Türkiye. In this present study, the *in vitro* TNF-α, COX, and LOX enzyme inhibitory potentials of the preparation were evaluated experimentally. CarvenScontains standardized *Thymus vulgaris* and *Glycyrrhiza glabra* extracts in a stevia syrup form.

In vitro enzyme inhibition assays were performed by using a fixed 20 µg/mL concentration with commercially available "Tumor Necrosis Alpha-2 Inhibitor Screening" and "Cyclooxygenase 1-2" Assay Kits in 96 well microplate format at fluorescence mode. The assay results showed that TNF alpha data for CarvenS was 74.2% inhibition. The *in vitro* COX-1 and COX-2 inhibition results of CarvenS were recorded at 76.3% and 78.9, respectively. Finally, the 5-LOX inhibition result for CarvenS was 83.1%. The enzyme inhibitions suggested mechanistically remarkable anti-inflammatory potential under *in vitro* conditions.

Further detailed *in silico* and *in vivo* experimental studies are ongoing to confirm the efficacy of the preparations.

Keywords: TNF, COX, LOX, *in vitro* enzyme assay.

Acknowledgments: This work was supported by ENA Farma Ltd.

OP21. *IN VITRO* AND *IN SILICO* EVALUATION OF THE ANTIVIRAL POTENTIAL OF EUCALYPTUS ESSENTIAL OILS

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The members of the genus *Eucalyptus* L. belonging to the Myrtaceae are well- known and have been utilized for millennia as aromatic and medicinal plants. Due to their antibacterial and antioxidant properties, eucalyptus essential oils are frequently used in flavorings, culinary preparations, as well as in medicinal and cosmetic applications. In the present study, *in vitro* enzyme inhibition assays were conducted for neuraminidase (NA), transmembrane serine protease 2 (TMPRSS2) and angiotensin- converting enzyme 2 (ACE2) to explore the antiviral potential of two different essential oils from *Eucalyptus* species. European-Pharmacopoeia-quality essential oils from *E. globulus* and *E. citriodora* were employed in the enzyme assays. The inhibitory activitiesof essential oils at 20 µg/mL against ACE2, TMPRSS2 and NA were measured using commercial kits. *E. globulus* essential oil inhibited ACE2, TMPRSS2 and NA by 94.3%,74.82% and 67.59%, respectively. *E. citriodora* essential oil inhibited ACE2, TMPRSS2 and NA by 83.4%, 60.55% and 43.64%, respectively. Although both essential oils fromthe *Eucalyptus* species demonstrated good enzyme inhibitory activity, our *in vitro* results indicated that *E. globulus* essential oil possesses greater antiviral activity potential than *E. citriodora*. Furthermore, protein–ligand docking and interaction profiling studies were utilized to gain structural and mechanistic insights into the *in silico* ACE2, TMPRSS2 and NA inhibitory potentials of the major constituents of *Eucalyptus* essential oil, 1,8-cineole and citronellal. The results corroborated the in vitro findings. In conclusion, based on the results obtained in this study, both eucalyptus essential oils exhibit antiviral potential, making them viable candidates against cold, flu, and coronavirus. Further *in vivo* studies are required to confirm their activity.

Keywords: Eucalyptus; essential oil; antiviral; in vitro enzyme assay; moleculardocking.

Acknowledgements: This PhD and research project was supported by AnadoluUniversity Scientific Research Projects Commission BAP 2005S058.

OP22. DEVELOPMENT OF A TECHNOLOGY FOR OBTAINING A SUBSTANCE BASED ON POLYSACCHARIDES OF *FERULA KUHISTANICA* PREBIOTIC ACTION

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The search for new approaches to the complex processing of plant materials for the purpose of its full use will significantly expand the list of biologically active substances released, which are synthons for obtaining new drugs for medicine, agriculture and veterinary medicine.

At the Institute of the Chemistry of Plant Substances, the technologies have been produced for production of estrogenic preparation Kufestrol from the aerial part *Ferula kuhistanica*. In addition to the esters of terpenoid alcohols, this raw material contains other types of biologically active compounds that are disposed of as production waste. In order to rationally use plant raw materials, we conducted a chemical study of the production waste of this drug.

In the production of the Kufestrol substance, the main waste in terms of quantity is the depleted raw material after extraction with alcohol. The residual amount of alcoholwas recovered directly from the raw material in a vacuum drum dryer. Dry ferula meal contains protein, ash substances, fiber, so it can be used as a fertilizer for plowingfields. As a result of the chemical study of the *Ferula kuhistanica* meal, water-soluble polysaccharides were isolated, the basis of which is arabinogalactan (45%). The monosaccharide composition of water-soluble polysaccharides is mainly representedby arabinose and galactose in a ratio of 1:3 and has an Mm of 36-45 kDa. Structuralstudy of arabinogalactan made it possible to attribute it to arabino-3,6-galactans. Arbifilan exhibits prebiotic activity, stimulating the growth of an associative culture of bifidobacteria and some monostrains of lactobacilli. The technology for obtaining the substance of Arbifilan has been developed, which consists of three-fold extraction of *Ferula kuhistanica* meal with water with forced circulation of the extractant at a rateof 80 l/h, concentration of the aqueous extract and drying in a spray dryer. In this case, the drying process must be carried out under the following conditions: dry matter ofthe extract - 15%, water - 85%; drying agent inlet temperature- 180 □C, outlet - 85 □C; solution feed rate - 6 l/h; solution supply pressure - 0.2 Mpa.

The results of the studies of waste production of the Kufestrol substance made it possible to develop a technology for obtaining the Arbifilan substance from the *Ferula kuhistanica* meal.

Keywords: Polysacharides; Ferula; prebiotic

OP23. ISOLATION OF SECONDARY METABOLITES FROM *VALERIANA TUBEROSA* L. THROUGH *IN VITRO* ANTI-INFLAMMATORY ACTIVITY-GUIDED FRACTIONATION

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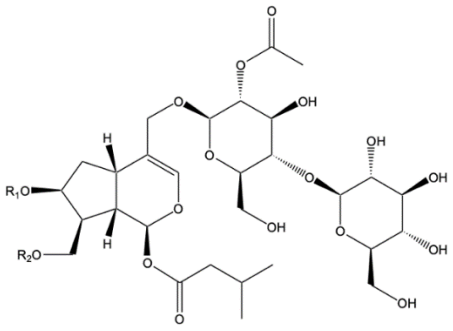
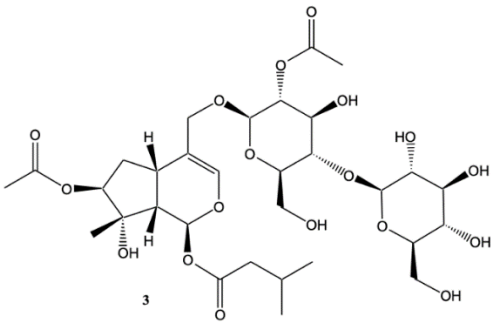
The genus *Valeriana* consists of 426 species distributed worldwide while, it is represented by 13 species in flora of Türkiye, including *Valeriana tuberosa* L [1,2]. Previous studies on some secondary metabolites obtained from *Valeriana* species indicated their cytotoxic and anti-inflammatory activities [2,3]. The aim of this study was to isolate anti-inflammatory secondary metabolites from the underground parts of *V. tuberosa* through *in vitro* activity-guided fractionation and to identify their chemical structures. The shade-dried and powdered underground parts of *V. tuberosa* were extracted with EtOH. The crude EtOH extract was dispersed in H_2O and then partitioned against Petroleum Ether (PE), $CHCl_3$, EtOAc, and *n*-BuOH, respectively. The crude EtOH extract and subextracts were tested for their *in vitro* nitric oxide (NO) inhibitory activities in LPS-induced RAW 264.7 macrophage cells. $CHCl_3$, EtOAc and *n*-BuOH subextracts exhibited remarkable inhibitory effect on the production of NO with IC_{50} values of 58.80, 61.14, and 14.17 µg/mL, respectively. Thus, these subextract were fractionated by chromatographic methods. Similarly, the main fractions were also tested in the same bioassay. Among the tested fractions, fr. IV from $CHCl_3$ subextract, fr. A from EtOAc subextract and frs. B and C from *n*-BuOH subextract displayed NO inhibition with the IC_{50} values in the range of of 57.68 to 84.49 µg/mL. Successive chromatographic studies on these active fractions by MPLC (C_{18} and SiO_2) and Sephadex LH-20 CC yielded four new iridoids (**1-4**) along with 12 known analogues as well as a lignan glycoside. Their chemical structures were established by extensive 1D and 2D NMR as well as HR-MS analysis.



	R_1	R_2
1	H	Isovaleroyl
2	Isovaleroyl	H



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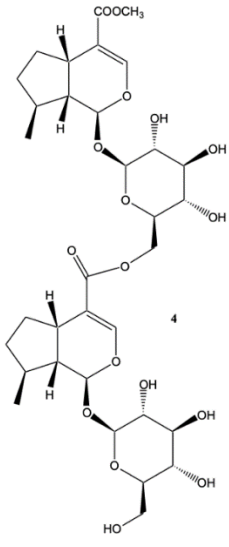

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Keywords: *Valeriana tuberosa*, anti-inflammatory activity, iridoids

Acknowledgement

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References

[1] POWO. 2023. Plants of the World Online.–R. Bot. Gard. Kew. (https://powo.science.kew.org/taxon/urn:lsid:ipni.org:names:30000719-2, accessed 28 Jul 2023)

[2] Erdoğan, M., Aru, B., Yılmaz, Ş. T., Yeşilada, E., Yanıkkaya-Demirel, G., Kırmızıbekmez, H. (2023). *Phytochemistry*, 208, 113590.

[3] Wang, H., Song, Z., Xing, H., Shi, Z., Wu,P., Zhang J., Tuerhong, M., Xu, J., Guo, Y. (2020). *Bioorganic Chemistry*, 101, 103974.

OP24. ISOQUINOLINE ALKALOIDS AS A PROMISING FRAMEWORK FOR CHEMICAL MODIFICATIONS TO ENHANCE BIOACTIVITY

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Investigation of natural products is not limited only to the discovery and isolation ofnovel bioactive compounds; but equally important, it would provide valuable lead molecules that can be modified chemically and serve as a template for the design of semi-synthetic potent molecules. Numerous medications have been developed or inspired by the chemical modification of their natural parent molecules, such as development of atracurium from tubocurarine and dextromethorphan from morphine.

Isoquinoline alkaloids are one of the largest groups of natural products that have beenknown as fruitful sources in the drug discovery. Some isoquinoline alkaloids, such asgalantamine and morphine, have found their place in therapy as naturally occurring molecules, and yet there are many other well-investigated isoquinoline alkaloids withpromising bioactivity profiles, providing a natural potent scaffold. Derivatization andpreparation of analogues of the natural isoquinoline-bearing alkaloids can be utilizednot only as a beneficial strategy for improving the potency of these complex structures but also to improve the toxicity or bioavailability profile of the molecule, whileavoiding the complicated and expensive total-synthesis procedure.

In this presentation, we will describe the perspective designed study for preparing semi-synthetic derivatives of a few selected potent isoquinoline alkaloids, which are available in natural sources in sufficient amounts, to enhance their targeted biologicalactivity. Moreover, the possible challenges of chemical modification of alkaloids will be discussed, and achieved results will be presented.

Keywords: Alkaloid, isoquinoline, pharmacological activity

OP25. SYNTHESIS, CHARACTERIZATION AND BIOLOGICAL STUDIES OF OXAMIDES

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The aim of this study is to synthesize and characterize a new class of oxamides and to study its biological significance. From the literature survey, it is investigated that this class of compound has significant biological application, but still insufficient information is available on biological studies of oxamides. Compounds of oxamides (1-10) were synthesized by reaction of aniline with oxalyl chloride. The structure of synthesized compounds were confirmed by 1H-NMR, EI-MS and IR spectroscopy. 1H-NMR was confirmed the trans conformation of compounds by giving the spectra of half protons because of plane of symmetry in structure. EI-MS predict the correct molecular mass of compound which was confirmed by CHN. Non- enzymatic (DPPH), enzymatic (lipoxygenase and xanthine oxidase) antioxidant activities and enzyme inhibition (α-glucosidase) studies of all synthesized compounds were performed. Oxamides exhibit promising antioxidant and enzyme inhibition activity. Most of the compounds showed significant antioxidant radical scavenging potential compared with the standard butylated hydroxy anisole (BHA). All compounds showed proficient inhibitory potential in different enzymatic assays. Compound 4 has a most promising efficacy for xanthine oxidase (XO) analogous with the standard allopurinol. This compound exhibit high inhibitory potential of XO in vitro reveal that it may restrain the production of active oxygen specie. Compound 1 was most potent lipoxygenase inhibitor. Most of the oxamides exhibit good inhibition for α- glucosidase, it is an enzyme which is related to glucose level in blood, the inhibitor of this enzyme can be used to cure diabetes type II. Further studies are still required to understand its pharmacological role to use oxamides in therapeutic drugs.

Keywords: Oxamides, spectroscopy, xanthine oxidase, α- glucosidase.

OP26. STUDY OF THE NON-POLAR COMPONENTS OF THE ENDOPHYTIC FUNGUS *OVATOSPORA SENEGALENSIS* FROM FLOWERS OF *VERNONIA ANTHELMINTICA*

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The non-polar compounds are very important organic molecules that play a key role in the manufacture of various drugs, membranes, mechanical oils, dyes, and some important fine chemicals. The production of non-polar compounds by microbial fermentation is convenient and fast. This paper presents the obtained experimental data on the study of the non-polar components isolated from the culture filtrate of the endophytic fungus *Ovatospora senegalensis* isolated from the flowers of the plant *Vernonia anthelmintica*, used in traditional Chinese and Uyghur medicine. The supernatant of the endophytic fungus *O. senegalensis* was extracted with petroleum ether, dichloromethane and ethyl acetate, successively. The non-polar components of these extracts were analyzed by GC-MS. The GC-MS analysis of the petroleum ether, dichloromethane and ethyl acetate extracts detected 36 compounds in comparison with the NIST library based on the peak area (%), molecular weight, retention time, and CAS number. The identified compounds appeared to belong to different chemical classes including tert-butyl phenol compounds, fatty acid methyl esters, hydrocarbons, aldehydes, benzoquinones, pyrroles, and terpenes. The highest number of compounds were identified from the ethyl acetate extract (15 compounds). In the petroleum ether extract, 13 compounds were identified, whereas the dichloromethane extract showed 8 compounds. Major components of these extracts are 9-octadecenoic acid (Z)- methyl ester (8.0%), 1,4-benzenedicarboxylic acid, dimethyl ester (72.9%), cholesterol (30.7%), phenylethyl alcohol (16.6%), dibutyl phthalate (26.3%), diisooctyl phthalate (27.9%), benzenepropanoic acid, 3,5-bis (1.1-dimethylethyl)-4-hydroxy-, octadecyl ester (5.2%), 1 2-bis(trimethylsilyl)benzene (13.3%). It should be noted that 1,4-benzenedicarboxylic acid, dimethyl ester was the main compound in almost all extracts.

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Keywords: Ovatospora; Veronina; extract

REFERENCES

1. S. Xu, M. Li, Z. Hu, Y. Shao, J. Ying, and H. Zhang, Microorganisms, **11**, 464 (2023).
2. L. T. Niu, N. Rustamova, H. X. Ning, P. Paerhati, C. F. Lu, and A. Yili, Int. J. Mol. Sci., **23**, 11935 (2022).
3. N. Rustamova, Y. H. Gao, Y. Zhang, and A. Yili, Microorganisms, **8**, 586 (2020).

OP27. CONSTRUCTION OF QSAR MODELS TO PREDICT POTENCY ON A SERIES OF SUBSTITUTED IMIDAZOLE DERIVATIVES AS ANTI-FUNGAL AGENTS

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Quantitative structure–activity relationship (QSAR) modelling is one of the main computer tools used in medicinal chemistry. Over the past two decades, the incidence of fungal infections has increased due to the development of resistance. Inthis study, the QSAR was performed on a series of esters of 2-carboxamido-3-(1*H*-imidazole-1-yl) propanoic acid derivatives. These compounds have showed moderate and very good antifungal activity. The multiple linear regression (MLR) was used to generate the linear 2d-QSAR models. The dataset consists of 115 compounds with their antifungal activity (log MIC) against «*Candida albicans*» (ATCC SC5314). Descriptors were calculated and different models were generated using Chemoffice, Avogadro, GaussView software. The selected model was validated. The study suggests that the increase in lipophilicity and the reduction in the electronic character of the substituent in R1 as well as the reduction in the steric hindrance of the substituent in R2 and its aromatic character supporting the potentiation of theantifungal effect.

The results of QSAR could help scientists to propose new compounds with higher antifungal activities intended for immunocompromised patients susceptible to multi- resistant nosocomial infections.

Keywords: Quantitative structure–activity relationship, imidazole, antifungal, *Candida albicans* (ATCC SC5314).

OP28. BRIDGING GAP BETWEEN TRADITION AND FUTURE: *PELARGONIUM GRAVEOLENS* ESSENTIAL OIL TARGETED THE KEY PATHOGENITY MECHANISMS OF *CANDIDA ALBICANS*, VIA MIMICRY OF GASTROINTESTINAL COMPARTMENT AMBIENT PH ALTERATION

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Anatolia, the elements that are part of the traditional cultures are now nearly forgotten due to the not be able to be the part of widespread production technologies and the traditional components scientific values are not revealed an not popularized by researchers. Pelargonium graveolens L'Hér (PG), one of the irreplaceable component of traditional desserts and syrups with its pleasant and unique fragrance, is one of these valuable elements, and it is known as "Itır" among the Turkish people, especially in the Mediterranean region. This important species of the Geraniaceae family, with its medical and traditional value, still in existence only as a part of historical heritage in certain regions of Türkiye, in the preparation stages of food products and relieving the gastrointestinal (GIS) problem but unfortunately it is fall into oblivion. It is necessary to establish the scientific value of the traditional usage way of these elements and bridging the gap between tradition and the future by use science and technology, so the benefits and the harms of traditional components on human being, and health promotion can be revealed. In this context, PG essential oil and its antimicrobial properties evaluated by aiming transfer the ethnomedical and traditional usage to the future. In order to determined the response of *C. albicans*, which induced health problem throughout the GIS, to PG's essential oil, it was construct and established the experimental models which are able to mimicry the microenvironment of the host GIS compartment, especially in the aspect of ambient pH, and focus on oral mucosa, stomach, intestine and urogenital system pH alteration. We have found that, the special chemotypes of PG's essential oil has different effect, against the key pathogenicity mechanism of *Candida albicans*, adaptation of ambient pH during colonization stages.

Keywords: *Pelargonium; Candida*; GI

OP29. NEW DRUGS FROM OLD MEDICINES: IDENTIFICATION OF ANTI-EPILEPTIC NATURAL PRODUCTS FROM MEDICINAL PLANTS

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People with epilepsy are 1% of the population, and over one third of epilepsy patients have treatment-resistant seizures. Many epilepsy patients have additional cognitive, affective, and behavioral disorders that often remain untreated. Over 25 anti-seizure medications (ASMs) are currently approved in many countries, but most of these function through only a limited number of mechanisms (primarily GABA, glutamate, calcium, or sodium). Medicinal plants are an underutilized resource to develop new therapies for epilepsy that are likely to have novel mechanisms of action. Over the past 10 years, we and others have established zebrafish as a microscale in vivo biodiscovery platform for the systematic identification of bioactive natural products from medicinal plants. Because of their high genetic, physiological and pharmacological similarity to humans, zebrafish are well-suited to identify bioactive small molecules with therapeutic potential. Advantages of zebrafish include the small size and optical transparency of their embryos and larvae, enabling rapid in vivo screening in multi-well plates. Using zebrafish as a biodiscovery platform, we have identified several novel anti-seizure compounds from medicinal plants, including [1] spirostane glyocosides identified from the Philippine medicinal plant Solanum torvum (tandang-aso), structurally similar to the recently approved epilepsy drug candidate ganaxolone; [2] tanshinones, identified from the Chinese medicinal plant Salvia miltiorrhiza (dan shen); [3] indirubin, a known inhibitor of the kinase GSK-3, identified from the Congolese medicinal plant Indigofera arrecta (kasholoza); and [4] turmerones, identified from the Ayurvedic and East African medicinal plant Curcuma longa (turmeric). The latter are currently in clinical development for drug-resistant epilepsy.

Keywords: Medicinal plants, biodiscovery, zebrafish, epilepsy.

References:

[1] Aourz N, Serruys AK, Chabwine JN, Balegamire PB, Afrikanova T, Edrada-Ebel R, Grey AI, Kamuhabwa AR, Walrave L, Esguerra CV, van Leuven F, de Witte PAM, Smolders I, Crawford AD. Identification of GSK-3 as a potential therapeutic entry point for epilepsy. ACS Chem Neurosci. 2019; 10(4): 1992-2003. http://dx.doi.org/10.1021/acschemneuro.8b00281.

[2] Brillatz T, Jacmin M, Queiroz EF, Marcourt L, Slacanin I, Petit C, Carrupt PA, Bum EN, Herrling P, Crawford AD, Wolfender JL. Zebrafish bioassay-guided isolation of antiseizure compounds from the Cameroonian medicinal plant Cyperus articulatus L. Phytomedicine. 2020; 70: 153175. http://dx.doi.org/10.1016/j.phymed.2020.153175.

[3] Chipiti T, Viljoen AM, Cordero-Maldonado ML, Veale CGL, Van Heerden FR, Sandasi M, Chen W, Crawford AD, Enslin GM. Anti-seizure activity of African medicinal plants: The identification of bioactive alkaloids from the stem bark of Rauvolfia caffra using an in vivo zebrafish model. J Ethnopharmacol. 2021; 279: 114282. http://dx.doi.org/10.1016/j.jep.2021.114282.

[4] Crawford AD. Identification of anti-epileptic natural products using zebrafish. Maced Pharm Bull. 2022; 68: 177-178. http://dx.doi.org/10.33320/maced.pharm.bull.2022.68.04.081.

OP30. METHOD AND SYSTEM DESIGN FOR THE PRODUCTION OF NATURAL SUBSTANCES

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The production of natural products and natural substances, starting from agriculture or collection is challenging as it is well known both at pilot and industrial scales.
Based on the knowhow and experience of our companies; the production of essential oils, natural extracts must be very good designed and engineered, using sophisticated systems with environmental sustainability. The current presentation will focus on various griding/grating, cold-press, adsorption, separation, filtration, fractionation, mixing, vacuum, steam generation stations, distillation systems, extraction systems including different type of reactors among other machinery and their key applications.
Keywords: Natural product; cold press; extraction

OP31. FROM BENCH TO INDUSTRY AND BEYOND: MEDICINAL AND AROMATIC PLANT LABORATORY COMPLEX, BATI AKDENIZ AGRICULTURAL INSTITUTE

Muslime TANRISEVEN

Bati Akdeniz Agricultural Institute

Anatolia, the cradle of the civilizations, witness many culture. The interrelation between humankind and plant species being the elements that are part of the tradition. Furthermore the usage of flora, as food, medicines, spirutual therapies and for other applications shape the cultures sharply. Since the existence of mankind, the plants have met almost every need to sustainabilty of human survival. As civilizations evolve the knowlegde about the plants also grow fastly. Humanbeing explore the way to identify, disseminate, and producing tecniques about plants usage. So on the plants, its formulations and its bioactive compounds be part of the human life and as well es health practices. Moreover the area of research about the medicinal and aromatic plants expand day by day. Here in Anatolia, with in the location between Europe and Asia the crossroads of the Middle East, Balkans, Mediterranean basin, and Caucasus, the civilization of the many different culture is growth with the nature flora of more than 10000 medicinal and aromatic plants MAP. Via richness of the flora and with the aiming to meet the need on to enhance the MAP research, Medicinal and Aromatic Plant Laboratory was established via governmental support of Türkiye, in 2010. The reputation of construction the research facilities is to meet the need in the area research of MAP, and bridging the gap between basically the four and more related area such agriculture, health, economy and ecosystem. Since 2010 the main rooted mission is enliven with carry out scientific and practical researches in high grade, with identifying the plant materials which growth in nature flora, sample collection and usage practices of etnobotanically usage plants, enhancing about the knowlegde about the plant propagating and processig methods. Morover make the plants, physical, chemical, microbiological, instrumental anaysis, detection of the seconder metabolites of the plants and their biological activity and related study. In the last decades, the Medicinal and Aromatic Plant Laboratory and its researcher teams conducting many research projects in coorporation with national and international institutes and organizations, such as GEF, FAO, TUBITAK, TAGEM, EU, as well as MAP business firms globally and all stakeholders in the MAP area. As a Bati Akdeniz Agricultural Research Institute, Medicinal and Aromatic Plant Research complex researcher we believed that when every stakeholder take advantage of the research results of the MAP the country will develop more than ever and with this intentions we welcomed the globally cooperation with national and international research activities

Keywords: Medicinal and Aromatic Plant Research; Research Institute; Antalya

PP1. PROSPECTS AND SIGNIFICANCE OF A NEW DRUG FROM *ASTRAGALUS* PLANT

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Cycloartane compounds are produced by plants of the genus *Astragalus* (Fabaceae). Glycosides of plants of the genus *Astragalus* are differentiated by a wide variety of structural types. Most cycloartane glycosides have a number of important properties,such as cardiotonic, hypocholesteriolemic, contraceptive, sedative, hypotensive, anti-inflammatory, immuno-stimulating, interferon-inducing activities.

Astragalus pterocephalus Bunge growing in Uzbekistan are a source of triterpene glycosides. The main triterpene glycoside is cyclosieversioside F (astragaloside IV). To obtain a biologically active compound cyclosieversioside F with 95% purity, a proposed method involves extraction with ethanol. The optimal conditions for the isolation and separation of the amount of extarct have been tried to obtain cyclosieversioside F. Quantitative analysis of the glycoside was carried out by High Performance Liquid Chromatography HPLC-ELSD.

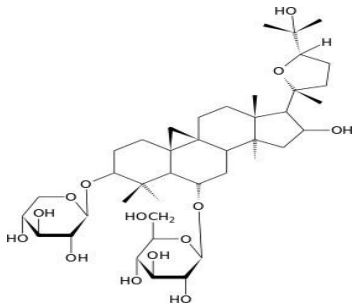

Fig. Cyclosieversioside F or astragaloside IV

Preclinical trials of cyclosiversioside F have been performed and it has been shown that glycoside has cardioprotective activity of a metabolic type of action.

These glycosides do not possess cumulative properties and are not toxic, have a large breadth of pharmacological action. A study of the cumulative properties of cyclosiversioside F showed that at long oral administration of the preparation there were no deviations in animal behavior. Cyclosieversioside F has a stress-protective property.

When considering changes in heart rate, it was found that modeling chronic heart failure, an increase in heart rate was observed. When glycoside and mildronate were administered, no significant changes were observed based on the obtained data

It was found that glycoside has cardioprotective and anti-ischemic activity not inferiorand in some cases superior to the reference drug. This study has been carried out withthe hope that medicinal plants containing active components will contribute to the creation of new safe agents. Pharmacogological studies have shown that cyclosiversioside F isolated from *A. pterocephalus* have cardioprotective effect of a metabolic type of action comparable to that of the known cardioprotector mildronate.

PP2. 2-METHYLQUINAZOLIN-4-YLIDENECYANOACETIC ACID ETHYL ESTER

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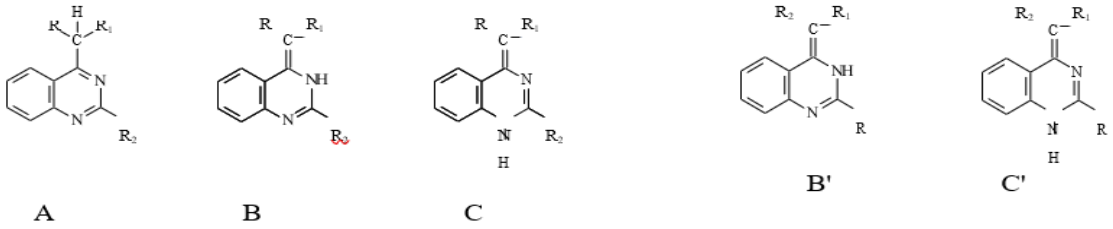
From a theoretical point of view, the 2,4-substituted quinazolines studied by us canexist in three (**A, B, C**) interconvertible tautomeric forms, and the reaction productcan be one of the most stable forms or a mixture of tautomers [1]. In addition, for the**B** and **C** forms, one can write two geometric isomers, respectively, **B'** and **C'**:



Therefore, the synthesis of these compounds and the determination of the exact structure of the final reaction products using physical methods was of great theoretical interest.

The structure of 2-methylquinazolone-4-ylidenecyanoacetic acid ethyl ester (1) synthesized by us in solution was studied by 1H NMR spectroscopy, and the crystal structure of compound 1 was determined by X-Ray (Fig. 1).

The presence of an intramolecular hydrogen bond NH---O=C between the N^3- nitrogen of the quinazoline ring and the carbonyl group of the cyanoacetic ester residue is characteristic of compound 1. The parameters of this intramolecular H- bond are as follows: N3…$O1^1$ distances 2.592 Å, H…$O1^1$ 1.78 Å and angle N3- H…$O1^1$ 141°.

Thus, based on the ^{1}H NMR spectrum of compound **1**, it was determined that they also exist in solution in the tautomeric state **B**. This is due to the presence of an intramolecular hydrogen bond NH…O=C.

Fig. 1. Crystal structure of ethyl ester 2-methylquinazolin-4-ylidenecyanoacetic acid[1].

REFERENCE

[1] Lapachev V.V., Zagulyaeva O.A., Mamaev V.P. Tautomerism of pyrimidyl-2-cyanoacetic esters, Izv, Academy of Sciences of the USSR. Ser. Chem., Moscow, 1977; 11: 2633

PP3. PHENOLIC COMPOUNDS OF *RHUS GLABRA*

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Among the natural compounds representing medicinal benefits significant place belong to plant phenolics. A wide range of biological action and low toxicity allows include them in a number of promising medicinal formulations in this regard. Therefore, the search for plants containing phenolics, the development of methods for their isolation, the determination of their chemical structure, and the study of biological activity is an actual problem in bioorganic chemistry. In this regard, the aimof our study is study the chemical composition of the polyphenols of the *Rhus glabra*(Smooth sumac) plant, in order to search for new sources of raw materials rich in biological active compounds growing on the territory of the Republic of Uzbekistan.The leaves of *R.glabra* were collected at the end of the vegetative period,air dried in the shade. 70% aqueous acetone used for full extraction of phenolics, afterevaporation of acetone under vacuum, the aqueous residue sequentially partitioned with chloroform and ethyl acetate. Ethyl acetate fraction, containing main amount ofphenolics (controlled by Folin-Ciocalteu`s reagent) vacuum concentrated as far as possible and pool of phenol compounds precipitated by adding of chloroform. The yield of total phenolics was 12% of the air-dry weight of the raw material. Qualitative reactions and TLC methods revealed the presence of flavonols, phenolic acids and tannins in the composition of the total polyphenols. RP-HPLC with corresponding standards and LC-MS/MS shown, that the main constituent of prepared phenolic fraction there was a group of the hydrolysable tannins – poly galloyl glucose. In Table below listed the identified compounds.

Acknowledgment: This work was supported by the Chinese Academy of Sciences president's international fellowship initiative (Grant No. 2022VBA0015 and 2023VBB0005).

Table 1. List of identified compounds

RT, min	$[M-H]^-$	[Mw]	Identification
5.08	169.01	170	Gallic acid
5.86	635.09	636	Trigalloyl-glucoside
6.37	617.09	618	Trigalloyl-levoglucosan
6.82	787.10	788	Tetragalloyl- glucoside
6.86	419.98	420	Cyanidin pentoside
7.13	469.05	470	Valoneic acid dilactone
7.24	939.11	940	Pentagalloul-glucoside
7.26	771.10	772	1,5-di-O-galloul-3,4-(S)-hexahydroxydiphenoyl protoquercitol
7.30	1091.12	1092	Hexagalloyl-glucoside
7.44	1243.13	1244	Heptagalloyl-glucoside
8.02	537.20	538	Hinokiflavone
8.21	479.08	480	Myricetin glucoside
8.22	153.02	154	Protocatechuic acid
8.52	463.09	464	Quercetin- glucoside
9.26	447.09	448	Quercetin -rhamnosid
9.30	416.21	416	1,3-O-Caffeoyl-dihydrocaffeoylglycerol
15.67	537.08	538	lithospermic acid

PP4. ON NOOTROPIC PROPERTIES OF DONSUMIN

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Donsumin is fraction of indole tryptamine alkaloids isolated from Arundo donax L consists of Donaxine, Donaxamine, Arundine, Ardine. Of these, only Donaxine according for 55-85% of the composition has been pharmacologically studied, Previously, it was established that Donsumine revealed elements of nootropic actionin the form of increased motor activity, increased search and research activity according to C. Hall. This was the basis for further study of the nootropic properties of the substance. It was found that Donsumin at a dose of 5 mg/kg orally accelerates production, short of the time of the reflex of finding the platform in the Morris watermaze to 60%, short of the food search reflex in the maze - 67%. The nootopic effect ofDonsumin was confirmed in experiments to eliminate the amnestic effect of scopolamine 1 mg/kg intraperitoneally in mice. Donsumin increased verticalization from phenamine 5 mg/kg, i.e. increased the sensitivity of DA2 receptors to the drug. The nature of the nootropic action was close to that of Ginkgo, Piracetam and others. In addition, it was found that Donsumin increases the sensitivity of central M- cholinergic receptors to arecoline 10 mg/kg, which was expressed in a shortening ofthe latent period and duration of tremor. It is known from the literature that Donaxinis a partial blocker of 5HT2 receptors that cause sedation. Strengthening of locomotor action under the influence of Donsumin begins at a dose of 1 mg/kg, and at a doseof 5 mg/kg is optimal. Donsumin, unlike Ginkgo and Piracetam, shows its nootropic effect immediately after administration, just like neurotransmitters. When comparing Donsumin with amphetamine or caffeine, a narrow therapeutic index was noticed.

According to the literature, amphetamine at a dose of 5 mg/kg caused activation of locomotor and cognitive activities, and a dose of 20 mg/kg caused a sharp excitationand convulsions leading to death, while in Donsumin the optimal dose is 5 mg/kg, and 50 mg/kg shows some sedative effect and preservation of verticalization, and LD50 is 1030 mg / kg, which indicates the narrowness of the therapeutic index of phenamine, while in Donsumin the difference between the effective and lethal dose is more than 200 times. In a comparative experiment, the study of the effect of Donsumin and ecdysten at a dose of 10 mg/kg on locomotor activity increased miceafter 15 days of administration showed that the effect of the first lasted 12 days, andthe second only 5 days. In view of the fact that the components of Donsumin differ in their structure from allknown nootropic drugs, a comparative study of their specific action was not considered appropriate.Thus, a new chemical class of low-toxic and safe nootropics with a high pharmacological latitude has been identified, which has an effect immediately after administration, while Ginko, Piracetam and others after a week of administration. With a 45-day application of Donsumin to mice at doses of 3 and 30 mg/kg orally all days of administration, it caused the activation of locomotor activity up to 250% compared to the control. No death of mice was observed. According to preliminary data, D2-, 5HT2, and M-cholinergic receptors are involved in the mechanism of nootropic action.

PP5. SYNTHIS OF NEW DERIVATE OF MERCAPTO-3-PHENYL-1,3,4-THIADIAZOL-2-THIONE AND ESTIMATION OF ITS BIOLOGICAL ACTIVITY ON PASS.

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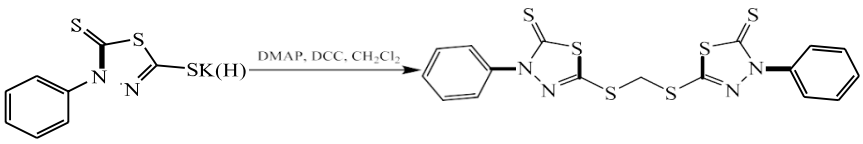
Heterocyclic compounds of 1,3,4-thiadiazole are the important class of substances with a wide spectrum of biological activity. The sulfur atom of thiadiazole givesthese compounds lipophilic properties, which allow to better penetrating through biological membranes. Thiadiazole fragments have potential activity with G-receptors, through enzyme binding, at the active final cysteine (for example, bacterialenzymes are part of non-steroidal anti-inflammatory drugs. For the synthesis of new heterocyclic derivatives with a wide spectrum of biological activity, we study the formation of various derivatives based on 5-mercapto-3- phenyl-1,3,4-thiadiazol-2-thione. The experiment was carried out in the presence of a mixture of DMAP and DCC catalysts according to the general procedure [1].



Scheme 1. Reaction

We report here the synthesis of 5-mercapto-3-phenyl-1,3,4-thiadiazol-2-thione, in the presence of a mixture of DMAP and DCC catalysts. The presence of a mixture of catalysts promotes the formation of a methylene bridge in the structure of the resulting compound - 5,5'-(methylenebis(sulfanediyl))bis(3-phenyl-1,3,4-thiadiazole- 2(3H)-thione). The crystal structure has been determined by X-ray diffraction and intermolecular interactions have been analyzed by HS. We studied the "biological activity spectrum" of 5,5'-(methylenebis(sulfanediyl))bis(3-phenyl-1,3,4-thiadiazole-2(3H)-thione) by PASS on line software, and described biological activity properties in a depending of its structure [2].

In the future, PASS on screening should help to test biological activity of 5,5'-(methylenebis(sulfanediyl))bis(3-phenyl-1,3,4-thiadiazole-2(3H)-thione) on amyloid beta precursor protein antagonist, 5-O-(4-coumaroyl)-D-quinate 3'-monooxygenase inhibitor or Glycosylphosphatidylinositol phospholipase D inhibitor, according their most significant values Pa.

REFERENCES

[1] Md. Ch. Sheikh, Sh.Takagi, T.Yoshimura, H.Morita Mechanistic studies of DCC/HOBt-mediated reaction of 3-phenylpropionic acid with benzyl alcohol and studies on the reactivities of 'active ester' and the related derivatives with nucleophiles. Tetrahedron. 2010; 66: 7272–7278. https://doi.org/10.1016/j.tet.2010.07.011

[2] K.J.Tidke, P.R.Solanki Microwave assisted synthesis of (substitutedbenzilidene)-4-amino dihydrothiophen-3(2H)-one (IA-IH) and their biological activities on PASS/JETIR. 2020; 7:(3), 1-12.

PP6. NEW BENZIMIDAZOLE 3'-DEOXYNUCLEOSIDES

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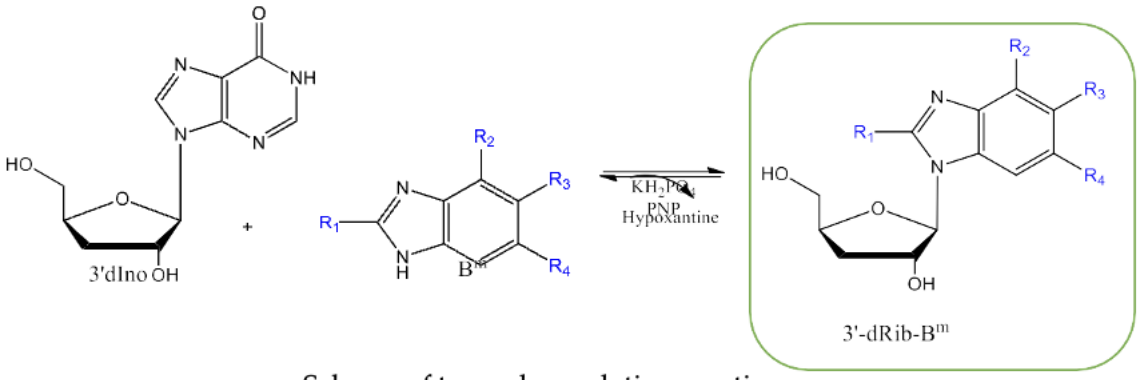
Compounds containing benzimidazole fragment exhibit pronounced antiviral, antispasmodic, neuroleptic, and antihistamine activity. The biological activity profileof benzimidazole nucleosides can be changed by introducing a substituent into the benzimidazole ring and/or carbohydrate residue.

A series of new modified substituted benzimidazole nucleosides (3'd-Rib-B^m) has been prepared by enzymatic method with yields from 8 to 72% and with purity morethan 95%.



Scheme of transglycosylation reaction.

R1 = H, NH2; R2 = H, F; R3 = H, F, OMe; R4 = H, F, OMe.

3'-Deoxyinosine (3'd-Ino) and substituted benzimidazoles (B^m) have been used as substrates in the transglycosylation reaction in the presence of recombinant purine nucleoside phosphorylase (PNP).

At the first step, each reaction was optimized for substrate ratio and amount of PNP. Conditions: 50 °C, 2 mM potassium-phosphate buffer, pH 7.0. The next step was preparative synthesis followed by isolation of enzymatic reaction products. Thestructures of 3'd-Rib-B^m were confirmed by NMR and mass-spectrometry. In the case of asymmetrically substituted benzimidazoles N1 and N3 regio-isomers were formed.

PP7. BIOSTIMULATORS BASED ON NATURAL SAPONINS AND CYTOKININS

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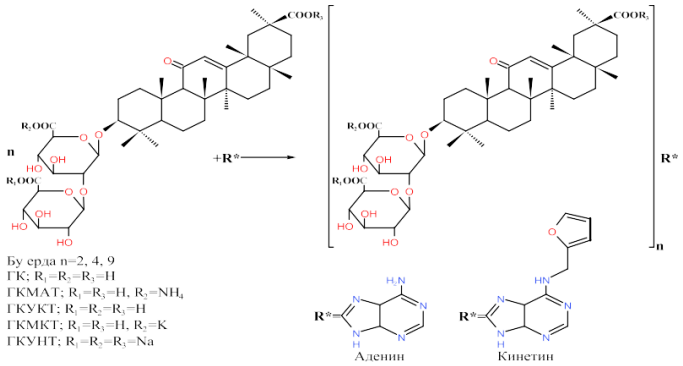
Currently, the use of cytokinins (adenine and kinetin), which perform the function of receptors of external signals in the internal tissues of plants, and supramolecular complexes obtained on the basis of them, are used in agriculture. use as a biostimulant, as a result of the activation of enzymes in the plant cell under the influence of cytokinins and the increase in the stability of the membrane, it is considered to be of great practical importance to isolate and modify the compounds that have a positive effect on the metabolism. The aim of the work is to obtain 30 supramolecular complex compounds based on cytokinins adenine and kinetin in different molar ratios with GK and its salts, and based on the study of their spectral and rheological properties, the stabilizing forces of the complexes are hydrogen bonds, hydrophobic-hydrophobic, ion-dipole ($-NH_3^+\cdots O-$ N, $NH^+\cdots OH^-$) and electrostatic ($-COO^-\cdots+NH_3^+$) interactions have been proven. Their physico-chemical properties and chemical structures were analyzed based on UV, IR spectroscopy, X-ray phase analysis methods, and mass spectrometry methods.



Scheme 1. Obtaining supramolecular complexes of adenine and kinetin with GA, MASGA, MPSGA, 3KSGA, 3NaSGA

When the biostimulant properties of the obtained supramolecular complex compounds were applied to grain crops, the activity of the α-amylase enzyme increased during the germination and development of the "Krasnodar 99" wheat variety, the amount of total proteins in the grain increased by 27.39%, and the amount of macro and micro elements in the grain was comparable to the control. when studied, the quality of wheat was improved due to the increase of Ca 7-8%, Fe up to 21%, andthe amount of gluten compared to the control.

Keywords: Adenine; kinetin; glycyrrhizic acid; supramolecular chemistry.

PP8. RESEARCH OF COMPLEXES OF GOSSYPOL DERIVATIVES

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Gossypol is a natural polyphenol, a yellow pigment extracted from the *Gossypium* plant (cotton plant). The structural properties of gossypol and its derivatives and thepossibility of chemical modification of their structure make it possible to increase effective drugs. A number of preparations based on gossypol and the scientists of the «Low molecular biologically active compounds» laboratory at the Institute of Bioorganic Chemistry AS RUz, which are currently used in medical practice, have created its derivatives. In order to expand the production of local medicines created because of gossypol, large-scale research and development work is ongoing. At the same time, continuing our scientific research, the Schiff base with gossypol 2-amino-5-methylpyridine was synthesized. A complex was obtained by modifying the azomethine derivative of this gossypol with $NiCl_2 \cdot H_2O$. Physico-chemical dimensions, structure and individuality of the obtained complex were comparatively studied usingmodern UV- and IR-spectroscopy methods. The following results were obtained whenthe IR spectrum of 2-amino-5-methylpyridine was analyzed. Accordingly, the absorption maxima of the valence vibration of the -NH_2 group, the valence vibrationsof the -N=C bond and the valence vibrations of the Ar-CH_3 bond were determined dueto the valence vibrations of the -C=C bond. When analyzing the IR-spectrum of the Schiff base formed by gossypol with 2-amino-5-methylpyridine, the absorption maxima belonging to the NH_2 group and the absorption maxima caused by the valencevibrations of the new -N=CH-bond were formed. According to the analysis of IR spectrum of Gossypol Schiff base complex with $NiCl_2 \cdot H_2O$, absorption maxima causedby valence vibrations of -N=CH bond did not change and absorption maxima caused by hydrogen bonds in the complex were determined. Based on the obtained results, the structural formula of the new complex was confirmed. Currently, studies on crystal growth and biological activity of the obtained complex are being continued.

PP9. PREPARATION AND PHYSICO-CHEMICAL CHARACTERISTICS OF THE WATER-SOLUBLE COMPLEX OF THE GOSSYPOL DERIVATIVE

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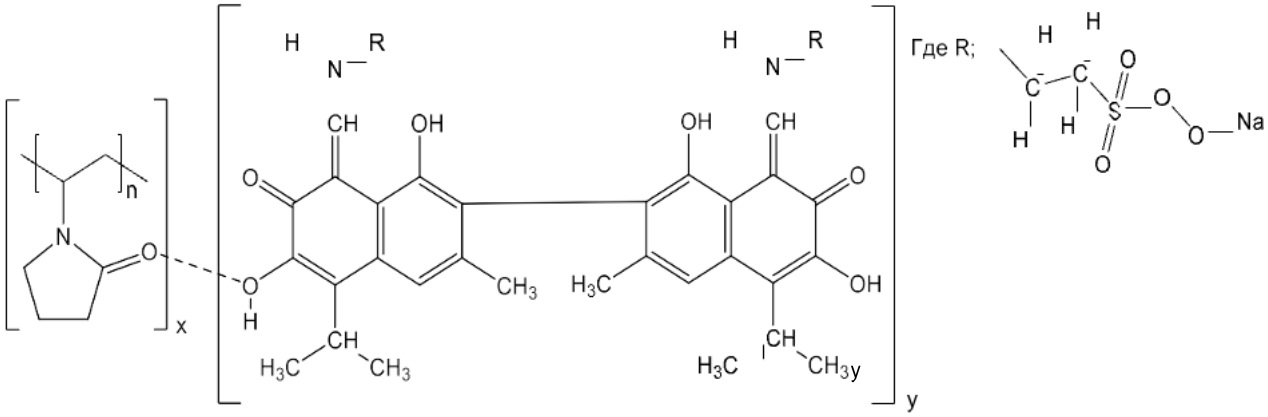
The article is devoted to the study of the process of obtaining a new water-soluble complex of the imino derivative of gossypol, its physicochemical and structural parameters. N-polyvinylpyrrolidone (N-PVP, M.w.=8000) for medical use was chosen to obtain the complex of the imino derivative of gossypol. During the study, we testedthe methods for obtaining several complexes, which are proposed in the classical literature and information resources. The following method was used to obtain the complex: the imino derivative of gossypol was mixed with the polymer at room temperature for 24 hours in a solvent system (acetone:water). Thus, a water-solublecomplex of gossypol with N-PVP was obtained, which was purified and dried. The yield of the final product was 75.35%.

To study the spectral properties of the obtained substances, modern UV and IR spectroscopy instruments were used. The results were analyzed and compared withdata presented in the scientific literature. The proposed structure of the resulting water-soluble supramolecular complex is proposed.



Keywords: Gossypol, N-polyvinylpyrrolidone, water-soluble complex, UV and IR spectroscopy, structure.

PP10. COMPLEXES OF WATER-SOLUBLE LOCAL PLANT POLYPHENOL DERIVATIVES AND THEIR BIOLOGICAL ACTIVITY

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The article is devoted to obtaining water-soluble complexes of iminoazo derivatives of gossypol, studying their physicochemical properties and biological activity. Aromatic, heterocyclic amines and sulfanilamide preparations were used as amine componentsin obtaining iminoazo derivatives of gossypol and their water-soluble complexes. The maximum values of wavelengths and the corresponding optical densities were determined in the UV spectra of compounds in acetone solvent. In order to determinethe structure of the compounds, the infrared spectrum was taken and analyzed: the shift of the fundamental vibrational frequencies up to 31 cm^{-1} showed that the water-poly-N-vinylpyrrolidone in the compound is connected to a lesser extent because of hydrogen bonding. Obtaining complexes of azoderivatives of gossypol imines with poly-N-vinylpyrrolidone is related to the multi-functionality of the reactive groups ofthe ligand compound; formed hydrogen bonds due to the oxygen of the cycloamide group. For the first time, six new water-soluble complexes iminoazo derivatives of gossypol with poly-N-vinylpyrrolidone were obtained. The results of determination of interferon-inducing activity of compounds were analyzed. The activity was compared with the effectiveness of azo-, iminoazo derivatives of gossypol. Accordingto the obtained results, it was shown that the effectiveness of water-soluble complexes iminoazo derivatives of gossypol.

Keywords: Gossypol, Schiff bases, azo derivatives of gossypol, iminoazo derivativesof gossypol, poly-N-vinylpyrrolidone, UV and IR spectroscopy methods, interferon-inducing activity.

PP11. DEPENDENCE OF THE GROWTH-STIMULATING ACTIVITY OF CYCLOARTANES ON THEIR CHEMICAL STRUCTURE

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Triterpene glycosides play a crucial role in the regulatory systems of plant organisms. Studying the effects of glycosides on plant growth and metabolic processes, as well as establishing the relationships between chemical structure and biological activity, is necessary not only to understand their bioregulatory functions but also for practical applications.

In this study, we conducted a comparative analysis of the growth-stimulating activityof cycloartane triterpene glycosides - cyclosieversiosides A, E, F and astragaloside VII - based on their chemical structure. The compounds, were examined under laboratory conditions using wheat and cucumber plants. Auxin activity was determined by the ability of these substances, at a concentration of $1x10^{-5}$ %, to induce root formation in mung bean cuttings.

The results indicated that cyclosieversioside A exhibited high activity in wheat culture, with growth indicators almost on par with the growth regulator Floroxan. The lengthof wheat roots increased by 12.7%, and stems by 6.3%. In cucumber culture, the highest indicators, were observed when exposed to a solution of astragaloside VII, with root length exceeding the control variant by 36.9% and stem length by 9.6%.

These findings suggest that the substances demonstrate auxin-like activity, predominantly promoting the growth of seedling roots.

Additionally, studies on the activation of root formation through the influence of cycloartanes confirmed the ability of these substances to stimulate the root system. Root formation was observed after 10-14 days, with a high percentage of rooted cuttings observed at a concentration of $1x10^{-5}$ %. Cyclosieversioside A and astragaloside VII demonstrated significant activity, with the number of roots per cutting surpassing the control variant by 15.5% and 13.9%, respectively.

In conclusion, the comparative analysis of the growth-stimulating activity of cycloartane triterpene glycosides - cyclosieversiosides A, E, F and astragaloside VII - based on their chemical structure revealed that cyclosieversioside A and astragaloside VII exhibited high growth-regulating activity.

PP12. MANCHURIAN SCORPION TISSUES PROTEIN EXTRACTION WITH CHAOTROPIC SOLUTION AND TANDEM ION-EXCHANGE CHROMATOGRAPHY

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Manchurian scorpion (*Buthus martensii)* one of high poisonous types for animals and insects. It represent interest of a wide range of researchers as a source of neurotoxic peptides, potentially useful in medicine, including positive impact at vitiligo by melanin synthesis stimulation. The accelerated-simplified extraction and fractionation of venom gland and other tissues of this scorpion species with subsequent screening of bioactivity on murine melanoma cell lines B16 culture was the purpose of the present work.

The cut off scorpion tissues extracted by grinding by means of a mortar and a pestlein 50 mmol Tris-HCl pH 7.8, containing 4% of Triton X-100, 6 M of urea, 5 mmol of EDTA, 2 mmol of a PMSF and 5% of glycerol. A ratio of solid tissue to extracting solvent was 1 g : 5 ml, for efficiency of homogenization quartz sand (2 g tissue : 1 g ofsand) was added into grinding mix. Homogenate was clarified centrifuging at 12000 rpm, 5 min. (Eppendorf, Germany) and the insoluble debris was repeatedly extractedwith the same buffer solution, adhering an initial proportion extracting solution to solid tissue. The pH of combined extract was adjusted to 5.0, than clarified by centrifugation and loaded on a column with Toyopearl CM-650M cation-exchanger equilibrated in 50 mmol Tris-HCl pH 5.0 (buffer "A"). Column washed with buffer A (10 column bed volume) for remove of chaotropic agent and detergent, bonded cationic proteins/peptides eluted with 1.2 M NaCl in buffer A. Eluate desalted by using C18-cartridge: after loading to appropriate size C18-cartridge it washed with 10-15 column bed volume of water and bond protein fraction eluted with 75% ethanol. Resulting desalted fraction concentrated by means of vacuum evaporation and freeze-dried.

Acidic protein/peptides of scorpion tissue extract isolated in the same manner from Toyopearl CM - 650M column unbound fraction. pH of CM-650M column unbound proteins adjusted to 7.8 using 0.1 M Tris –base, clarified by centrifugation and load into column with QAE-sephadex A25. Other procedures as described above for cationic fraction isolation.

Acknowledgment: This work was supported by the Chinese Academy of Sciences president`s international fellowship initiative (Grant No 2021VBA0012, 2022VBA0015 and 2023VBB0005).

PP13. *ARTEMISIA AUSTRIACA* JACQ. ESSENTIAL OIL COMPONENT COMPOSITION, BIOLOGICAL ACTIVITY

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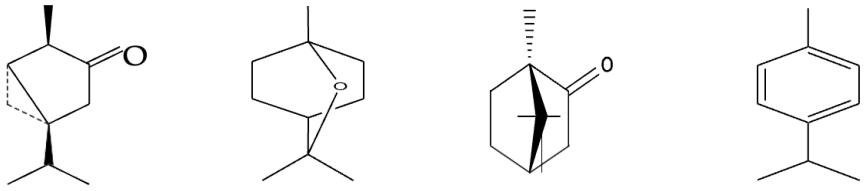
Artemisia austriaca Jacq., a plant characteristic of the steppe part of the Kazakh melkosopochnik, has a significant operational reserve.

We have studied for the first time the component composition of *Artemisia austriaca* Jacq. essential oil, isolated by microwave extraction methods, as well as traditional hydrodistillation.

Essential oils extracted from the aboveground part (buds, flower baskets, leaves) *Artemisia austriaca.*, collected during the budding phase in the Abai district of the Karaganda region, are mobile dark green and light green liquids with a characteristic odor. The yield of essential oils obtained by hydrodistillation and microwave extraction was 0.39% and 0.31%, respectively (calculated on air-dry raw materials).

According to chromatography-mass spectrometry, 50 components were detected in the essential oil isolated by microwave extraction from the aboveground part of *Artemisia austriaca* 47 of them were identified, the main components are: α- thujon **(1)** – 16.11%, camphor **(3)** – 14.35%, 1,8-cineole **(2)** – 13.34%, p-cymol **(4)** – 5.43%.

Chromatography-mass spectrometry of an essential oil sample obtained by hydrodistillation from the aboveground part of *Artemisia austriaca* Jacq. revealed 54 components, 51 of them were identified, the main components of the essential oil are: 1,8-cineole **(2)** – 16.20%, α-thujon **(1)** – 15.77%, camphor **(3)** – 10.91%, p-cymol **(4)**–7.02%;



(1) **(2)** **(3)** **(4)**

Thus, according to chromatography-mass spectrometry data for essential oils isolated from the aboveground part of *Artemisia austriaca* by methods of microwave extraction and hydrodistillation, the quantitative content is characteristicof α-thujone **(1)** (15.77-16.11%), 1,8-cineole **(2)** (13.3-16.2%), camphor **(3)** (10.91-14.35%). Comparative analysis of the composition of essential oils of *Artemisia austriaca* Jacq. and related species *Artemisia frigida* Willd. and *Artemisia sericea* Wb.ex Stechm. showed that their main component is 1,8-cineol **(2)**. Based on the results of biological screening, it was determined that samples ofessential oils from the aboveground part of *Artemisia austriaca* Jacq., isolated by hydrodistilation and microwave extraction, have antimicrobial activity and cytotoxicity.

PP14. BIOLOGICALLY ACTIVE TERPENOIDS *ACHILLEA TIANSCHANICA* KUPR. et KULEMIN

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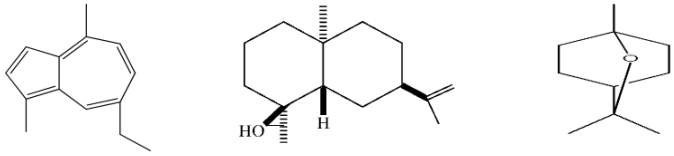
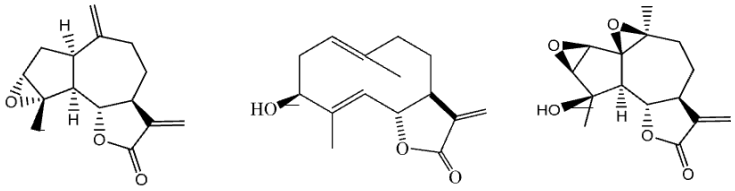
The genus *Achillea* L. is represented by 10 species in the flora of Kazakhstan, among them *Achillea tianschanica* Kupr. et Kulemin is endemic.The report presents the results of a chemical study of *Achillea tianschanica* Kupr. et Kulemin, collected in the flowering phase in the Sairam-Ugam National Park along theslope and floodplain of the Sairamsu River in the Turkestan Region of the Republic of Kazakhstan. For a comparative analysis of the composition of the essential oil and extractives of *A.tianschanica* Kupr. et Kulemin and related species: *A. nobilis* L., *A.millefolium* L., *A. setacea* Waldst. et Kit. and *A. stricta* L. we carried out theextraction of the essential oil and the extraction of the aerial part of the studied species of *Achillea* L. with chloroform. Component composition of the essential oil of the *A. tianschanica* Kupr. et Kulemin was determined by chromato-mass spectrometry on a gas chromatograph with a mass selective detector Agilent 7890B/5977B.



(1) **(2)** **(3)**

At the same time, 43 compounds were found, among which the major terpenoids are(in %): chamazulene (**1**) - 22.938, intermedeol (**2**) - 14.177, 1,8-cineole (**3**) - 10.245. From the



(4) **(5)** **(6)**

chloroform extract of the aerial part of *Achillea tianschanica* Kupr. et Kulemin isolated sesquiterpene γ-lactones estafiatin (**1**), hanfillin (**2**), chrysartemin A (**3**).

Thus, chamazulene (**1**), intermedeol (**2**), 1,8-cineol (**3**) were identified for the first time from the essential oil of the *Achillea* L. species, as well as from the sum of extractive substances - sesquiterpene γ-lactones estafiatin (**4**), hanfillin (**5**) , chrysartemin A (**6**). Based on the results of biological screening and pharmacological studies, it was determined that estafiatin (**4**) has antiparasitic and antitumor activity, hanfillin (5) has antitumor activity, chamazulen (**1**) has antimicrobial, anti-inflammatory and wound healing activity, 1,8-cineol (**3**) has antihelminthic activity.

PP19. OPTIMIZATION OF THE TECHNOLOGY OF A NEW DRUG BASEDON FURANOEREMOPHILAN-14β,6α-OLIDE

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Ligularia macrophylla (Ledeb.) DC is a promising source of biologically active terpenoid compounds, among which the main component is furanoeremophilan-14β,6α-olide (**1**), composition $C_{15}H_{18}O_3$ with a melting point of 135.7-137.1 °C (petroleum ether:ethyl acetate), $[\alpha]_D$ – 45° (c 0.45, dioxane), contained both in the aboveground and underground parts of the plant [1]. A sample of furanoeremophilan-14β,6α-olide (**1**)has anti-inflammatory activity.

The raw materials of the aboveground part (flower baskets, buds, leaves) and the underground part (roots) of *L. macrophylla* (Ledeb.) DC were collected in July 2020 in the vicinity of Nurken village of Karkaraly district of the Karaganda region of the Republic of Kazakhstan.

When optimizing the extraction method of *L. macrophylla* (Ledeb.) DC raw materials,a three-factor matrix of the complete experiment was built, including the following parameters: temperature, extractant concentration and raw material:extractant ratio.A narrow range of factors (parameters) is selected for the accuracy of the formula. Theoptimization criterion is the yield of the sum of extractive substances andfuranoeremophilan-14β,6α-olide (**1**). According to the results of extraction of raw materials *L. macrophylla* (Ledeb.) DC the yield of the sum of extractive substances and furanoeremophilan-14β,6α-olide (**1**) was determined. In the process of a complete 3-factor experiment, a general formula for optimizing the extraction method of the raw material of the large-leaved *L. macrophylla*(Ledeb.) DC was derived by mathematical analysis.The developed mathematical model of extraction of the raw material of large-leaved *L. macrophylla* (Ledeb.) DC on the basis of a second-order polynomial equation has been verified for convergence with experimental data. The convergence with experimental data has been verified on the basis of a second-order polynomial equation of the large-leaved *L. macrophylla* (Ledeb.) DC. Quality control of raw materials, substances, and the final product is carried out by spectral analysis methods (IR, UV, NMR ^1H, ^{13}C spectroscopy) and physico-chemical constants according to a standard sample of furanoeremophilan-14β,6α-olide (**1**). Thus, the raw material *L. macrophylla* (Ledeb.) DC is of interest as a promising source for the production of an original medicinal product.

PP16. ISOPRENOIDS OF *POPULUS BALSAMIFERA* L. ESSENTIAL OIL AND THEIR BIOLOGICAL ACTIVITY

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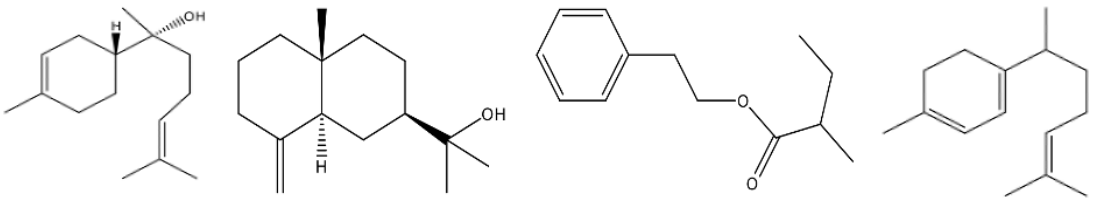
Populus balsamifera L. is a promising source of biologically active compounds, including terpenoids and flavonoids. Essential oils of the buds of *Populus balsamifera* L., is of particular interest as a potential source of pharmacologically active compounds.

We have studied for the first time the component composition of the essential oils ofthe buds of *Populus balsamifera* L., collected in the vicinity of the city of Karaganda of the Republic of Kazakhstan, isolated by hydrodistillation methods on the Clevenger apparatus and by the barothermal method.

98 components were found in the essential oil from the buds of *P. balsamifera* L., isolated by the barothermic method, by chromatography-mass spectrometry, 89 of them were identified. The main components are α-bisabolol (**1**) -14.14%, β-eudesmol (**2**) - 10.70%, 2-phenylethyl 2-methylbutanoate (**3**) - 10.22%. In the essential oil from thebuds of *P. balsamifera* L., isolated by hydrodistillation, 96 components were found, of which 88 were identified, the main components are 2-phenylethyl 2-methylbutanoate (**3**) - 15.10, γ-curcumene (**4**) - 11, 85%.



(1) **(2)** **(3)** **(4)**

It should be noted that in the essential oil isolated by the barothermal method, thereare compounds that are products of polymerization or thermal decomposition. In turn, no such compounds were found in the essential oil isolated by hydrodistillation.

According to the results of pharmacological studies, it was determined that the essential oil of *Populus balsamifera* L. buds has a pronounced antimicrobial activity, cytotoxicity, antitumor activity against Pliss's lymphosacoma, sarcoma 37 and Walker's carcinosarcoma.

PP17. NEW SUPRAMOLECULAR COMPLEXES WITH SPECIFIED PROPERTIES BASED ON PHYTOECDYSTEROIDS

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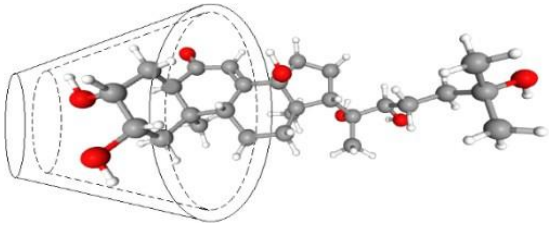
Supramolecules (cyclodextrins, polysaccharides, water-soluble natural polymers, etc.) are widely used for intermolecular encapsulation of a medicinal substance in terms of stabilization and improvement of hydrophilic properties.

Taking into account the unique properties of organic supramolecules, we synthesizedand obtained a number of supramolecular ensembles based on α-, β-, γ- and 2- hydroxypropyl-β-cyclodextrins, disodium salt of glycyrrhizic acid (Na2GA), and polyvinylpyrrolidone with 20-hydroxyecdysone (20E), 2-deoxyecdysone, 2-deoxy-20-hydroxyecdysone, 3-epi-2-deoxyecdysone, as well as tri and tetracetate, hydrazone, oxime and enamine derivatives 20E used as clathrates [1]. When using 2-hydroxypropyl-β-cyclodextrin (2-GP-β-CD) as a



component of intermolecular self-assembly, it is more hydrophilic compared to analogues of α- andβ-CDs, due to the presence of additional 2-hydroxypropyl fragments in the macroheterocycle molecule, where proton changes both in the outer shell and and they are the same internally, which contributes to the formation of a mixed ligand supramolecular composite (Fig.1). The fine structure of the new water-soluble supramolecular ensembles of phytoecdysons and synthesized synthon compounds is confirmed by the data of two-dimensional correlation of ^{1}H-^{1}H, TOCSY, ^{1}H-^{1}H ROESY, ^{1}H-^{13}C HMQC and ^{1}H-^{13}C HMBC NMR spectra. When studying the water solubility of supramolecular complexes based on 20E with2-GP-β-CD and Na2GA, the moment of dissolution of the substance was determined using high-performance liquid chromatography and a potentiometric value in time intervals. The experimental results demonstrated a 3-fold improved solubility of 20Ein combination with 2-GP-β-CD and 2.7–fold with Na2GA, respectively. As a result of bioscreening, substances with pronounced anti-inflammatory andanalgesic activity were found among the synthesized compounds, surpassing the comparison drug “Sodium diclofenac”.

REFERENCES

[1] Tuleuov BI, Temirgaziev BS, Kozhanova AM, *et al.* Supramolecular Complex of 20-Hydroxyecdysone-3-acetate with β-Cyclodextrin and Its BiologicalActivity. *Russ J Gen Chem.* 2020; 90, 2258–2263,

PP18. APPLICATION OF POLYPRENOLS *PAULOWNIA TOMENTOSA* IN THE CULTIVATION OF WINTER WHEAT IN KASHKADARYA REGION

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Recently, growth regulators of natural origin have been used in fields with winter wheat crops. As scientific research and practice prove, these preparations help cropsto better absorb micro and macro elements, solar energy, and water in variousenvironmental conditions. Especially winter wheat during its life cycle, plants are affected by many stress factors, such as drought resistance, water deficiency, and saltstress.

Our research aims to study the effect of the *Paulownia tomentosa* plant extract on thebiometric and quality indicators of winter wheat to improve cultivation technology.The object of research is the polyprenol of the extract of the plant *P. tomentosa* and thestimulant Uchkun - stimulating the synthesis of auxins. Crops were processed at thetime of the exit phase into the tube. The subject of research was the most commonwinter wheat variety Grom and the local winter wheat variety Bunyodkor. As a resultof the studies, it was found that the polyprenol of *P. tomentosa* and stimulant Uchkun,under conditions of drought resistance during the growing season in the Kashkadaryaregion, contributed to an increase in the content of chlorophylls, the amount of greenmass, the coagulation temperature of water-soluble proteins in the leaves of winterwheat.

In the experimental variant with the use of polyprenol, the value of the sum of chlorophylls in the leaves increased by 5.6% compared to the control variant and amounted to about 56.2%. The use of the Uchkun stimulator in the winter wheat cropsof the Bunyodkor variety responded with an increase to the control within 14.0%, and the value of this indicator was 58.5%. The temperature of coagulation of water-soluble proteins in the leaves of winter wheat Grom and Bunyodkor variety ranged from 58°Cto 59°C during the phases of budding and heading.

PP19. METHOD OF COMBATING THE QUARANTINE PEST OF COTTON *HELICOVERPA ARMIGERA*

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In recent years, many chemical compounds have been shown to be effective against crop insects but the practical efficacy of only a few compounds has been observed.

In this work, for the first time, the insecticidal activity of the 1,3,4-oxadiazole derivative against the global crop pest - *Helicoverpa armigera* was evaluated in laboratory, the toxicity (LD50) of 1,3,4-oxadiazole derivative was evaluated against the insect, as wellas the effectiveness against *H. armigera* in the field.

It was found that the 1,3,4-oxadiazole derivative at 0.1 mg/mL caused 65.5% -69.0% mortality of larvae *H. armigera* after 24 - 48 hours of incubation. The toxicity of SD-79 against larva *H. armigera* was LC_{50} 0.42 mg/mL.

The insecticidal activity of the 1,3,4-oxadiazole derivative was studied for the first time in vitro against *Helicopvera zea, Spodoptera frugiperda,* and *Trichoplusiya ni* insect cells. The results obtained confirm that 1,3,4-oxadiazole derivative at a dose of 10 μM/mL exhibits strong toxicity against cells of various cutworm species, which is confirmedin the experiment in vivo.

The field trials of effectiveness against larvae *H. armigera* were conducted in the Tashkent region during the 2022 cropping season. The results of field trials showedthat on the 7^{th} day, the effectiveness of 1,3,4-oxadiazole derivative at a rate of 0.2 kg/ha against larvae *H. armigera* was 56.0% compared to the control, 11.0% more compared to the insecticide BI-58 (a.i. dimethoate).

Thus, it can be assumed that the 1,3,4-oxadiazole derivative can control the number of larvae *H. armigera* with the best control efficiency of more than 58.5% at an increased level of economic damage threshold in the field conditions of the Tashkent region.

PP20. FLAVONOIDS FROM *ARTEMISIA PORRECTA*

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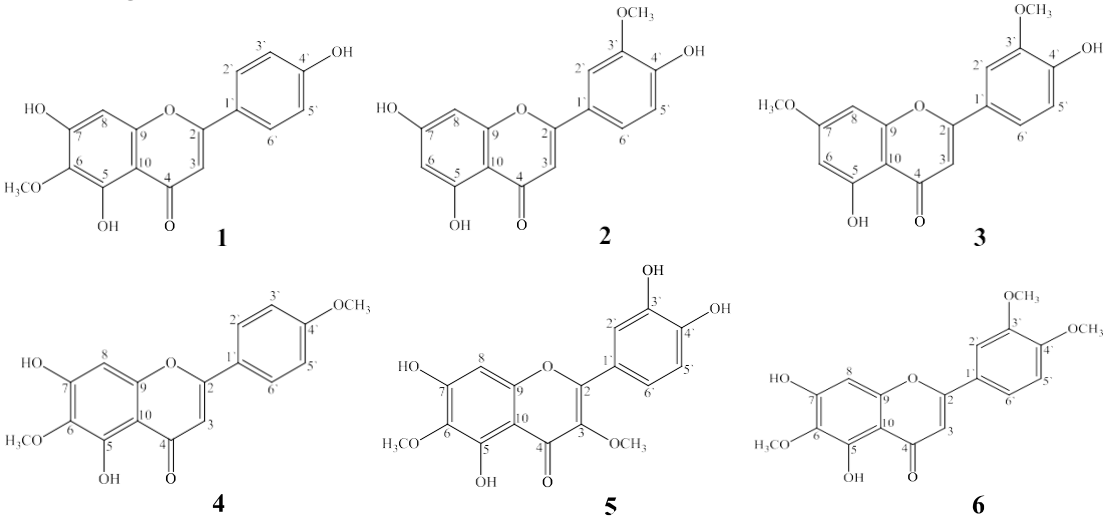
Artemisia, one of the largest genera in the Asteraceae family, including more than 350 species, is wide distributed in the temperate regions of the northern hemisphere suchas Asia, Europe and North America [1]. 81 species of *Artemisia*, grow in the territoryof Uzbekistan [2]. A 10 kg sample of the dried *Artemisia porrecta* was extracted with 90 % ethanol (70 L) at room temperature resulting in a total yield of 1.1 kg of crude extract. The extractwas then partitioned in *n*-hexane, chloroform, ethyl acetate, and *n*-butanol. The ethyl acetate extract (100 g) was subjected further processing columnchromatography with silica gel by eluating gradient of hexane-ethyl acetate (100:0 to0:100). As a result, six flavonoids were obtained from the ethyl acetate fraction of theplant. Their structures were elucidated by investigating their spectral data of UV, IR, and NMR spectroscopies. These structures were then compared with existing literature and authenticated samples. The isolated compounds were identified as hispidulin (1), chrysoeriol (2), velutin (3), pectolinaringenin (4), axillarin (5), and eupatilin (6).



All isolated secondary metabolites were isolated from the *A. porrecta* for first time.

REFERENCES

[1] L.N. Pribytkova and S. M. Adekenov, Flavonoids from Plants of the Genus Artemisia [in Russian], Gylym, Almaty, 1999, p. 180.

[2] Poljakov, P.P., 1961. Systematic studies in the genus Artemisia L., vol. 11. TrudyIns. Bot. Akad. Nauk. Kazakh, SSR, Alma Acta, pp. 134–177.

PP21. INFLUENCE OF POLYPRENOL OF *PAVLOVNIA TOMENTOSA* ON FORMATION OF WINTER WHEAT YIELD

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In the Republic of Uzbekistan, winter wheat occupies the main areas of crops. The useof plant growth regulators in winter wheat crops is an environmentally safe method of increasing yields and product quality.

The studies were carried out in 2022-2023 in the "Muslimakhon oltin kuz khosili" farm of the Tashkent region, with a total area of 2 hectares. Winter wheat variety - Thunder.

The aim of the study was to establish the effect of polyprenol of *P.tomentosa* on the productivity of winter wheat plants.

In the course of the work, an increase in the number of productive stems was revealed - 362.2 pcs/m^2 in the polyprenol of the *P.tomentosa* plant variant, while in the controlit was 352.7 pcs/m^2, and in the standard Uchkun it was 365.1 pcs/m^2. Additional foliar processing of the experimental variant had little effect on the number of productive stems.

It was established that the use of presowing treatment with polyprenol of the *P.tomentosa* plant had a positive effect on the indicators of the crop structure. Thus, the mass of grain from one ear in the experimental variant of the presowing treatment was higher than the control variant by 14% and in the variant with additional foliar treatment by 15.9%, as well as the weight of 1000 grains by 5.5-9.8%, respectively. Inthe standard Uchkun, these indicators exceeded the control by 9.5%, and the weight of1000 grains by 4.5%, respectively. The increase in the yield of winter wheat in the experimental variants was 4.1 c/ha and 5 c/ha, while in the standard Uchkun, the increase was 1.6 c/ha.

Thus, the use of polyprenol of *P. tomentosa* in the technology of cultivating winter wheat by the method of presowing treatment and additional foliar treatment in the booting phase contributes to an increase in grain yield.

PP22. PLANT LIGNINS AND THEIR APPLICATION

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Lignin is the second-most abundant plant polymer on Earth after cellulose and the first among aromatic biopolymers. Natural lignins are unique organic polymers that hold the plant body together.

Lignin performs a number of functions, such as transporting water, strengthening seed coats, protecting from mechanical damage, ultraviolet rays, drought, microorganisms, viruses, insects, and animals.

The biosynthesis of lignin begins with the formation of glucose during photosynthesis, glucose is converted into shikimic acid - the most important intermediate compound in the so-called shikimic acid pathway, two aromatic amino acids are formed as final compounds along this path: L-phenylalanine and L- tyrosine, are amino acids that serve as starting materials for the enzymatic synthesisof phenylpropanoid compounds, which leads through activated cinnamic acid derivatives to three cinnamic alcohols. Cinnamic alcohols are synthesized in the cytoplasm and transported to the cell wall, where lignin is formed, which is called lignification. The network macromolecule of lignin is built from derivatives of guaiacyl (G), syringyl (S), and p-hydroxyphenyl (H) units.

They are interconnected by simple ether bonds, such as (C–O–C) alkyl-O-aryl –β-O-4, α-O-4, aryl-O-aryl (4-O-5), alkyl- O-alkyl (γ-O-γ) and carbon-carbon bonds such as (C–C) alkyl-aryl –β-5, aryl-aryl 5-5, alkyl-alkyl β-β.

Lignin is also a multifunctional polymer that contains –OCH3, -OH (carboxylic, phenolic, and aliphatic), -CO, -COOH.

Lignin in plant cells has a spatial structure chemically associated with hemicellulose.The chemical bonds between lignins and carbohydrates have been ester, phenyl glycosidic, and hemiacetal bonds. In fact, lignin is just as interesting a raw material asoil, but unlike the latter, it is a renewable resource. Lignin and its modifications are used in the food, pharmaceutical, cosmetic, agricultural, polymer, construction, and other industries.

In nature, humus is a breakdown product of lignin. Products similar to humus can be synthesized from it to improve soil fertility.

PP23. ACUTE TOXICITY AND ANALGESIC ACTIVITY OF 4-(4-((4-(METHOXYCARBONYL)PHENOXY)METHYL) -1H-1,2 ,3-TRIAZOL-1-YL)BENZOIC ACID

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1,2,3-Triazoles have long been known to chemists, but in recent decades these compounds have become widely used in heterocyclic chemistry, since interesting biological activities have been discovered for them. In particular, they have been shownto have antimicrobial, antiviral, and antitumor activity. It has been shown that 1,2,3- triazole derivatives have an anti-inflammatory effect and are promising for further development as non-steroidal anti-inflammatory drugs. Thus, the presence of a 1,2,3- triazole fragment in a molecule can lead to the creation of potentially new compounds with high biological activity.

The aim of this work is to study the analgesic activity and acute toxicity of a new derivative of the 1,4-disubstituted 1H-1,2,3 series - triazoles - 4-(4-((4- (methoxycarbonyl)phenoxy)methyl) -1H-1,2 ,3-triazol-1-yl)benzoic acid.

Acute toxicity investigation using Litchfield and Wilcoxon method shown the mean semi-lethal dose (LD50) for mice 21,600 (18,782 ± 24,840) mg/kg. This substance belongs to the VI class of toxicity (relatively harmless substances). Under thermal pain stimulation (hot plate test) in intact animals (control), the latent period of the pain reaction was 12.5 sec. The reference drug ketoprofen at a dose of 10 mg/kg lengthens the latent period of the pain reaction by 2 times compared to the initial one. 4-(4-((4- (methoxycarbonyl)phenoxy)methyl)-1H-1,2,3-triazol-1-yl)benzoic acid increases thelatent period by 1.6 times compared to the original, somewhat inferior to the reference drug. In acetic writhing test, ketoprofen at a dose of 5 mg/kg reduces the number of writhings by 4 times, 4-(4-((4-(methoxycarbonyl)phenoxy)methyl)-1H-1,2,3-triazole-1- yl) benzoic acid at a dose of 150 mg/kg - 3 times compared to the control group.

Those, the 1,2,3-triazoles are prospective for further search for substances with analgesic action.

PP24. INFLUENCE OF THE COMBINATION OF CYTIZINE AND SUCCINIC ACID ON THE ACUTE ALCOHOLIC INTOXICATION

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Drugs containing succinic acid (SA) belong to drugs of a metabolic type of action, the pharmacotherapeutic effects of which are aimed at restoring biochemical metabolic reactions disturbed by pathological processes. Alcoholic coma is often accompanied by respiratory failure. The purpose of this work is to study the effect of combinationsof cytisine, N-methylcytisine and benzylcytisine with succinic acid on the duration ofacute alcohol poisoning.

Substances were injected to mice subcutaneously for 10-15 minutes before intraperitoneal injection of 24% ethanol at a dose of 4.8 g/kg. The effect of the substances was evaluated by the duration of the lateral position (narcotic sleep) of the animals.

The studied compositions have an antitoxic effect in alcohol poisoning ща moderate degree. Thus, SA 10 mg/kg reduces the duration of narcotic sleep by 40%, cytisine ata dose of 0.1 mg/kg - by 66.6%, the composition "cytisine:SA" - by 74.6%. Compositions "N-methylcytisine:SA" and "N-benzylcytisine:SA" at a dose of 0.1 mg/kg - by 35.2 and41.3%, respectively, yielding to cytisine, SA and their composition, but showing a significant reduction in the duration of narcotic sleep.

PP25. ACUTE TOXICITY AND ANALGESIC ACTIVITY OF SOME1,2,3,4-TETRAHYDROISOQUINOLINE DERIVATIVES IN THE ACETYLCHOLINE WRITHING TEST

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Nowadays, it was shown that, according to the latest SOS clinical study, the risk of myocardial infarction development was not limited to coxibs, but also well-known NSAIDs, such as ketoprofen, nimesulide, meloxicam, naproxen, ibuprofen, diclofenac, indomethacin, ketorolac may have such side effects [1]. Actual problem of medicinal chemistry and pharmacology is the search for safer new candidate substances with analgesic action.

In this work, the acute toxicity of four new 1,2,3,4-tetrahydroisoquinolines was studied. The test substances were administered orally to 18-22 g mice using a non- traumatic metal probe at doses ranging from 1000.0 to 13000.0 mg/kg. Each dose was tested on 6 mice. The mean lethal dose was determined by the well-known method of Litchfield and Wilcoxon. The acetylcholine writhings were induced by intraperitoneal administration of acetylcholine at a dose of 3.2 mg/kg, which leads to the appearanceof the "writhing" syndrome. Each group included 6 mice. The test substances wereadministered subcutaneously to the experimental group of mice for 15 minutes before the introduction of acetylcholine, and the number of "writhings" for 20 minutes counted.

It was shown that the acute toxicity of compounds is lower than the toxicity of the reference drug ketoprofen by 3-3.5 times, respectively. The studied compounds at doses of 1–5 mg/kg in the acetylcholine writhing test showed a pronounced analgesic effect, which, however, was inferior to that of ketoprofen. Further study of the analgesic action of 1,2,3,4-tetrahydroisoquinolines is of current interest.

REFERENCES

[1] Castellsague J, Riera-Guardia N, Calingaert B, et al. Drug Saf. 2012;35. pp.1127– 1146.

PP26. CHEMICAL AND ELEMENTS CONTENT OF HYDROLYSIS OF LIGNIN OF COTTONSEED HULLS

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The plant biopolymers lignin, cellulose and hemicellulose are the main components of the plant cell wall.

Natural lignin is a complex amorphous polymers with three-dimensional cross-linked structure. It is basically composed of three phenylpropanoid monomers namely guaiacyl, syringyl, and p-hydroxyphenyl subunits. Its content in the cells of agricultural plants, depending on the culture, is 17-24%. Hemicellulose is the main constituent of most agricultural crops.

By chemical and biotechnological methods, hydrolyzing agricultural plants residues more precisely hemicelluloses on an industrial scale into ethanol, furfural, xylitol, feedyeast, etc. are obtained.

We investigate the chemical and elemental composition of hydrolysis lignin (GL) of cottonseed hulls taken from the burials of the Andijan hydrolysis plant.

The general characteristics of the fractions less than 2 mm had the following composition: moisture -9.1%, ash - 3.72%, extractives - 1.02%, easily hydrolysable polysaccharides 1.89%, difficultly hydrolysable polysaccharides 14.1%, Klasson'slignin - 79.3% .

The elemental composition of GL samples was determined using a Vario MACRO CHNS elemental analyzer. The method consisted in catalytic combustion of samples in a tube at a temperature of 1150°C in an oxygen atmosphere, reduction of oxides ina reduction tube at 850°C, separation of the resulting products on a chromatographic column with subsequent determination of the elements using a thermal conductivitydetector (TCD), helium served as the carrier gas.

The content of C, N, H, S (wt.%) is calculated from the formed gases N_2, CO_2, H_2O and SO_2 using a TCD. The oxygen content was calculated from the difference between the mass of the sample and the content of C, H, N, and S.

The content of elements (%) in the simple: C - 61.63, H – 4.90, S – 0.88, N – 1.16, O – 31.43, a H/C ratio of 0.95 and an O/C ratio of 0.51.

PP33. SYNTHESES BASED ON SUBSTITUTED β-PHENYLETHYLAMINES

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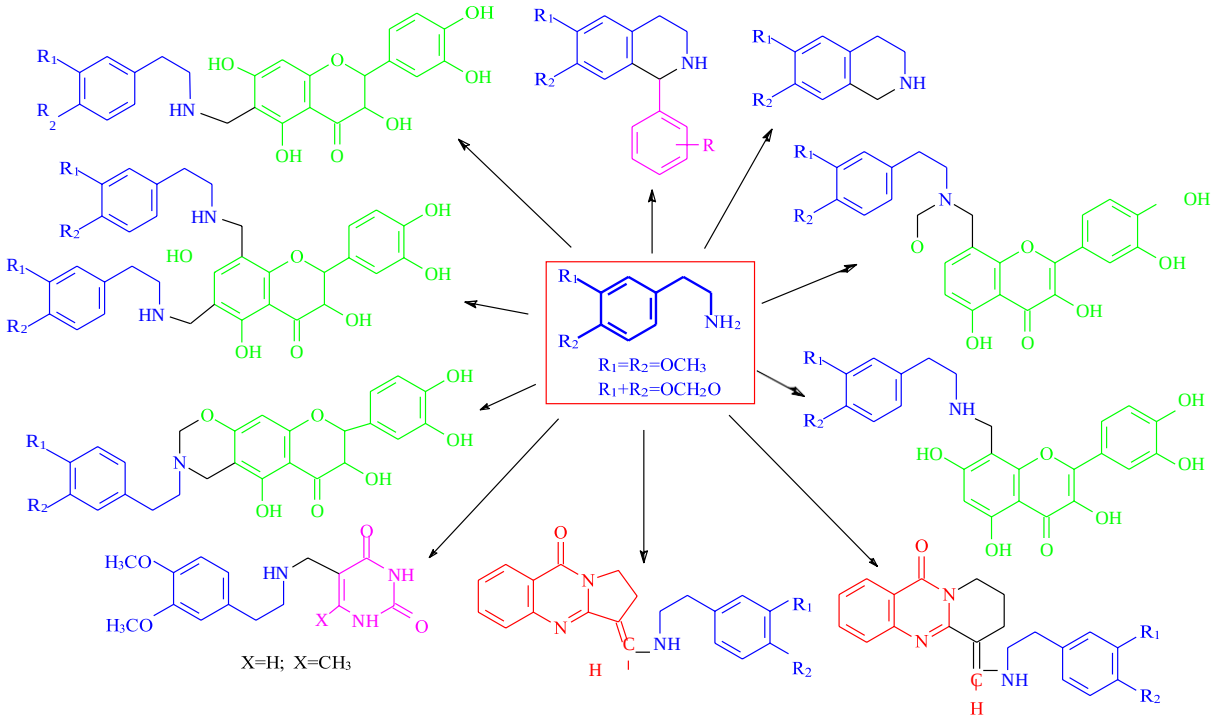
Modern approaches to the creation of new synthetic drugs are the synthesis of analogues of known drugs and the creation of new classes of drugs. β-Phenylethylamines are used as medicines and feedstocks in the pharmaceutical industry. β-Phenylethylamines, characterized as endogenous neurotransmitters, among them the first synthetic phenylethylamine is the CNS stimulant amphetamine, used in medicine for the treatment of attention deficit hyperactivity disorder (ADHD), as a nootropic agent and sports doping. Of particular interest among β-phenylethylamines is levodopa, which is an antiparkinsonian agent. Therefore, syntheses based on β-phenylethylamines are an important task of medicalchemistry.



PP34. LIPIDS OF HALOPHITE FRUIT PLANT OF THE *SUAEDA PARADOXA*

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Suaeda paradoxa Bunge. is a halophytic plant of the family *Amaranthaceae*, which is an endemic species of Central Asia, growing in Uzbekistan on saline lands. Biomass of *S. paradoxa* is recommended as a promising renewable raw material for biogas productionin the desert saline regions of Central Asia.

For the first time, we have studied the lipids of seeds (I) and pericarp (II) of *S. paradoxa* fruits that was collected on highly saline soil of the dried bottom of the Aral Sea (2022).By using well-known methods of lipids chemistry, it was determined that samples I andII contain 18.12 and 12.27% neutral lipids (NL), 0.47 and 0.78% glycolipids (GL), 0.77 and 0.89% phospholipids (PL). In the composition of the NL of two samples, the content of unsaponifiable substances was 5.41% (I) and 8.36% (II), carotenoids in the unsaponifiable components, according to spectrophotometers date, 105.38 mg% (I) and 244.13 mg%.

Hydrocarbons, fatty acid esters (FA) with phytosterols and triterpenols, triacylglycerides, free triterpenols, and phytosterols were identified in NL I and II by TLC on silica gel using known solvent systems, qualitative reactions, and model substances. GL included mono- and digalactosyldiacylglycerols, steryl glycosides and their esters with fatty acids; PL included phosphatidylcholines, phosphatidylethanolamines, phosphatidylinositols, and phosphatidic acid.

The lipid FA composition of two samples was determined by GC on an Agilent instrument 6890N, FID, 30 m x 0.32 mm capillary column, HP-5 phase, helium carrier gas, programming temperature 150-270°C. In the LL, 19 (sample I) and 14 (sample II) FAs with dominance ω6-18:2 and 16:0 were found; GL I and II included 24 and 16 FAs, respectively, with basic 16:0 and ω9-18:1; in FL I and II there were 23 and 16 LCDs, where the majors were 16:0, as well as 16:0 and ω6-18:2.

Thus, the fruit pericarp of *S. paradoxa* contains a significant amount of neutral lipids and is enriched in polar lipids and carotenoids.

PP29. PROTEIN PROFILE OF MEDICINAL PLANTS

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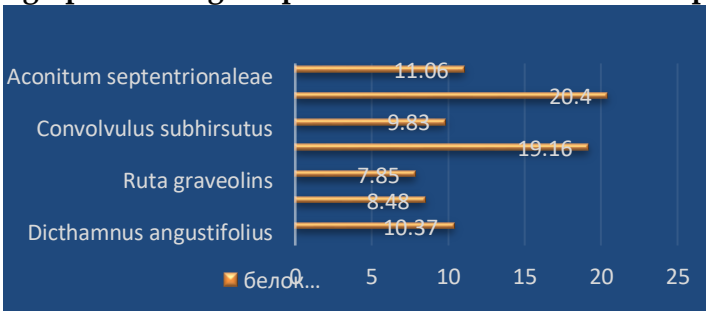
It is believed that biologically active molecules obtained from plant sources, mainly including secondary metabolites, are of great value for the treatment of various human diseases. However, some unavoidable limitations associated with these secondary metabolites, such as high cytotoxicity, low bioavailability, poor absorption, low content, improper metabolism, etc., have forced the scientific community to investigate medicinal plants in search of alternative biologically active molecules. It has been shown that a large number of proteins isolated from medicinal plants exhibit antimicrobial, antioxidant, anti-HIV, anti-cancer, and ribosome inactivating and neuromodulating activity. Despite these developments and the fact that proteins are potential candidates for medicinal products, to date, no systematic review article has documented the therapeutic potential of the available biologically active proteome of a medicinal plant. Thus, the present work was developed to describe the current state of therapeutically active proteins/peptides of medicinal plants in comparison with their potential as future protein-based drugs for the treatment of various human diseases [1]. In our study, the aboveground parts of the selected plants were used, namely: *Dictamnus angustifolius, Haplophyllum perforatum, Ruta graveolens, Mentha longifolia, Convolvulus subhirsutus*, *Arundo donax* and the roots of *Aconitum septentrionale*. The purpose of this work is to study the protein substances of these plants. The determination of protein substances in these samples was carried out by colorimetric method on a V-5000 Metash spectrophotometer with Nessler reagent at a wavelength of 400nm [2]. It was found that the total protein content in *Dicthamnus angustifolius* is 10.37%, in *Haplophyllum perforatum* 8.48%, in *Ruta graveolens* 7.85%, in *Mentha longifolia* 19.16%, in *Convolvulus subhirsutus* 9.83%, in *Arundo donax* 20.40% and in the roots of *Aconitum septentrionale* was 11.0%. The difference in the protein content in plants may be due to the ability of plants to fix nitrogen in the soil, which, in turn, helps in protein synthesis. The results were determined as the average of three repeated determinations.

Fig. A graph showing the protein content in the selected plants



When comparing seven selected medicinal plants, it was found that the protein content in *Arundo donax* and Mentha longifolia was the highest, while the lowest protein content was found in Ruta graveolens plants. Further in-depth protein studies should be conducted where the protein content is relatively high, which may be useful for the development of a new drug.

PP30. NITRATION REACTION OF THE QUINOLINE ALKALOID HAPLOPHYLLIDINE

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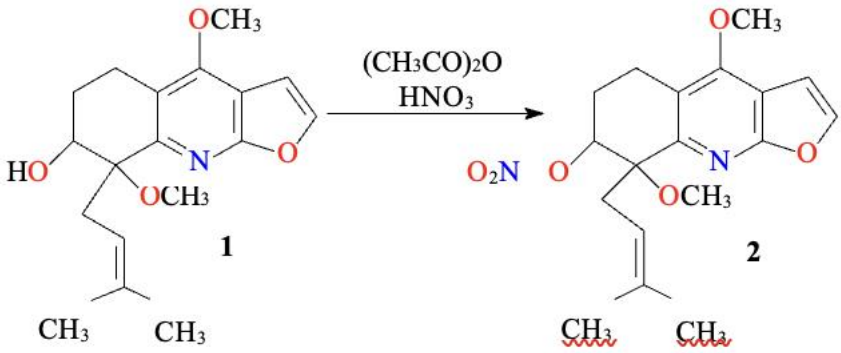
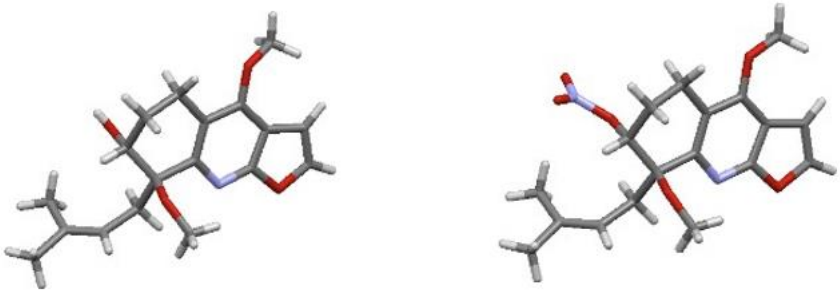
Alkaloids with a quinoline substructure are widespread and possess different biologically activities. For example, carteolol are used to treat arrhythmia and glaucoma, rosoxacin is used to treat respiratory tract, urinary tract and bacterial infections. In order to obtain a new alkaloid derivative nitration reaction was carried out on the basis of haplophyllidine (**1**), a quinoline alkaloid isolated from the seeds of the *Haplophyllum perforatum*. The haplophyllidine alkaloid was dissolved in acetic anhydride and concentrated HNO_3 was added dropwise over half an hour at a temperature of 0-5℃. The reaction was then carried out at room temperature for 5 hours. As a result of the reaction, an nitro ester of haplophyllidine (**2**) was formed in yield of 76%. The structure of the product is confirmed by ^1H and ^{13}C NMR spectroscopy and X-ray diffraction analysis.





PP31. POLYSACCHARIDES O F *CROCUS SATIVUS*

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Crocus (saffron) is a herbaceous plant from the family. Iridaceae. Saffron tea is known to help with atherosclerosis, flatulence, and some intestinal disorders. We have studied the petals and stigmas of *Crocus sativus* growing in Uzbekistan for the content of various groups of polysaccharides according to the previously described method. water-soluble polysaccharides (WSPS), pectin substances (PS) and hemicelluloses (HMC) were isolated, their monosaccharide compositions were established. The content and monosaccharide composition of the isolated polysaccharides are shown in Table 1. According to chromatographic analysis, alcohol-soluble sugars are represented by glucose, sucrose.

Table 1. Yield of polysaccharides and their monosaccharide composition

Type PS	Exit, %	Ratio of monosaccharide residues						UA, PC
		Rha	Ara	Xyl	Man	Glc	Gal	
Crocus sativus petals								
WSPS	6.8	+	+	+	-	–	+	+
PS	2.7	+	+	+	-	–	+	+
HMC-A	1.4	+	+	+	-	–	+	+
HMC-B	0.8	+	+	+	-	+	+	+
Crocus sativus stigmas								
WSPS	5.3	+	+	-	+	+	+	-
PS	3.2	+	+	+	+	+	+	+
HMC-A	2.1	+	+	-	+	+	+	+
HMC-B	1.6	+	+	-	+	+	+	+

As can be seen from Table 1, the dominant polysaccharides in the petals are WSPS (6.8%), and in the stigmas - PS (3.2%) and HMC (3.7%), and the latter are characterized by the presence of galactose, arabinose and xylose. In all samples, isolated polysaccharides contain a sufficient amount of galactose, arabinose, xylose, rhamnose, and uronic acids. It should be noted that, in contrast to the polysaccharides of C. sativus petals, the presence of mannose and the absence of xylose are observed in the stigma polysaccharides in the monomeric composition, and the absence of uronic acid in WSPS. Xylose was observed only in PS. Therefore, the WSPS of the stigma is a neutral polysaccharide.

Thus, the carbohydrate composition of the petals and stigma of *C. sativus* was studied and their qualitative monosaccharide composition was established.

PP32. OXIDATION OF FOLIOSIDINE WITH IODIC ACID

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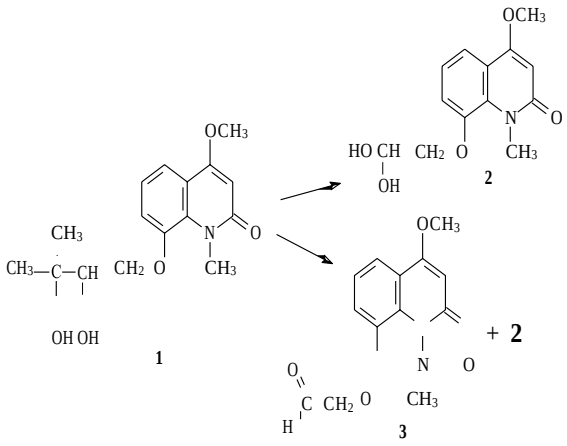
Currently, quinoline derivatives are widely used in the national economy and due to the presence of antispasmodic, local anesthetic, analgesic, sedative, antioxidant, antiarrhythmic and antimalarial properties, more than 100 quinoline-based drugs areused as medicines.

Therefore, the search for new highly effective biologically active derivatives based onquinoline alkaloids is an urgent task of modern medical chemistry. One of these alkaloids is the alkaloid foliosidin (1), which is isolated from the plant *Haplophyllumfoliosum* of the Rutaceae family of the flora of Uzbekistan.

Foliosidine contains in the 8-position a 1,2-diol chain OCH_2-CH(OH)-$C(OH)(CH_3)_2$, which we oxidized by the classical method using H_5IO_6 (L.Malaprad, 1928). The reaction was carried out using two concentrations of iodic acid (C=0.0876 mol/l; C=0.439 mol/l)

In the first case, the only reaction product is hydrate 2, whereas at a higher concentration of iodic acid, a mixture of two products containing hydrate 2 and foliosidinal 3 (1:0.6) was obtained.



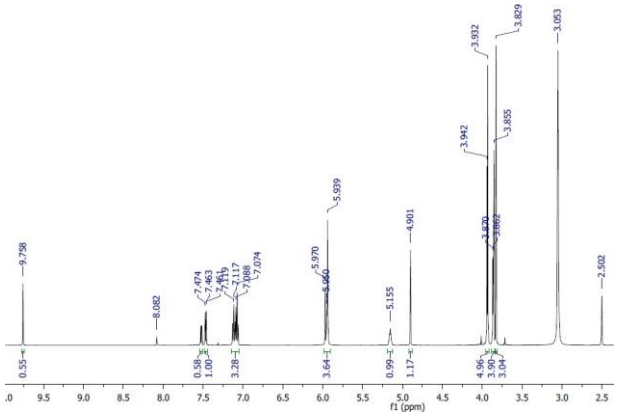


Fig.1 Oxidation of foliosidine with iodicacid Fig.2 1H NMR spectrum of the mixture compound 2+3.

PP33. CHEMICAL MODIFICATION OF BUCHARAINE ALKALOID

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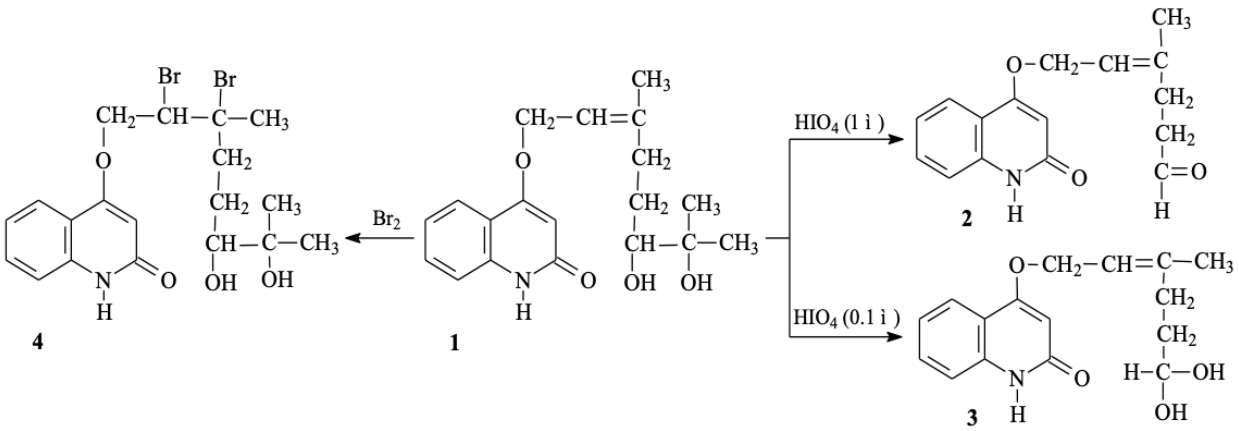
Among nitrogen-containing heterocyclic compounds, quinoline alkaloids are important heterocyclic compounds. Among the quinolines, Grepafloxacin is used in the treatment of bacterial infections, and Vinorelbine is used in the treatment of breast cancer and lung cancer. Quinoline alkaloids are found in Dictamnus andHaplophyllum plants growing in the flora of Uzbekistan. Chemical modification of bucharaine alkaloid isolated from Haplophyllum bucharicum plant was carried out. It was found that 2 different products are formed depending on the concentration of periodic acid during oxidation of bucharaine with periodic acid. When oxidized with 0.1 M periodic acid, hyminal diol 3 was formed, when oxidized with 1 M periodic acid, aldehyde 2 was formed. Bromination of bucharane with molecular bromine in chloroform at room temperature gave dibromine product 4.



The structure of the obtained substances was proved on the basis of IR, mass-, ^{1}H and ^{13}C NMR spectra.

PP34. SYNTHESIS OF HETEROCYCLIC AMIDES OF THE 18βH-GLYCYRRHIZIC ACID

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Targeted orientation of physiologically active natural compounds which were obtained by the novel construction and structural forms of molecules with specific effects and low side effects are actual topic in bioorganic chemistry. It is known that these compounds will have biological and pharmacological properties, improved by adding new pharmacophore ligands to their structure. Plant triterpenoids, like Glycyrrhizin and its aglycone Glycyrrhetate, which are secondary metabolites, have more attention in recent years, because of they have anticancer, antiviral, anti-inflammatory, and antiulcer properties.

In this work it was synthesised novel Glycyrrhizin derivatives containing heterocyclic amines, analyzed some of their physical and chemical characteristics, chemical structures and investigated their biological activity. To isolate Glycyrrhizic acid, a commercial Glycyrrhizic acid, which is produced locally and has a primary material concentration of 32% HPLC, was used. Glycyrrhizic acid subjected to hydrolysis and removed its monoammonium salt. In a result yield was equal to 56% (95% HPLC purity). Glycyrrhizic acid derivatives were synthesized by activated ester method using EDCI and HOBT, as a solvent was used dry acetonitrile, 20% TEA was added and the amino derivative was taken in a two-fold molar ratio. The yield of the product was 85-90%. The synthesized Glycyrrhizic acid derivatives were analysed by HPLC and mass spectrometry, melting point and Rf were determined (petroleum ether: acetone 3/1). Molecular docking analysis by MOE 2014.0901 software of designed Glycyrrhizic acid derivatives was done to investigate the possible receptor-ligand complex binding types in the active cavity of $3CL^{pro}$. Among designed derivatives the structures of 6,22,36,48 in complex with $3CL^{pro}$ presented most docking scores (-7.16 to -7.67), lower RMSD values (1.74 Å to 2.04 Å), morehydrogen interactions with pocket amino acids. Overall, molecular docking data analysis results show, the aforementioned four structures might be an active inhibitor of SARS-CoV-2 $3CL^{pro}$ than the Glycyrrhizic acid.

PP35. SYNTHESIS SOME OF 3,11-DIOXO-18βH-GLYCYRRHETIC ACID AMIDES

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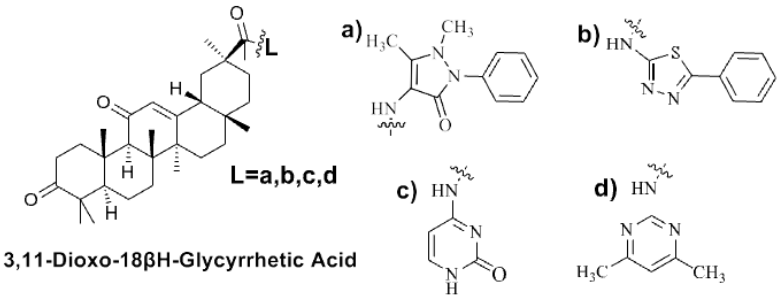
The structural alterations of natural compounds and the subsequent addition of particular functional ligands allow for the synthesis of their novel, highly promising semi-synthetic analogs, which have a directed action against pathogens of various diseases like bacteria, viruses, etc.

One of these compounds is 18H-glycyrrhizic acid, which was examined during the pandemic as an alternative antiviral substance for the treatment of COVID-19 diseaseand showed encouraging results. It also has an aglycone called Glycyrrhetic acid. They demonstrated improved tolerance for the latter by minimizing its negative effects when used in conjunction with other antiviral medications. In vitro studies have revealed that, several mechanisms of antiviral activity described, the main two waysare reducing the virus's adsorption and entry through the membrane during the first stage of viral replication, altering membrane fluidity, and because of its capacity to interact with the



Structure of synthesized 3,11-dioxo-18βH-glycyrrhetic acid derivatives.

ACE2 enzyme. 18H-glycyrrhetic acid was obtained from technically manufactured locally Glycyrrhizic acid. Johnson's reagent was used to synthesize 3,11-dioxo-18-H- glycyrrhetic acid, and X-ray diffraction analysis was used to determine the synthesized structure. By using the activated ester method, amino derivatives were obtained in atwofold molar ratio, the reaction took place for 10 to 24 hours at room temperature,and dry methylene chloride, EDCI, and HOBT reagents were utilized as activators. In a result the yield of synthesized product was equal to 92%. HPLC and mass spectrometry were used to analyze the compounds, and melting point and Rf were calculated (petroleum ether: acetone 3/1).

Ligands used: a) 4-aminoantipyrine; b) 2-amino-5-phenyl-1,3,4-thiadiazole; c) 2-amino-4,6-dimethylpyrimidine d) 4-aminouracil

PP36. DETERMINATION OF CARBOHYDRATE CONTENT IN BLACK RAISIN GRAPES

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In this thesis, the amount of carbohydrates in grape molasses is determined and information about the healing properties of grapes is presented.

The medicinal properties of grapes have been known for a long time. Ripe and raw grapes were used as a medicinal plant in Eastern medicine. They also used grape juice,vinegar, and leaf stalks. Abu Rayhan Biruni said that the water that flows when cutting the stem of a grape has many healing properties. Essential oil is also extractedfrom its stem. The famous physician Abu Ali ibn Sina writes about the properties of grapes: "Grapes that have been stored for a while will nourish and strengthen the body." A well-ripened grape is less harmful than an unripe one. Grapes themselves are more useful than their juice. Grapes and raisins are good for intestinal pain. Raisins are also good for kidneys and bladder. Grape stem water, wild grape fruit juice eliminates blood spitting. It is also useful for diarrhea and colon diseases. The water of the grape stem crushes stones, cures gout, cysts, and temiratkini.

The chemical composition of grape juice increases strength due to the presence of useful substances such as fructose, glucose, sucrose, raffinose, xylose. Those who havestones or sand in their kidneys will get rid of it if they constantly eat grapes and drinktheir juice. It is useful to drink grape juice against colds and asthma in the respiratorytract, it takes colds.

Grape molasses has a dark reddish color, and the presence of carbohydrates in the chemical composition of grape molasses was determined by high-performance liquid chromatography. Fructose 3.25 mg, glucose 4.61 mg, sucrose 0.11 mg are found in grape molasses. was found to exist. [1-3].

Molasses is rich in carbohydrates, it is a medicinal product that gives energy, increases appetite, increases blood volume, and is used in anemia. Grape molasses contains 3.25mg of fructose, 4.61 mg of glucose, and 0.11 mg of sucrose. was found to exist.

REFERENCES

[1] Temurov Sh. Viticulture. Tashkent. 2002. B. 199.

[2] Islamov AKh, Jalmurodova DD. Advantages of taking biologically activesupplements with natural capsules based on raisins. ToshDTU. Actual problems and innovative technologies in the field of natural sciences. International scientific-practical online conference. collection of scientific papers. Tashkent. 2020. B. 608 -610.

PP37. TRITERPENOIDS FROM THE PLANT *ASTRAGALUS TRANSOXANUS*

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Currently, herbal medicines are widely used in medicine for the treatment and the prevention of various diseases. For this reason, we studied the chemical compositionof the plant *Astragalus transoxanus* Fisch., which belongs to Fabaceae family. The previously known individual triterpenoids Hareftoside C (**1**) and cyclodisectoside (**2**) (Fig.) were isolated from the n-butanol fractions of the aerial part of this plant.

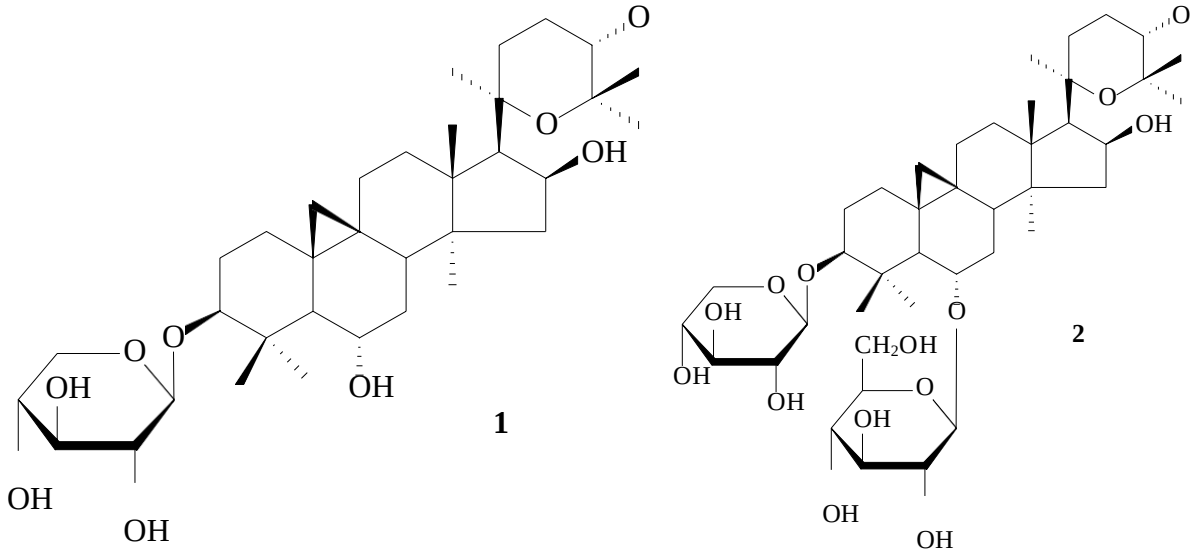

Fig. Structures of Hareftoside C (**1**) and cyclodisectoside (**2**)

The structure of the compounds was established on the basis of ^{1}H and ^{13}C NMR spectra. Thus, the plant *Astragalus transoxanus* was found to contain previously knowntriterpenoids, which were found in this plant for the first time.

PP38. BENZODIOXOLS FROM *FERULA LAPIDOSA*

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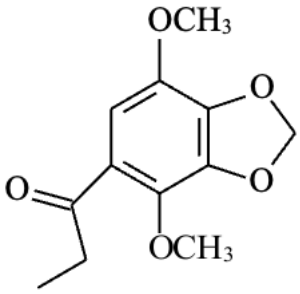
Ferula lapidosa Eug. Korov. refers to one of the plants richest in terpenoids and coumarins of the genus *Ferula* (family *Apiaceae*). Species of the genus are found in the flora of Central Asia, China and in the flora of India. The genus *Ferula* includes over 200 species. 50 species of this genus grow in Uzbekistan. *Ferula lapidosa* is an endemic plant for Central Asia [1-2].

The plant was extracted, collected during the flowering period, at room temperature with ethanol. The combined alcoholic extract was evaporated in vacuo. The resulting amount was chromatographed on a column of silica gel in gradient systems of extraction gasoline-ethyl acetate (25:1-6:1). As a result of chromatographic separation, three compounds were isolated. Structure of isolated substances 4,7-dimethoxy-5 (propanonyl)benzo[d][1,3]dioxol (1), 7-methoxy-5-(propanonyl)benzo[d][1,3]dioxol (2) and 4-hydroxy-7-dimethoxy-5-(propanonyl)benzo[d][1,3]dioxol (3) were found based on their NMR spectral data (1H, 13C NMR and using DEPT, HSQC, HMBC.

These compounds from *F. lapidosa* are isolated for the first time.



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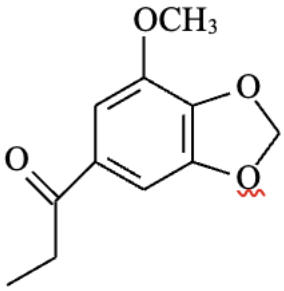

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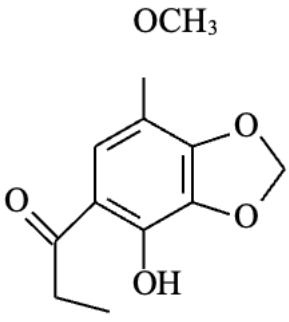

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REFERENCES

[1] Flora of the Kirghiz SSR. T. 8. Acad. Sciences of the Kirghiz SSR. Frunze. 1959;91 p.

[2] G.K. Schroeter. Medicinal plants and plant materials included in domestic pharmacopoeias. M. 1972; 119 p.

PP39. ETHYL β-D-GLUCOPYRANOSIDE FROM *RUMEXTIANSCHANICUS*

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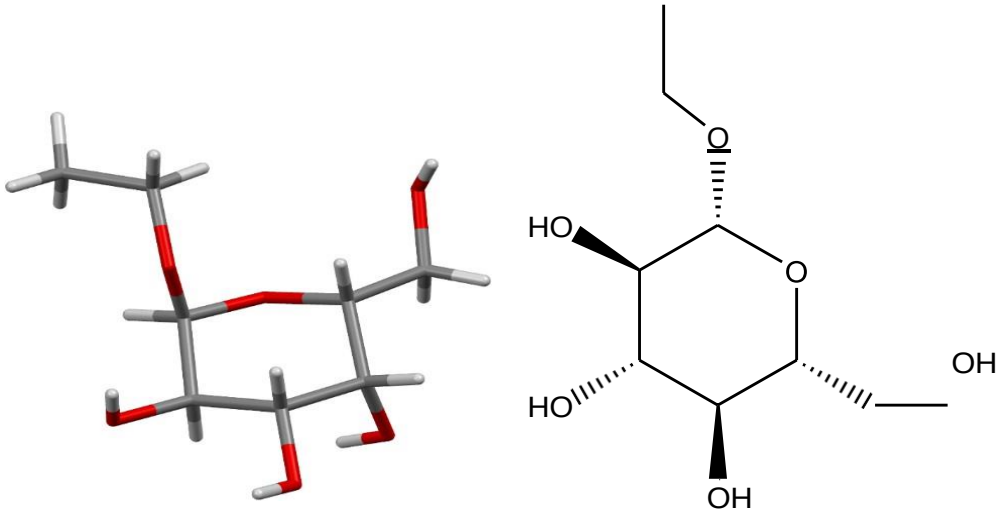
Rumex tianschanicus is an important medicinal plant in Uzbekistan. The activity of the underground parts of the leaves of the plant was studied using traditional medicine. Infusion and alcoholic extract are used for treatment. Fruits are used to treat dyspepsia in children. The object of research is the *Rumex tianschanicus* plant growing in Khojaariq village, Sariosiya district, Surkhandarya region.

Above-ground part of dried plant of *Rumex tianschanicus* was extracted with 70% ethanol and obtained four fraction: Extraction benzene, chloroform. ethyl acetate and n-butanol. All fractions sdudied antibacterial activity. n-Butanol fraction shoved higly antibacterial activity. The n-butanol fraction subjected to column chromatography with silica gel, by the sistem khloroform-methanol 50:1. In thechloroform methanol 25:1 system isolated one compound glucoze kharakteric and the crystal was grown. Its structure was determined using x-ray structural analysis (RSA). This is a known substance, but it was obtained for the first time from *Rumex tianschanicus.*



Ethyl β-D-glucopyranoside

PP40. ALKALOIDS FROM *LINDELOFIA MACROSTYLA*

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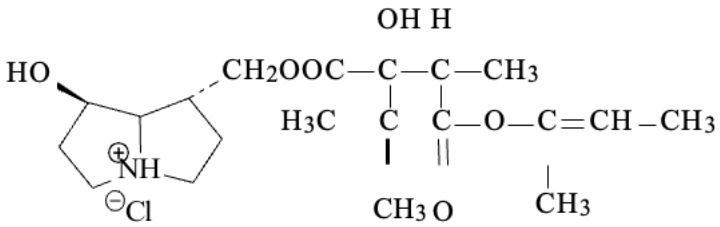
Lindelofia macrostyla is a perennial plant belonging to the Boraginaceae family, genus *Lindelofia*. Blooms in May-August; bears fruit in June-September. The plant *L. macrostyla* grows in Central Asia - Iran, Uzbekistan and Afghanistan. The alkaloids such as lindelofine, lindelofine N-oxide, lindelofamine and alkaloid №1 are known to have been isolated from this plant.
We studied the aerial part of L. macrostyla collected in the vicinity of the village Chimgan in the Tashkent region. The air-dried crushed aerial part of the plant was moistened with 10% aqueous ammonia solution. The alkaloids were exhaustively extracted with dichloromethane. Distilled 2/3 parts of dichloromethane, then transferred to a 5% solution of sulfuric acid. The acidic solution was made alkaline with 5% aqueous ammonia solution and the alkaloids were extracted with chloroform. According to HPTLC data, 2 of them were identified as lindelofin and N- oxylindelofin alkaloids wich previously isolated from this plant. The alkaloids lindelofamine hydrochloride (1) and carboxypyrrolizidine (2) were separated preparatively using TLC plates (FLUKA, Germany). Alkaloid (1) in to was found lindelofamine



hydrochloride, determination results of NMR (1H, 13C). spectral date.

Figure 1. The structure of Lindelofamine hydrochloride (1).

In this work, we isolated this alkaloid in the views of quaternary salts.
Crystal of alkaloid (2) was grown in methanol and determined by X-ray diffraction analysis. In result 1-exo-carboxypyrrolizidine was isolated from *L. macrostyla* for the first time.

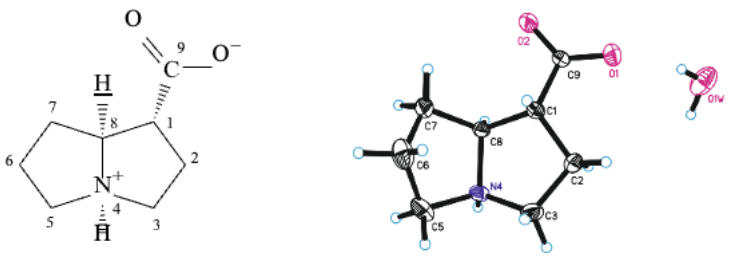


Figure 2. Structure of 1-exo-carboxypyrrolizidine (2)

PP41. WATER-SOLUBLE POLYSACCHARIDES OF *SCUTELLARIA COMOSA*

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The genus *Scutellaria* (scutellaria) is a valuable pharmacopoeial medicinal plant of the *Lamiaceae* family. This perennial herb is traditionally used in oriental medicine, due to the wide spectrum of activity of its herbal raw materials. In medicine, preparations of Baikal skullcap are used, which exhibit hypotensive, antiviral, anti-inflammatory, antitumor, vasoconstrictive, sedative and anticonvulsant properties, P-vitamin and antioxidant activity.

A water-soluble polysaccharide (WSPS) was isolated from the aerial part of *Scutellaria comosa* with a yield of 11%. The monosaccharide composition is represented by *Gal*(15.0%), *Glc* (3.9%), *Ara* (38.0%), *Rham* (6.9%), and *UAc* (36.2%). WRPS were separated on a DEAE-cellulose (OH-form) column. Neutral polysaccharides were eluted with water (3.0%), galactose, glucose, and arabinose were found in the hydrolyzate of the latter in a ratio of 2.6:3.4:3.4:1.0; acid polysaccharides (APS) were eluted with 0.5 M alkali, their yield was 89.0%; glucose, arabinose and uronic acid. Fractional precipitation of APS alcohol received 5 fractions (table 1). The isolated fractions differin the qualitative and quantitative content of monosaccharides. Fraction I by monosaccharide composition refers to arabinoglucans (AG).

Table 1. Yield and monosaccharide composition of the *S. comosa* fractions.

Fractions	Output, %	Monosaccharide composition, %						
		Gal	*Glc*	*Ara*	*Xyl*	*Man*	*Rham*	*UAc*
I	24.0	–	70.7	29.2	–	–	–	75
II	25.0	11.7	24.7	10.8	22.8	14.4	15.4	60
III	5.0	8.1	53.5	16.8	11.6	9.7	–	45
IV	12.0	–	66.5	14.2	10.7	8.5	–	40
V	54.0	12.2	51.0	22.5	–	7.4	6.7	20

AG - white amorphous powder, soluble in water, staining with iodine does not give. Its molecular weight calculated from the calibration curve with dextrans (MM 80.000,40.000, 15-20.000) in the case of gel chromatography is 37.5 kDa. In the IR spectrum of AG there are absorption bands at 914 (α-glycosidic bond), 830 cm^{-1} (pyranose ring), 1240 and 1750 cm^{-1} (O-acetyl groups). Therefore, AG is a natively acetylated polysaccharide.

PP42. BIOLOGICAL EFFICIENCY OF EXTRACT OF *HAPPLOPHYLLUM PERFORATUM* AGAINST *SCHIZAPHIS GRAMINUM* IN WINTER WHEAT CROPS

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Currently, agriculture faces a number of important tasks. The main ones are the creation and introduction of productive varieties of crops resistant to pests, taking into account the soil-climatic and economic conditions of the regions, as well as the development of integrated crop protection against pests. The aim of this work is to evaluate the biological effectiveness of the *Haplophyllum perforatum* extract against aphids in winter wheat crops.

This article discusses the results of field studies to evaluate the effectiveness of the extract of *H. perforatum* against wheat aphids (*Schizaphis graminum*) in winter wheat crops in the conditions of the Tashkent region.

The wheat aphid is one of the most widespread groups of pests of cereal crops worldwide. With early sowing of winter wheat, aphids significantly reduce grain yield. According to many researchers, the harmfulness of cereal aphids ranges from 5to 100%, depending on the prevailing conditions.

To combat pests of crops around the world, there is a growing interest in environmentally friendly and relatively safe biological plant protection products. A huge advantage of biopreparations is their ability to infect certain types of plant pathogens and displace them from agrophytocenosis, as well as provide environmentally friendly food and feed.

The search for such biological products, especially those of plant origin, is relevant today. It is known that the extract of *H. perforatum* has a high insecticidal activity against the larvae of the tomato leaf miner, aphids, pear suckers, etc.

According to the experiment results, the efficiency of a 10% extract with a consumption rate of 0.5 l/ha was 97.7% on the 3rd day after treatment. The most significant decrease in the number of *S. graminum* was observed on the 14th day, the efficiency reached99.5%, which was at the level of the standard.

PP43. INFLUENCE OF PRE-SOWING TREATMENT WITH BIOSTIMULANTS ON YIELD OF PHYTOMASS OF *ASTRAGALUS BABATAGI* AND *ASTRAGALUS XANTHOMELOIDE*

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Currently, not only in crop production but also in the crops of medicinal plants, biostimulants are increasingly being used. It is known that biostimulants can influence important physiological processes in plant life: rooting, acceleration of photosynthesis, growth, and development, acceleration of early flowering, increase in the number of flowers, fruit ripening, etc.

Most species of the genus *Astragalus* are a valuable source of biologically active substances, in turn, their accumulation occurs both in the aerial parts and in the rootsof plants.

The research aimed to study biostimulants for the accumulation of plant phytomass *A. babatagi* and *A. xanthomeloides* in the conditions of the Tashkent region.

The work was carried out in the Quyichirchik district of the Tashkent region in 2023.The analyzes were carried out on *A. babatagi* and *A. xanthomeloides* plants grown fromseeds treated with biostimulants Uchkun plus and Potassium Humate Souffler. The harvesting of raw plant phytomass was carried out in the phase of intensive flowering. Pre-sowing treatment in *A. babatagi* crops provided an increase in the yield of raw biomass in the "scarification + Uchkun plus" experiment by 25.2%, in the "scarification+ Potassium Humate Prompter" option by 17.3% relative to the "scarification" option. The increase in the biomass yield of *A. xanthomeloides* in the variant of the experiment "scarification + Uchkun plus" was 15.8% and "scarification + Potassium humatePrompter" - 17%, respectively.

As our studies have shown, the use of presowing seed treatment of *A. babatagi* and *A. xanthomeloides* with biostimulants Uchkun plus and Gumat potassium Souffler contributed to an increase in the yield of raw plant phytomass.

PP44. VOLATILE COMPONENTS OF *DAPHNE* SP. FROM TÜRKİYE

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The genus *Daphne* belongs to the Thymelaeaceae family, which includes about 500 plant species and 44 taxa. This genus is widely distributed across the Europe and East Asia,where the genus *Daphne* is represented by 12 species in Anatolia. Also, it used in traditional medicine against various pathologies and diseases such as antimicrobial, antioxidant, analgesic, anti-inflammatory, cytotoxic, antiulcerogenic, abortive, and hemostatic effects. In this present study, the chemical compositions of 7 species (*D. mezereum* L., *D. pontica* L., *D. glomerata* Lam., *D. sericea* Wahl., *D. oleoides* Schreber, *D.gnidioides* Jaub et. Spach and *D. mucronata* Royle) and 2 subspecies (*D. mucronata* subsp. *turcica* and *D. oleoides* subsp. *kurdica*) of the genus *Daphne* from the natural habitat in Türkiye were investigated comparatively. The chemical profiles of the volatile compounds obtained by the hydrodistillation were further analyzed by GC-FID and GC/MS, simultaneously. The major volatile components for all samples weredetermined as pentacosane (17.6-1.2%), phytol (11.4-0.6%), heptacosane (10.1-1.0%) and hexadecanoic acid (53.2-9.0%). Detailed compositions will be discussed in detial.

Keywords: *Daphne* L.; Thymelaeaceae; volatile component; GC; GC-MS.

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PP45. SYNTHETIC DERIVATIVES BASED ON TROPANE ALKALOIDS

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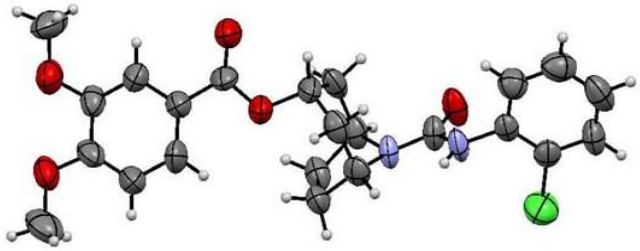
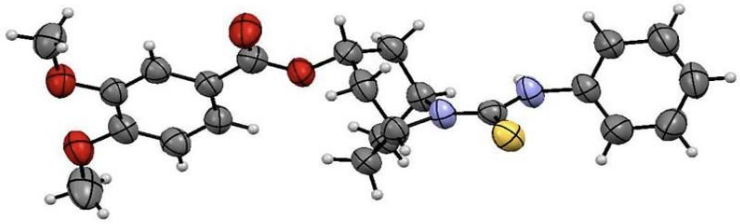
Previously, it was found that the *Convolvulus subhirsutus* plant growing in various regions of Uzbekistan, Kazakhstan and Tajikistan contains significant amounts of tropane alkaloids, the main of which is the convolvin alkaloid (3,4- dimethoxybenzoyloxy-northropane) - a derivative of northropine. Due to the sufficient availability of convolvin, a number of its derivatives were obtained in orderto search for substances with valuable pharmacological properties. In this regard, thesynthesis of other convolvin derivatives was also of interest. We investigated the interaction of the convolvin (1) alkaloid with the homologous series of alkyl halides 2a-g. It is established that all reactions take place with heating at the boiling point of the solvent with yields of 60-85 %. The structures of the synthesized compounds 3a-g have been proved on the basis of IR and NMR spectroscopy data. For compounds 3c, 3e and 3f, the spatial structure was determined by X-ray diffraction analysis of their hydrochlorides. The structures of the synthesized compounds were proved on the basis of IR and NMRspectroscopy data. For the hydrochlorides of the compounds N-hexyl-, N-octyl- and N-nonyl derivatives of convolvin, the spatial structure was established by the RSA method. Next, we investigated the interaction of the convolvin alkaloid with a numberof isocyanates. Synthesized: convolvin N-phenylisocyanate (**3a**), convolvin N- allylisocyanate (**3b**), convolvin N-thiophenylisocyanate (**3c**), convolvin N-o-chlorphenylisocyanate (**3d**), convolvin N-m-chlorphenylisocyanate (**3f**), convolvin N-ethylisocyanate (**3e**). The spatial structure of **3d** and **3c** is established by the X-ray method.



Convolvin N-o-chlorphenylisocyanate **(3d)**



Convolvin N-Thiophenylisocyanate **(3c)**

PP46. AMINO ACID AND MINERAL COMPOSITIONS OF FLOWERS OF *CROCUS SATIVUS* L.

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Among the *Crocus* species, *Crocus sativus* L. (saffron, *Iridaceae* family) is considered the most valuable due to the unique color of its flowers, aroma, color and taste of dried stigmas of flowers used as a valuable spice (spice). Stigmas are also used as food coloring and in medicine. In folk medicine, saffron is recommended as a sedative, hypnotic, mild antidepressant and mental enhancer, as well as for the prevention and treatment of a number of other diseases.

The purpose of this study is a comparative analysis of the compositions of amino acids (AA), micro- and macroelements of individual parts of flowers (stigmas, stamens, petals) of *Crocus sativus* grown in Uzbekistan.

AA of individual parts (stigma, stamens, petals) of flowers of *Crocus sativus* L. growing in Uzbekistan were studied for the first time. 20 AAs were identified in the samples, which 8 were nonessential, 8 were irreplaceable, 4 were partially nonessential aminoacids. The total amount of AA in the stigmas was 11.35001 mg/g, in the stamens 60.85032 mg/g, in the petals 48.7104 mg/g. Essential AAs are found in approximatelyequal amounts in petals (15.73832 mg/g) and stamens (14.84272 mg/g), partially replaceable AAs dominate in stamens (29.48137 mg/g). According to the results of acomparative analysis, the stamens of the flowers of *Crocus sativus* are quantitatively richer in amino acids than their other parts.

For the first time, the elemental composition of individual parts of the flowers of *Crocus sativus* was studied by optical emission spectrometry with inductively coupled argon plasma. It was found that the predominant elements in the raw material are K,Na, Mg, Ca, Fe, P, Al and Ga. Flower petals are enriched with macro- and microelements.

The obtained data allow us to consider the petals and stamens of *Crocus sativus*, which are waste products of saffron production, as a promising source of mineral elements and valuable amino acids with a wide range of pharmacological activity, based on them can be used to develop new food additives and pharmaceutical substances.

PP47. ISOLATION AND BIOLOGICAL ACTIVITY OF *NITRARIA SIBIRICA* POLYSACCHARIDES

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Nitraria sibirica Pall is a traditional Chinese medicine (TCM) and rich in polysaccharides. The Xinjiang district of China is rich in *Nitraria sibirica* resources. Numerous preparations containing *Nitraria sibirica* have been used to treat various diseases in TCM. However, the relevant studies lack systematicness in both chemistryand pharmacodynamics, and the effective substances are still not clear. They are facing the crisis of "insufficient scientific interpretation of drug theory" and "unclear sourceof medicinal materials", which leads to the lack of scientific methods and indicators for the quality control of *Nitraria sibirica* or its preparations. Therefore, it is essential to systematically study genuine medicinal materials to solve the problems such as the confusion of medicinal materials, the lack of related literature, andtheoretical basis. In this paper, the isolation and bioactivity evaluation of polysaccharides from the *Nitraria sibirica* medicinal material was systematically discussed, which laid an important basis for elucidating the theoretical basis of its medicinal substances. The main findings are as follows:

The ultrasonic-assisted extraction of *Nitraria sibirica* polysaccharides (NSP) was optimized by response surface methodology. The results showed that the optimum conditions were liquid-solid ratio 33 mL/g, ultrasonic power 430 W, ultrasonic temperature 60 ℃ and ultrasonic time 70 min. At this condition, the yield of NSP wasup to 14.63 ± 0.21%. Four homogenous polysaccharides, namely NSP-a, NSP-b1, NSPb2, and NSP-c, were obtained through purifying by AB-8 macroporous resin, dialysis, DEAE-650M anion exchange, and Sephadex G-150 gel permeation chromatography. Among them, NSP-a was a neutral polysaccharide, and acidic polysaccharides for the others, with the purity 91.12 ± 1.15%, 94.02 ± 2.18%, 95.71 ± 2.56%, 94.30 ± 0.87%, respectively.

Acknowledgement: This work was supported by the National Foreign Expert Program "Foreign Young Talent Program" (Grant No. QN2022045004L), and ChineseAcademy of Sciences president's international fellowship initiative (Grant No. 2023VBB0005).

PP48. QUALITATIVE ANALYSIS OF CHEMICAL CONSTITUENTS IN *HYSSOPUS CUSPIDATUS* BORISS. BY Q-ORBITRAP–HRMS

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Hyssopus cuspidatus Boriss. (HcB) is a plant of the genus *Hyssopus* in the Labiatae, growing mainly in the northern region of Xinjiang [1-2]. HcB is a medicinal herb in Chinese medicine, traditionally used to treat respiratory diseases. HcB is also one of the main herbal materials of many traditional ethnic medicine prescriptions, such as Hanchuan Zupa Granules, which is commomly used for the treatment of cough and abnormal mucus artma caused by colds. In this study, the chemical constituents of HcB were investigated using Q-Orbitrap-HRMS, and a total of 89 compounds, including 42organic acids, 29 flavonoids, 7 phenylpropanoids, 5 terpenoids, 1 alkaloid and 5 othercompounds, were identified from the HcB extract. The result could provide theoreticalfoundation for the quality control and new drug development from HcB resources inthe future.

Acknowledgment: This work supported by the Major Science and Technology Projects in Xinjiang Uighur Autonomous Region (Grant No. 2022A03017-5).

REFERENCES

[1] Wang J, Lou J, Luo C, Zhou L, Wang M, Wang L. Int. J. Mol. Sci. 2012; **9**: 13.
[2] Mamadalieva NZ, Akramov DK, Ovidi E, Tiezzi A, Nahar L, Azimova SS, SarkerSD. Medicines. 2017; **1**: 4.

PP49. NINE NEW PIPERIDINE ALKALOIDS FROM *ANACYCLUS PYRETHRUM*

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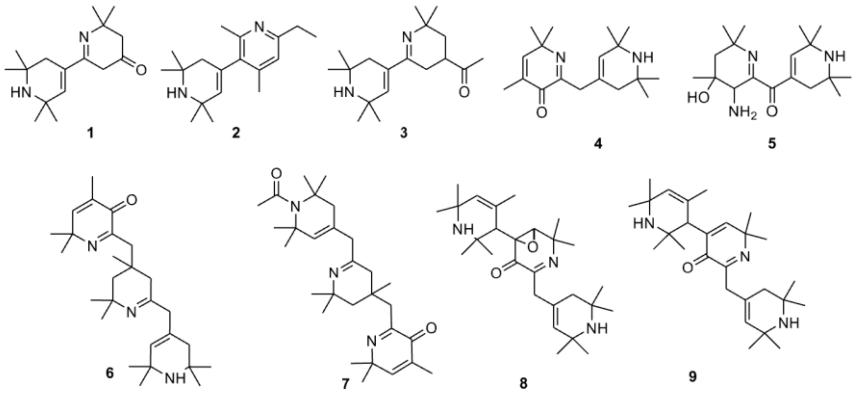
The root of *Anacyclus pyrethrum* (Chinese name: "Anaqigen") that possesses very important medicine value in traditional medicine is widely used to treat impotence, facial paralysis, and tremor in traditional Chinese medicine in northwest China, whileto treat epilepsy, rheumatism, cephalalgia, paralysis, and hemiplegia in Ayurvedic ("Aaqarqarhaa" in Ayurveda) and Unina medicine ("Aaqarqarhaa" in Unani). Aanethines A-I (**1-9**), nine new piperidine alkaloids, were obtained from the root of *Anacyclus pyrethrum* (L.) DC. Their structures were determined via spectroscopic analyses (NMR, UV, IR), HRESIMS,and electronic circular dichroism (ECD) calculations. Aanethines A-E (**1-5**) consists of two piperidine rings connected directlyor through a carbon atom. Aanethines F-I (**6-9**) contains three piperidine rings.



Acknowledgment: This work was supported by the National Key R&D Program ofChina (2020YFE0205600), and the Biological Resources Programme, Chinese Academy of Sciences (KFJ-BRP-007-011).

REFERENCES

[1] Doudach L, Meddah B, Alnamer R, Chibani F, Cherrah Y. In vitro antibacterial activity of the methanolic and aqueous extracts of *Anacyclus pyrethrum* used in moroccan traditional medicine [J]. *International Journal of Pharmacy and Pharmaceutical Sciences*. **2012**; 4(3): 402-405.

[2] Chen QB, Gao J, Zou GA, Xin XL, Aisa HA. Piperidine Alkaloids with Diverse Skeletons from Anacyclus pyrethrum. *J Nat Prod*. **2018;** *81*:(6), 1474-1482.

PP50. ORAL ADMINISTRATION OF TURMERONES REDUCES SEIZURES IN MOUSE MODELS OF EPILEPSY

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Curcuma longa (turmeric) is widely used as a medicinal plant, buth in traditional medicine (including, but not limited to, Ayurvedic medicine and traditional Chinese medicine), and as a dietary supplement. Most studies regarding potential therapeutic activities of turmeric have focused on curcuminoids, which have poor bioavailability. Turmeric most commonly used for the treatment of inflammation and pain, but are also used in other indications. In East Africa, *Curcuma longa* leaves are used in traditional medicine for the treatment of epilepsy. We have previously reported the identification of turmerones as anti-epileptic constituents from *Curcuma longa*, using a zebrafish seizure model to carry out *in vivo* bioassay-guided fractionation. Subsequent testing of turmerones in mouse seizure models confirmed their anti-epileptic activity, but relied on i.v. or i.p. administration. To further evaluate the potential of turmerones to treat epilepsy, we tested the effects of oral administration of turmerones (essential oil of *Curcuma longa* purified to contain >98% turmerones) on seizure duration and latency in a mouse epilepsy model with seizures induced by the GABA(A) receptor antagonist pentylenetetrazole (PTZ). Mice with PTZ-induced seizures pre-treated with turmerones at 50 mg/kg p.o. for 7 days exhibited a 79% decrease in seizure duration and a doubling of seizure latency. A similar decrease in seizure duration was observed in the 6-Hz mouse epilepsy model pre-treated with turmerones at 50 mg/kg p.o. for 7 days. These initial results suggest a potential anti-seizure effect through oral administration of turmerones, which will be investigated further in these and additional epilepsy models.

Keywords: *Curcuma longa*, turmeric, tumerones, epilepsy, seizures.

REFERENCES

[1] Crawford AD. Identification of anti-epileptic natural products using zebrafish. Maced Pharm Bull. 2022; 68: 177-178. http://dx.doi.org/10.33320/maced.pharm.bull.2022.68.04.081

[2] Moshi MJ, Kagashe GA, Mbwambo ZH. Plants used to treat epilepsy by Tanzanian traditional healers. J Ethnopharmacol. 2005; 97(2): 327-36. http://dx.doi.org/10.1016/j.jep.2004.11.015

[3] Orellana-Paucar AM, Serruys AS, Afrikanova T, Maes J, De Borggraeve W, Alen J, León-Tamariz F, Wilches-Arizábala IM, Crawford AD, de Witte PA, Esguerra CV. Anticonvulsant activity of bisabolene sesquiterpenoids of Curcuma longa in zebrafish and mouse seizure models. Epilepsy Behav. 2012; 24(1): 14-22. http://dx.doi.org/10.1016/j.yebeh.2012.02.020

PP51. PYTOCHEMICAL AND BIOLOGYCAL EVALUATION STUDY OF *ARTEMISIA VACHANICA* KRASCH. EX POLJAKOV

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The genus of *Artemisia* (Asteraceae) is a large and diverse plants containing 478 species. *A. vachanica* is distributed in Tajikistan, Afghanistan, Pakistan and West Himalaya [1]. *A. vachanica* is found to be a novel plant source of artemisinin [2]. Thedried aerial parts of *A. vachanica* (5 kg) were minced and extracted with 95% ethanol (3 × 30 L, 10 d each time). Crude extract (1 kg) was suspended in water and partitioned with petroleum ether, dichloromethane, ethyl acetate and n-Butanol. The dichloromethane fraction (159.2 g) was separated through silica gel, and further purified by varying chromatography techniques and semi-preparative HPLC. The structures of isolated compounds were elucidated based on spectroscopic data ID, 2DNMR, HRMS, and a comparison with reported data. Five known compounds were isolated and identified from the *A. vachanica* as xanthoxylin [3], anemarrehenoside B [4], *β*-sitosterol, stigmasterol [5], eupatrin [6] and 8-epiisovangustin. All of them wereisolated from *A. Vachanica* for the first time, and anemarrehenoside B was isolated from*Artemisia* genus for the first time.

Acknowledgement: This work was supported by the National Key R&D Program of China (No. 2020YFE0205600) and CAS-TWAS President's Fellowship Programme for PhD students.

REFERENCES

[1] "Artemisia L. | Plants of the World Online | Kew Science." 30001021-2 (accessed Jul. 12, 2023).

[2] Numonov S, Sharopov F, Salimov A, Sukhrobov P, Atolikshoeva S, Safarzoda R, Habasi M, Aisa HA. Medicines. 2019; **6**: 23.

[3] Hartmann G, Nienhaus F. Phytopathol. 1974; **81**: 97.

[4] Liang HJ, Lyu JN, Feng QM, Zhang LX, Liu QY, Dai LP, Wang ZM. Chin. J. Exp.Tradit. Med. Formulae. 2022; **28**: 139.

[5] Gomaa AAR, Samy MN, Abdel-Baky RM, Desoukey SY, Kamel SM. Chem. Nat.Compd. 2022; **58**: 368.

[6] Zeng X, Fang Z, Wu Y, Zhang H. China J. Chin. Mater. Medica. 1996; **21**: 167.

PP52. GLUCOSIDE COUMARINS FROM THE N-BUOH PART OF THE ROOTS OF *PRANGOS PABULARIA*

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Prangos belongs to the Apiaceae family. It's wildly distributed from the Mediterranean region to the Western and Central Asia. *P. pabularia* is one of the most investigated species among the 72 species and it's indigenous to India [1]. This plant produces a large number of coumarins and has been found to be relatively rich in secondary metabolic products [2]. The *n*-butanol fraction (100 g) was applied to the silica gel column (100-200 mesh), and eluted with a gradient solvent of dichloromethane: methanol by increasing the polarity. Five individual compounds were obtained by further isolation and purification of the obtained fractions by different chromatography techniques and semi-preparative HPLC. The structures of individual compounds were established according to the spectroscopic data ID, 2D NMR, HR-MS and comparison of the obtained data with the reported data. Isolated compounds from this fraction were identified as yuganin B (**1**), 1'-O-*β*-*D*-glucopyranosyl-(2'*S*)-marmesin (**2**) [3], oxypeucedanin hydrate 3'-O-*β*-*D*-glucopyranoside (**3**), duharin B (**4**) [4] and 1'-O-*β*-*D*-glucopyranosyl-(2'*S*,3'*R*)-3'-hydroxymarmesin (**5**). Compound **1** was a new coumarin, while compounds **2**, **4** and **5** were isolated from this species for the first time.

Acknowledgment: The authors are grateful for the CAS-TWAS Fellowship for S. Atolikshoeva, and Central Asian Drug Discovery & Development Center of Chinese Academy of Sciences (Grant No. CAM 202203).

REFERENCES

[1] Sharma N, Ashok PK, Negi A, Lakshmayya B. J. Nat. Rem. 2013; 13: 68.
[2] Tada Y, Shikishima Y, Takaishi Y, Shibata H, Higuti T, Honda G, Ito M, Takeda Y, Kodzhimatov OK, Ashurmetov O, Ohmoto Y. Phytochemistry. 2002; 59: 649.
[3] Niu XM, Li SH, Jiang B, Zhao QS, Sun HD. J. Asian Nat. Prod. Res. 2002; 4: 33.
[4] Zhao XZ, Feng X, Jia XD, Wang M, Shan Y, Dong YF. Chem. Nat. Compd. 2007; 43: 399.

PP53. MANGIFERIN ACCUMULATION STIMULATED BY TISSUE CULTURE PROPAGATION AS COMPARED WITH WILD COLLECTION IN A MODEL OF FOUR *HYPERICUM* SPECIES

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Mangiferin is a xanthone C-glycoside, mainly obtained from different plant and fruit parts of the *Mangifera indica* species. Amongst the wide array of its therapeutical benefits are its anticancer, anti-inflammatory, antidiabetic, cardioprotective, antioxidative, antihyperlipidemic as well as neuroprotective and anti-obesity properties. Different xanthone compounds, as well as mangiferin and isomangiferin have also been reported in literature for some of the representatives of the *Hypericum* genus. However, the presence of mangiferin and iso-mangiferin in a given *Hypericum* species has been characterized with great variability amongst the different reports, demonstrating the occasional character of its availability and the presence of factors, still unknown, which determine its biogenesis. The present study aimed at elucidation of the potential of *Hypericum* species to serve as a mangiferin sources in a comparative model of wild collected and *in vitro* cultivated *Hypericum* species. *Hypericum calycinum, H. tetrapterum, H. perforatum* and *H. richeri* were collected from their wild habitats in Bulgaria and shoot cultures were developed from them. While in our experimental conditions none of the wild collected samples yielded mangiferin, its presence was detected in *H. perforatum* and *H. richeri* shoot cultures. Moreover, the stimulation of biomass formation, achieved by plant growth regulators treatment led to the stimulation of its accumulation.

Keywords: *Hypericum* species, *in vitro* cultures, mangiferin, *in situ* and *in vitro* accumulation, HPLC-DAD.

Acknowledgements: The authors are thankful to grant number КП-06-Н39-6 of the National Science Fund, Bulgaria for the financial support and the Centre of Competence: "Sustainable utilization of bio-resources and waste of medicinal and aromatic plants for innovative bioactive products" (BG05M2OP001-1.002-0012) for HPLC equipment used.

PP54. THE STUDY OF THE CHEMICAL CONSTITUENTS OF KUOKEAMUTI BASED ON UHPLC-QE-MS

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Pear has been used as food and medicine for more than two thousand years. Kuokeamuti belongs to Pyrus communis L. system and mainly grows in southern Xinjiang. Kuokeamuiti has high medicinal value, which can not only improve human immunity, but also has good effect of moistening lung and relieving cough.

At present, there is a lack of research reports on Kuokeamuti, and more in-depth systematic research is urgently needed. The metabolites of Kuokeamuti were analyzed by UHPLC-QE-MS technology. It is helpful to further explore the edible and medicinal value of Kuokeamuiti as a natural medicinal and edible plant.

The extracts of the peel and seed of Kuokeamuti were selected for UHPLC-QE-MS analysis of non-targeted metabolic components of traditional Chinese medicine (Figure 1), and 18 categories and 412 components were detected (Table 1). Mainly for terpenoids, flavonoids, phenols, alkaloids, phenylpropanoids, etc (Figure 2). Among them, A total of 130 terpenoids, 96 flavonoids, 65 phenylpropanoids and 45 alkaloids were identified. 16 triterpenoids such as oleanolic acid and corosolic acid were identified. And a variety of flavonoids, phenols, phenylpropanoids, alkaloids substances. These substances have good biological activity. It provides theoretical support for the in-depth development of health care products, functional foods and related drugs.

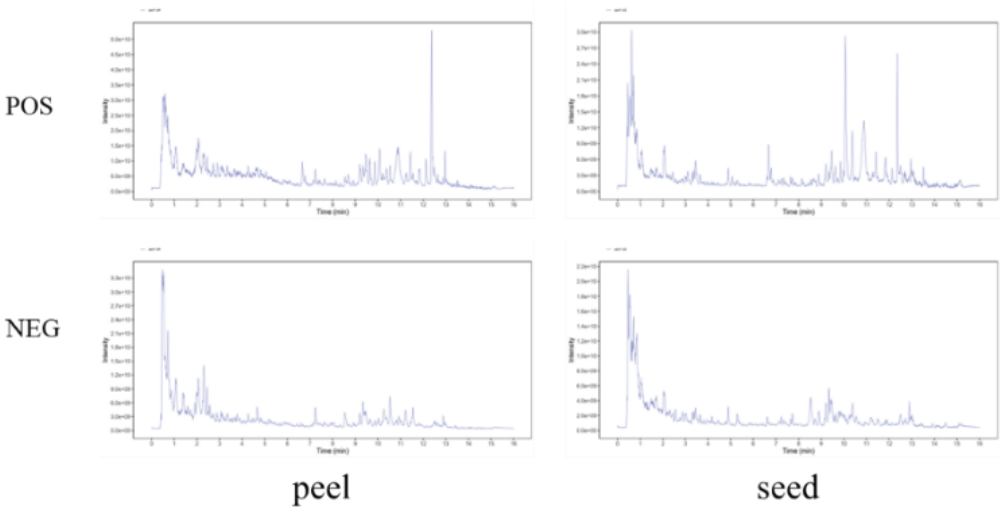

Figure 1 UPLC-QE-MS detection of positive ion and negative ion mode TIC diagram

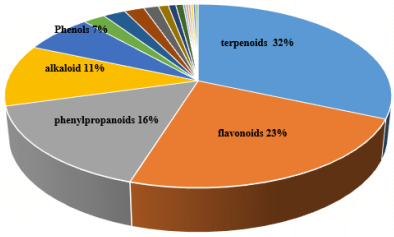

Figure 2 The proportion diagram of each component

Table 1 Component classification and quantity statistics

Class	Quantity	Class	Quantity	Class	Quantity
terpenoids	130	Aliphatic acyl	9	Xanthones	1
flavonoids	96	Amino acid derivatives	8	Prenol lipids	1
phenylpropanoids	65	Aromaticity	6	Amines	1
alkaloid	45	Fatty acids	4	Ester	1
Phenols	28	Terpenoid alkaloid	3	Carbohydrates and derivatives	1
quinones	9	Organic acids and derivatives	3	Lipids	1

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REFERENCES

[1] Hong SY, Lansky E, Kang SS. Int. BMC Complement Med Ther. 2021; 1: 21.
[2] Meimei C, Fengzhen W, Huangwei L. Int. Journal of Food Biochemistry. 2022; 12: 46.
[3] Kolniak-Ostek J, Kopotowska D, Rutkowski KP. Int. Molecules. 2020; 19: 25.

PP55. DETERMINATION OF FUNCTIONAL COMPONENTS AND ANTIOXIDANT ACTIVITY OF KUOKEAMUTI

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Kuokeamuti is a local characteristic pear with high nutritional value in Xinjiang. Kuokeamuti belongs to *Pyrus communis L.* system, which mainly grows in the southern Xinjiang region. Kuokeamuti has anti-inflammatory, antitussive, antibacterial and other effects. At present, there is a lack of research reports on Kuokeamuti in Xinjiang, so it is of great significance to conduct systematic theoretical research on Kuokeamuti.

In this paper, the contents of total flavonoids, total polyphenols, total triterpenoids and polysaccharides were determined by $Al(NO_3)_3$-$NaNO_2$-NaOH coloration method, Folin-phenol method, vanillin-glacial acetic acid-perchloric acid coloration method and sulfuric acid-phenol method, respectively. The antioxidant activities of peel, pulp and seed were studied by DPPH ·, ABTS ·scavenging experiment and FRAP iron ion reducing ability experiment with vitamin E as positive control.

The results showed that there were abundant sugars, flavonoids, triterpenoids and phenols in Kuokeamuti. The highest content of total flavonoids in seeds was 34.003 mg/g, the highest content of total phenols in peel was 30.748 mg/g, and the highest contents of total triterpenes and total polysaccharides in pulp were 51.074 mg/g and 69.071 mg/g. The three parts of peel, pulp and seed all have good antioxidant activity. In DPPH and FRAP methods, the highest antioxidant capacity of seeds was 143.502 and 184.969 μmol Trolox/g, respectively. In ABTS method, the highest antioxidant capacity of peel was 449.817 μmol Trolox/g, and the weakest antioxidant capacity of pulp in ABTS, DPPH and FRAP was 111.029,33.608 and 42.966 μmol Trolox/g, respectively. This shows that the functional components in Kuokeamuti have a great relationship with their antioxidant activity.

Figure 1. Relationship between the content and antioxidant activity of different components of Kuokeamuti

Acknowledgment: This work was supported by the Key Laboratory Open Project of of Xinjiang Uygur Autonomous Region (2020D04023), Xinjiang Uygur Autonomous Region Graduate Research Innovation Project (XJ2023G269).

REFERENCES

[1] Hong SY, Lansky E, Kang SS. Int. BMC Complement Med Ther. 2021; **1:** 21.

[2] Birhanie ZM, Xiao A, Yang D. Int. Plants-basel. 2021; **9**: 10.

[3] Kolniak-Ostek J. Int. Food Chem. 2016; 203.

PP56. MICROBIAL TRANSFORMATION OF CURCUMIN BY 25 DIFFERENT MICROORGANISMS

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Nowadays, many drugs are produced synthetically. However, some chemicals are very costly and difficult to synthesize or isolate from their natural sources. It has been observed that the microbial transformation method, which is frequently used today, can transform natural substances into different metabolites. (1).
Curcumin is obtained from the turmeric (*Curcuma longa*) plant, which is a type of ginger. Curcumin, the main bioactive component of the turmeric plant, exhibits anti-inflammatory, antibacterial, antioxidant and anti-atherosclerotic properties (2).
In this study, preliminary scale studies of microbial transformation of curcumin in *a*-medium were carried out with 25 different microorganisms. For each microorganism, 1 positive control, 1 negative control and a microbial transformation flask were prepared. When the microorganisms reached the appropriate maturity, curcumin was added and left for transformation under suitable conditions. At the end of the 14th day, ethyl acetate (EtOAc) was added to the amount of medium in each flask and extracted. Afterwards, EtOAc was removed in the centrivap device and thin layer chromatography was performed on each microorganism. The metabolites were found in extracts from the microbial transformation of curcumin by *Penicillium claviforme* MR 376. While M1 and M2 compounds are more polar than curcumin; M3 and M4 are more nonpolar than curcumin (3).

Keywords: Curcumin, Microbial Transformation, Thin Layer Chromatography.

Acknowledgements: The authors would like to thank Prof. Dr. Fatih Demirci (Anadolu University, Eskisehir) for supporting this work. This work is part of the MSc thesis of Sami Koray YETİM and was supported by Eskisehir Osmangazi University Scientific Research Projects Coordination Unit under grant number "FYL-2022-2456".

REFERENCES

[1] Civişov, E. (2016). *p-Simenin Mikrobiyal Biyotransformasyonu* (Doctoral dissertation, Anadolu University (Türkiye)).

[2] Erkul, C., Özenoğlu, A., & Elif, R. E. İ. S. (2021). Zerdeçalın Genel Sağlık Üzerine Etkileri. *Türkiye Sağlık Bilimleri ve Araştırmaları Dergisi*, *4*(2), 76-87. https://doi.org/10.51536/tusbad.950788

[3] Özşen, Ö. (2017). *Abiyetik asit, betulin, hidroksidiizoforon ve oleik asitin autoformasyon tepkimeleri ve metabolitlerin in vitro biyolojik aktiviteleri.* (Doctoral dissertation, Eskişehir Osmangazi Üniversitesi (Türkiye)).

PP57. CYTOTOXIC STUDIES ON TWO *SCABIOSA* SPECIES IN TÜRKİYE

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The Caprifoliaceae family, which includes the genus *Scabiosa*, is primarily found in the Mediterranean and the Near East. Essential oils, fatty acids, triterpene glycosides, triterpene saponins, iridoids, monoterpenoid glucoindole alkaloids, and flavonoids were the products of previous phytochemical studies on *Scabiosa* species. Because of the rich composition of this species, the cytotoxic properties of *Scabiosa pseudograminifolia* Hub.-Mor. and *Scabiosa hololeuca* Bornm. were the main focus of our study. The Brine Shrimp Assay has been commonly utilized for over thirty years in order to evaluate the cytotoxic levels of a wide variety of plants. This study aimed to evaluate the effects of hexane, methanol, and water extracts derived from *Scabiosa pseudograminifolia* and *Scabiosa hololeuca* on *Artemia salina* shrimps. The extracts were evaluated at concentrations of 0.632, 1.25, 2.5, 5, and 10 mg/mL. The determination of the median lethal concentration (LC_{50}) of the test samples was conducted by assessing the percentage of deceased shrimps in relation to the logarithm of the extract concentration following a 24-hour exposure period. Based on the results, it was observed that the methanol extracts derived from *Scabiosa pseudograminifolia* and *Scabiosa hololeuca* demonstrated strong toxic activity, as indicated by their low LC_{50} values of 0.478 and 0.205 mg/mL, respectively. Besides these results, other extracts exhibited nontoxic activity with high LC_{50} values. The initial cytotoxicity data obtained using the Brine Shrimp Lethality Assay yields LC_{50} values, which serve as a practical basis for conducting further studies on toxicity.

Keywords: *Scabiosa pseudograminifolia, Scabiosa hololeuca,* cytotoxicity.

Acknowledgements: This study was supported by Anadolu University Scientific Research Projects Commission with the project number 2103S009.

PP58. PHYTOCHEMICAL PROFILE OF *ROSA ILIENSIS*

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In the present work, three populations of *Rosa iliensis* Chrshan collected from the Sharyn River (P-II), upper (P-II) and lower reaches (P-III) of the Ili River were comprehensively evaluated for phytochemical profile. Carbohydrates, triterpenes, phenolic acids, vitamins and pro-vitamin, and minerals have been determined in the leaf, fruit and seeds of *R. iliensis*. The content of ascorbic acid in fruits and leaves of *R. iliensis* was determined via RP-HPLC. P-II was noted for the highest ascorbic acid content (3.15 mg%). The fruit pulp and seeds were investigated for α-tocopherol and β-carotene contents by using the UltraPerformance Convergence Chromatography (UPC²). The highest α-tocopherol (0.284 mg/mL) and □-carotene (0.363 mg/mL) amounts were found in P-II fruits. The highest content of phenolics was found in methanolic extracts of flower and leaves (>0.4 mg GAE/mL). The extracts obtained with polar solvents demonstrated significant antioxidant activity (IC_{50} 0.017 and 0.315 mg/mL). In the leaf, □-glucopyranose, myo-inositol (vitamin B8), gallic acid, and sucrose were found as the major constituents. In the fruit pulp, β-fructofuranose, α-D-fructofuranose, fructopyranose, α-glucopyranose, β-glucopyranose, myo-inositol (vitamin B8), oleanolic acid and ursolic acid were found as the major constituents. In the seeds, myo-inositol (vitamin B8), quinic acid, gallic acid, and β-sitosterol were detected. The mineral contents (Na, K, Ca, Zn, Pb, Ni, Cd, Fe, Cr, Cu, Ti, and Al) in the fruits were determined with an Inductively Coupled Plasma Optical Emission Spectrometer system. The present study shows that *R. iliensis* species is a rich source of valuable nutraceuticals.

Keywords: *Rosa iliensis*; vitamin; UPC²; HPLC.

Acknowledgements: Authors thanks to Faculty of Pharmacy, Medicinal Plant, Drug and Scientific Research and Application Center (AUBIBAM) of Anadolu University for helping in research work, and to Faculty of Biology and Biotechnology, Al-Farabi Kazakh National University for financial supporting of travel.

PP59. EVALUATION OF BIOAUTOGRAPHIC ANTIOXIDANT AND ANTILIPASE ACTIVITIES OF SOME *BOSWELLIA* L. OLEOGUM RESINS BY HPTLC-EFFECT DIRECTED ANALYSIS

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The *Boswellia* genus grows naturally in India, Africa, and the Middle East. Gum resins of these species, characterized by boswellic acid derivatives such as boswellic acid (BA), acetyl boswellic acid (ABA), acetyl-11-keto-beta boswellic acid (AKBA), have long been used in the treatment of topical and systemic inflammation, arthritis, and asthma. Within the scope of the study, the chemical profiles of 12 different *Boswellia* oleo-gum resins were analyzed using the HPTLC, and the DPPH radical scavenging effects and pancreatic lipase inhibition were evaluated with HPTLC-effect directed analysis (HPTLC-EDA). HPTLC analysis was carried out on HPTLC Silicagel 60F_{254} glass plates by using the mobile phase consisting of cyclohexane: diethyl ether: chloroform: formic acid (55:30:10:5, *v:v:v:v*). Plates were derivatized with the dipping solution of anisaldehyde. Antioxidant activity was evaluated with the dipping solution of DPPH•. Lipase inhibition was carried out with the immersion of plates into the β-naphthyl myristate, enzyme, and Fast Blue B, respectively. Images were taken under 254 nm, 366 nm, and white light (**Figure 1**). Fingerprint analysis revealed the non-consisting of AKBA on *B. frereana*, *B. neglecta*, and *B. rivae* samples. BA and ABA were determined by anisaldehyde under white light illumination, especially on *B. serrata* oleogum resin samples. In DPPH•-EDA, *B. rivae* and *B. dalzielii* samples showed the scavenged-free radical zones on the lower *hRf* values as white zones. In lipase activity, common compounds among the samples, including AKBA and BA or distinct bands with inhibitory activity, were observed as white zones on a purple background.

Keywords: Boswellia, HPTLC, antioxidant, antilipase.

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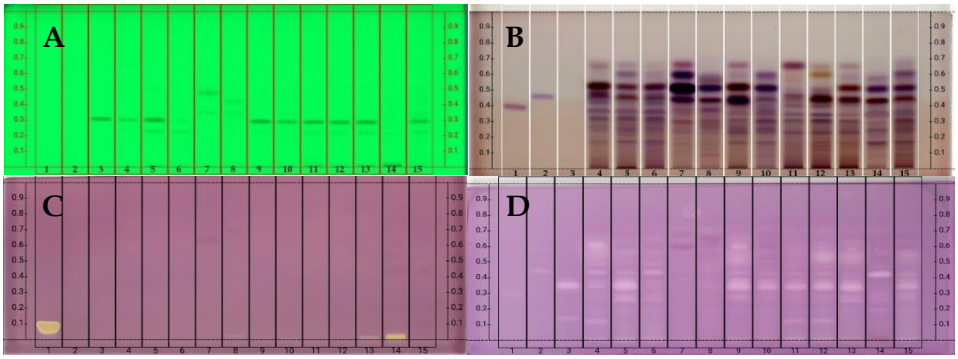

Figure 1. A, 254 nm; B, White light with anisaldehyde; C, DPPH with white light; D, Pancreatic lipase with white light. Track number 1, BA; 2, ABA; 3, AKBA; 4, *B. serrata* AHP5827; 5, *B. serrata* RMB02; 6, *B. serrata* AHP 2455; 7, *B. frereana;* 8; *B. neglecta*; 9, *B. carteri* Somalia; 10, *B. carteri* Oman; 11, *B. papyrifera* Sudan 1; 12, *B. papyrifera* Sudan 2; 13 *B. occulta*; 14, *B. rivae*; 15, *B. dalzielii*. In DPPH track number 1, gallic acid; 2, BA and ABA; 3, AKBA. In pancreatic lipase track number 1, orlistat; 2, BA and ABA; 3, AKBA.

PP60. SYNERGISTIC POTENTIAL OF *PINUS NIGRA* J.F. ARNOLD AND *THYMUS* L. ESSENTIAL OILS AGAINST DIFFERENT HUMAN PATHOGENS

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In this study, it is aimed to evaluate the *in vitro* antimicrobial effects of *Pinus nigra* J.F. Arnold and *Thymus serpyllum* L., *T. capitatus* Hoffmans. & Link, and *T. vulgaris* L. essential oils individually and in combination. The composition of the commercial essential oils was confirmed using by simultaneous Gas Chromatography-Mass Spectrometry (GC-MS) and Gas Chromatography/Flame Ionization Detector (GC/FID) analyses. The major component of *P. nigra* essential oil was α-pinene (73.8 %), while the major constiutents of *T. capitatus, T. serpyllum, T. vulgaris* oils were carvacrol (65.8%), geraniol (19.3%) and thymol (31.1%), respectively. *In vitro* antimicrobial evaluation of commercial essential oils against *Streptococcus aureus, Moraxella catarrhalis, Escherichia coli* were performed using a broth microdilution assay. The synergistic or antangonistic effects of *P. nigra* and *Thymus* sp. essential oils were evaluated using the checkherboard method, where the fractional inhibitory concentration (FIC) and fractional inhibitory concentration index (FICI) values were calculated. According to the initial results, the FICI of *P. nigra* + *T. capitatus* essential oil combinations against *M. catarrhalis* showed synergic effect, while *P. nigra* +*T. serpyllum* oil combinations showed antagonism. To the best of our knowledge, this is the first study for *P. nigra* + *Thymus* essential oil combinations against selected human pathogenic microorganisms.

Keywords: *Pinus, Thymus,* essential oil, antimicrobial activity, combinations.

Acknowledgement: This work is part of the MSc thesis of S.E.K.

PP61. TOTAL CONTENT ANALYSIS, *IN VITRO* ANTIOXIDANT, AND ENZYME INHIBITION TESTS ON *MYRTUS COMMUNIS* L.

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Myrtus communis L. is a member of the Myrtaceae family and is represented by a single species in Türkiye. This evergreen plant can grow naturally or cultivated mostly in countries in the Mediterranean region.

In this study, the total phenolic, flavonoid and proanthocyanidin contents of the 80% ethanol extract of *M. communis* and the fractions and infusion. The responses of the mentioned extracts and fractions to antioxidant activity and enzyme inhibition tests were examined.

Based on these studies, future studies aim to elucidate the neuroprotective effect of pure compounds with bioactivity-guided fractionation of the plant and support it with *in vivo* tests. 200 grams of dry leaves was macerated in 80% EtOH solution for 12 hours in 3 repetitions. Isolation studies were performed using open-column chromatography. Boiled distilled water was added to 30 grams of dry leaves for infusion.

Total phenolic, total flavonoid and proanthocyanidin content analyzes of the mentioned extracts and fractions were performed. The antioxidant activities were examined by ABTS, CUPRAC, DPPH, FRAP methods. It was also subjected to inhibition test of tyrosinase enzyme. According to the results of total phenolic content analysis, it was seen that the RC[9-22] had the highest phenolic content. According to the results of total flavonoid content analysis, the fraction seen as rich in flavonoids in thin layer chromatography results has the highest flavonoid content. Total proanthocyanidin content was less than other contents. Extracts and fractions with the richest flavonoid and phenolic content showed the highest antioxidant activity. 80% EtOH extract showed the highest tyrosinase enzyme inhibition activity.

The results of in vitro studies show that *M. communis* has general antioxidant activity and that the 80% EtOH extract of the plant has tyrosinase enzyme inhibition activity. In light of these data, it is predicted that the plant can play an effective role in the treatment of many diseases, especially neurological diseases.

PP62. ORGANIZATION OF PRODUCTION OF NATURAL AND SYNTHETIC SUBSTANCES OF DRUGS AND BIOLOGICALLY ACTIVE SUBSTANCES IN ACCORDANCE WITH GMP REQUIREMENTS

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Institute of Chemistry of Plant Substances named after. acad. S.Yu. Yunusova of the Academy of Sciences of the Republic of Uzbekistan has been engaged in the chemical study of medicinal plants of Central Asia and the synthesis of new chemical compounds for many years. Also, the department of pharmacology and toxicology of the institute deeply studies the toxicity and pharmacological activity of isolated natural substances from medicinal plants, synthesized compounds in order to create new, original medicines, biologically active additives (BAA) and bioreagents.

As a result of many years of research, the substances of such drugs as galantamine hydrobromide, deoxypeganine hydrochloride - anticholinesterase drugs, allapinin, axarhythmine, antiarrhythmin - antiarrhythmic drugs, ecdisthene - an anabolic drug, tefesterol - an esterogenic drug, medamin, albendazole, fenasal - anthelmintic drugs, etc. have been created.

On the basis of our Institute, a production center has now been created in accordance with international GMP requirements, where several lines for the production of substances based on alkaloids, neutral natural substances, and a line for the production of drug substances obtained on the basis of synthesis are installed.

This is the first production center in our Republic that produces certified drug substances in accordance with international GMP requirements, which provides the substances with the requirements of the Ministry of Health of our Republic and allows for partial export abroad. Currently, the substances of such drugs as allapinin, galantamine hydrobromide, and ecdisthene are exported to the Russian Federation. Work is underway to register the substance of a new antiarrhythmic drug, axarhythmin, in the Russian Federation.

PP63. *IN VITRO* SCREENING FOR ACETYLCHOLINESTERASE INHIBITORY ACTIVITY OF *DYSPHANIA BOTRYS*, *LOTUS CORNICULATUS*, *NOAEA MUCRONATA*, *VICIA CRACCA*

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Dementia, a term used for several diseases that affects memory, thinking, and the ability to perform daily activities, is the 7th leading cause of death, according to World Health Organization data. It affects more than 55 million of people worldwide, 60% of whom live in low- and middle-income countries. Alzheimer's is the most common type of dementia and affects more than half of cases. Clinical studies on Alzheimer's disease highlight the neurotransmitter hypothesis, also known as the cholinergic hypothesis, which is the earliest theory regarding the pathogenesis of the disease.

Taking advantage of the richness of chemical structures in natural sources is one of the smartest approaches in the discovery of new drug candidate molecules. For this purpose, the acetylcholinesterase enzyme inhibitory activities of *Dysphania botrys* (L.) Mosyakin & Clemants, *Lotus corniculatus* L. var. *tenuifolius* L., *Noaea mucronata* (Forssk.) Aschers. et Schweinf. ssp. mucronata, *Vicia cracca* L. ssp. *stenophylla* Vel. were assessed by Ellman's colorimetric assay. *n*-Hexane, dichloromethane, ethyl acetate, and *n*-butanol extracts of all plants, which were prepared by the partition of methanolic extracts by the corresponding solvents, remaining water parts, and crude methanolic extracts were used for the determination of the enzyme inhibitory activity.

Dichlorometane extract of *D. botrys* between the 30-90 µg/mL concentrations, exerted the highest inhibitory activity with the maximum inhibitory value of 49.9 %. Metabolites of active extracts that may be responsible for the activity deserve to be investigated and further studies are needed.

Keywords: Alzheimer's disease, natural sources, Ellman's method, enzyme inhibition.

PP 64. ASPECTS OF PHYTOECDYSTEROIDS

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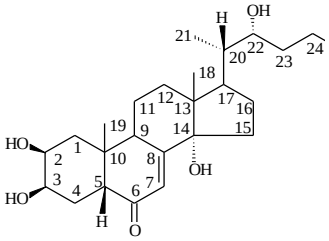
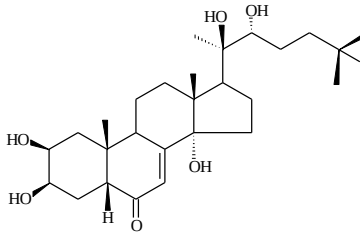
Ecdysteroids are one of the most widespread steroid compounds in nature. They were found in more than 90% of the species of the animals world, named after arthropods, the number of species of which reaches 1 million, as well as in some other invertebrates. Assessing the role of ecdysteroids, as ecdysone (1) and 20-hydroxyecdysone (2) in the vital activity of plants, one should bear in mind the close ecological interconnection and interdependence between the world of plants and insects.



α-ecdysone **(1)**



20-hydroxyecdysone **(2)**

Unlike plants, most invertebrates do not have an enzyme apparatus for the complete synthesis of steroids. Ecdysteroids in both the animal and the plants world, as it is now established, play an extremely important role in the regulation of vital processes in their organisms, despite the fact that they are far from each other in evolutionary terms. In recent years, in the field of chemistry and pharmacology of plant steroids, most of the work is devoted specifically to phytoecdysteroids, as the most original and promising group of compounds with metabolic activity. Further, in our research Institute have been characterized a lot of various phytoecdysteroids, which isolated and applied in the industry as Ecdysten, Ecdysilen, Ajustan and etc. Alternatively, currently these work continued by another researchers regardless Institute of the chemistry of Plant substances. Various phytoecdysteroids have been determined from endemic plants. For instance, *Rhaponticum carthamoides, Ajuga turkestanica, Siline viridiflora* and etc.

PP 65. ISOLATION OF HEDERAGENIN FROM THE *SAPONARIA OFFICINALIS*

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Saponaria officinalis L., also known as soapwort or fuller's herb, is a well-known perennial plant in the Caryophyllaceae family. It grows naturally from Europe to Central Asia in various habitats, usually along roadsides, in hedges, and close to water[1-2].

Performing various biological activity studies of this genus is crucial for phytochemical science because it can help to find effective therapeutic features of this species. In this regard, various biological activity studies were performed on extracts from *Saponaria officinalis*, including activities such as: antioxidant, anti-microbial, hepatoprotective, cytotoxic.

Saponins, alkaloids, ascorbic acid, flavonoids, essential oil and other natural compounds have been isolated from various plant organs. The aerial parts of *Saponaria officinalis* were collected in Tashkent of the Republic of Uzbekistan and dried in the air shadow method. The air-dried crushed plant was extracted six times at temperature with methanol. The combined alcohol extract was evaporated in vacuo, completely diluted with water in a ratio of 1:1 and subjected to liquid phase extraction with chloroform and n-butanol. After distilling off the solvent, were obtained 80 g of chloroform and 120 g of butanol extracts. From the butanol fraction was isolated hederagenin. The chemical structure of hederagenin was established based on the analysis of ^{1}H and ^{13}C NMR spectra, as well as HSQC, HMBC, COSY and NOESY experiments data. Hederagenin from *Saponaria officinalis* has been isolated for the first time.

References

1. Böttger S, Melzig MF. 2011. Triterpenoides saponins of the Caryophyllaceae and Illecebraceae family. Phytochem. Lett. 4(2):59-68.
2. Thakur M, Weng A, Pieper A, Mergel K, von Mallinckrodt B, Gilabert-Oriol R, Gorick C, Wiesner B, Eichhorst J, Melzig MF, Fuchs H. 2013. Macromolecular interactions of triterpenoids and targeted toxins: role of saponins charge. Int. J. Biol. Macromol. 61: 285–294.
3. Kucukkurt I, Ince S, Enginar H, Eryavuz A, Fidan AF, Kargioglu M (2011) Protective effects of Agrostemma githago L. and Saponaria officinalis L. extracts against ionizing radiation-induced oxidative damage in rats. Revue de Medecine Veterinaire 162 (6):289-296.

PP 66. NATURAL COMPOUND FROM THE AERIAL PART OF *SILENE TOMENTELLA* SCHISCHK.

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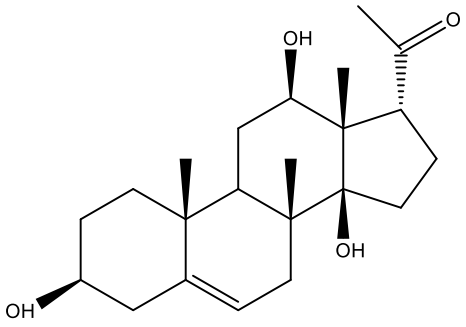
Steroid glycosides are a class of wide-spread natural products having either terrestrial or marine origins. Terrestrial representatives of this class, isolated from different higher plants are well known and include toxic, heart-arresting glycosides of cardenolide type (so-called cardiac glycosides), spirostan and furostan steroid saponins, pregnane glycosides and some other structural groups.

Silene is a large genus with more than 700 species growing in various temperate regions of the world. On the basis of the biological activities reported for *Silene* species, the phytochemical investigation of *Silene tomentella* was carried out. *S. tomentella* was collected in June, 2019 from Tashkent Navoi region of the hills and the plant materials were identified by Dr. Nigmatullayev A.M. at the Institute of the Chemistry of Plant Substances (ICPS), Uzbekistan.

A methanol extract of the roots of *S. tomentella* was suspended in H_2O and partitioned with hexane and n-BuOH. The BuOH-soluble extract (15.7 g) was subjected to CC (SiO2 (780g); AcOEt/MeOH gradient 100:0; 0:100) to yield 18 fractions (Frs. A – R). Fr. H (4.5 g; AcOEt/MeOH 4:1) was subjected CC (SiO_2 (200 g); with MeOH/H_2O 0:100, 10:90, 30:70, 50:50, 70:30, 100:0) to yield six fractions (Frs. H1 – H6). Fr. H6 (12.2 mg; asetonitril/H_2O 0:100-100:0), which was purified by Sephadex G-15 and yielded one individual compound: lineolon (1) (3.4 mg). The structures of all compounds were determined using chemical and spectroscopic methods, such as 1D and 2D nuclear magnetic resonance (NMR).



Lineolon (1)

This compound lineolon (1) belonging to steroid glycoside is known, was isolated from aerial part of *Silene tomentella* for the first time.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