



FIRST INTERNATIONAL BIOLOGY AND CHEMISTRY SYMPOSIUM BETWEEN DOKUZ EYLÜL UNIVERSITY AND GANJA STATE UNIVERSITY JULY 10, 2023

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**FIRST INTERNATIONAL BIOLOGY AND CHEMISTRY SYMPOSIUM
BETWEEN DOKUZ EYLÜL UNIVERSITY AND GANJA STATE UNIVERSITY
SYMPOSIUM PROGRAM, 10 JULY 2023, 09:45 – 16:30 (GMT+3)**

Time (GMT +3)	Speakers	Opening Speeches
09:45-10:00	Aylin Alın Dean, Dokuz Eylül University Faculty of Science	Opening Speeches
10:00-10:15	Alverdiyev İsfəndiyar Cavid Oğlu Dean, Ganja State University Faculty of Chemistry-Biology	
10:15-10:30	Fatma Duygu Özel Demiralp Vice Rector, Dokuz Eylül University	
10:30-10:45	Pervin Kerimzade Vice Rector, Ganja State University	
10:45-12:00	Moderator: Ergin Şahin	First Biology Session
10:45-11:00	Lala Abdullayeva	Study of the Influence of Some Environmental Factors on Mulberry Silkworm
11:00-11:15	Vagif Novruzov, Kerem Canlı , Ergin Shahin, Zilxumar Ismailova	Biological Diversity of Vegetation and Ecology in the Shyr - Shyr Waterfall Area of Gadabay (Azerbaijan)
11:15-11:30	Ainur Akif Bayramova	Bioecological Characteristics of Fern Species of <i>Asplenium Septentrionale (L.) Hoffm</i> Which Has Been Found on the High Mountain Slopes of Gadabay District
11:30-11:45	Elif Yıldırım Caynak , Mehmet Koçak, Kamil Candan, Yusuf Kumlutaş, Çetin Ilgaz	Skeletal Osteology and Skull Variation of Three Blanus Species (Squamata: Amphisbaenia) in Turkey
11:45-12:00	Humbatova Gulebatin Vagif	The Scientific Importance of Dividing the Bozach Sheep Breed into Intra-genous Types
12:00-13:00	Lunch Break	
13:00-14:30	Moderator: Kamil Candan	Second Biology Session
13:00-13:15	Huseynova Elnara Jabrail	Study of the Effect of Nutrition on Longevity Level in Herontological Age Groups

13:15-13:30	Kamil Candan , Elif Yıldırım Caynak, Yusuf Kumlutaş, Ahmet Buluç, Çetin Ilgaz	Age Structure and Growth Pattern in a Population of <i>Mediodactylus Heterocercus</i> (Blanford, 1874) (Squamata: Gekkonidae) from Şanlıurfa Province, Türkiye
13:30-13:45	Mammadova V.F. , Aslanova Y.A., Adıgözelova S.Y.	The Ecological Situation of the Ganga River and Its Branches
13:45-14:00	Yucel Angin, Pelin Balcık-Ercin	Determination of Interactions Between Ulvan Polysaccharide and Vascular Endothelial Growth Factor Receptor by Protein Docking Method
14:00-14:15	Zarifa Sabuhi , Seyidov Allahverdi Kamil	Bacteriosis of Chekil Varieties in Azerbaijan Disease and Preventive Fight Against It Preparation of Events
14:15-14:30	Rustamova Tukezban Vagif gizi	The Dynamics of Eeg Waves Changes Due to the Emotional Stress of the Exam Process in The Parietal and Occipital Lobes Of 21-Year-Old Young People
14:30-14:45	Break	
14:45-16:30	Moderator: Derya Topkaya Taşkıran	Chemistry Session
14:45-15:00	Nabiyev E.R. , Orujlu E.N., Alverdiyev I.J., Yusibov Y.A., Babanly M.B.	New Tetradymite-Type Layered Phases in the GeTe-SnTe-Bi ₂ Te ₃ System
15:00-15:15	Kadriye Ertekin , Sibel Oguzlar, Beyza Yildirim, Ozgur Yasin Keskin, Ramazan Dalmis, Isil Birlik, Funda Ak Azem,	Manipulation of Brightness and Decay Kinetics of LuAG: Ce ³⁺ and YAG: Ce ³⁺ by Simple Metal Oxides in Polymeric Matrices
15:15-15:30	Kasamanli Khayala Hamlet	Study of the Effect of Different Types of Imidazolines Obtained on the Basis of Natural Petroleum Acids on the Antistatic Properties of Diesel Fuel
15:30-15:45	Özlem Öter	Optical Chemical Sensor Studies: Some Examples of Different Designs and Applications
15:45-16:00	Huseynova P.F.	Crown Ethers in the Separation Process of Optical Isomers
16:00-16:15	Catalina Natalia Yılmaz	Polymers-by-Design for Safer Bio/Materials
16:15-16:30	Aliyev F.Y., Azizova S.M. , Babayev E.R., Mammadova P.Sh., Eyvazova I.M.	Biophytoremediation of Soils Contaminated with Oil and Heavy Metals
Closing Session		
Symposium Photo (Online)		

First Biology Session

Study of the Influence of Some Environmental Factors on Mulberry Silkworm

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Abstract

The purpose of the research is to study the influence of environmental factors – heat and moisture on introduced mulberry silkworm breeds in the conditions of Azerbaijan. In the course of the study, the influence of environmental factors on mulberry silkworm breeds (China-21, China-29, Ukraine-1, Ukraine-2, Gulustan-2) was studied in 3 seasons.

Recent serious environmental changes, environmental factors have a very serious impact on all living things, as well as on metabolic processes in the body of mulberry silkworm. The impact of external environmental changes, environmental factors on living things, and all living things on the environment is a natural process. The mulberry silkworm belongs to the group of poikilotherm creatures and its body temperature is not constant.

It is known from the literature data that many of the mulberry silkworm breeds with high productivity under optimal environmental conditions sharply reduce their productivity when exposed to unfavorable conditions. And heat and moisture directly play a major role in the development of mulberry silkworm. All living things in nature come into contact with the external environment, and the rapid or slow course of their development largely depends on external environmental factors. Climatic factors, especially solar radiation, light, heat, atmospheric pressure, relative humidity, soil moisture, wind, create conditions for the development of the biocenosis during the development of mulberry silkworm. Temperature, relative humidity, weathering, leaf quality plays a major role in the cultivation and yield of mulberry silkworm.

During the experiment, phenological observations were carried out, research was started when 3-5 leaves were formed on the trees of the shoot. During the research, the influence of environmental factors on worms in separate years of feeding of Mulberry silkworms was monitored, temperature and humidity were determined by appropriate devices in accordance with the standards.

Our experiment was carried out in spring feeding under unfavorable conditions: starting from the 4th day of age 1 until the end of feeding, the temperature in the cluster was kept at a level of 26-27°C (norm 23-24°C) and relative humidity below 51-56% (norm 70-75%).

As a result of scientific research, it has been proven that the heart rate of mulberry silkworm increases with increasing temperature. At a temperature of 23-25°C, the heart beats less, energy is spent much less, but at the same time it has a positive effect on its movement and feed intake, feeding, digestion is accelerated, and therefore more leaves are spent.

Mulberry silkworm does not accept feed at a temperature of 11°C, and at 10°C it dies at the age of 4. Mulberry silkworm can be adapted in pessimal conditions several generations later, at the age of the first three years, the presence of 20 - 22°C at night and 24-25°C during the day has a positive effect on their development. Jaundice disease occurs in worms when the temperature in the cluster is 28-30°C, and the humidity is 81-90%. Therefore, when feeding is carried out in relatively high temperature conditions at 26-27° c, it is required that the humidity does not rise above 50-55%, along with frequent feeding of worms with norms. The excess of heat and humidity outside the norm negatively affects the yield.

Keywords: mulberry silkworm, breed, productivity, heat, moisture

Biological Diversity of Vegetation and Ecology in the Shyr - Shyr Waterfall Area of Gadabay (Azerbaijan)

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Abstract

Shyr-Shyr Waterfall locates in the Duzyurd-Miskinli plateau at the foothill of Hachagaya mountain in the middle and high mountain zones of the Lesser Caucasus in the Gadabay district. The territory of the district covers the northern slope of the Shahdag ridge, a part of the Bashkend-Dastafur depression and the Shamkir Mountain massif. Jurassic, Cretaceous, Paleogene, and Anthropogenic sediments are common. 165 higher flowering plants belonging to 26 genera in 16 families, 7 pteridophytes belonging to 7 genera in 7 families, 21 lichens belonging to 18 genera in 9 families, 14 moss species belonging to 12 genera in 9 families were detected by Shyr-Shyr Waterfall located in the Gadabay district. According to the ecology of the area, species are divided into mesophytes, xerophytes, xeromesophytes, and hydrophytes.

Keywords: family, genus, species, xerophyte, mesophyte, xeromesophyte, hydrophyte

Shyr-Shyr Waterfall locates in the Duzyurd-Miskinli plateau at the foothill of Hachagaya mountain in the middle and high mountain zones of the Lesser Caucasus in the Gadabay district. The territory of the district covers the northern slope of the Shahdag ridge, a part of the Bashkend-Dastafur depression and the Shamkir Mountain massif. Jurassic, Cretaceous, Paleogene, and Anthropogenic sediments are common. Gadabayit, a metamorphic rock rich in granite, was studied for the first time (1903) in the Gadabay copper-kolchedan deposit. In the middle of the 19th century, copper ore deposits were discovered in the Gadabay district, and in 1855-1856, a copper smelting plant was built by local entrepreneurs.

The most beautiful geological natural monuments of the area are Akhinchachay, Shamkirchay, and Zayamchay valleys with picturesque landscapes. Another picturesque area is the Kechi valley, which runs along Inekboghanchay. Shyr-Shyr Waterfall is at the foothill of Hachagaya mountain. Hachagaya mountain is a sanctuary located between Tovuz and Gadabay districts, at an altitude of 2200 meters.

The road to Hachagaya, which is located between Tovuz and Gadabay, rises from the Khinna valley and passes through a very steep slope along the Keshkand road.

A mountainous tundra climate with hot, dry summers and cold, dry winters is common in the area. Annual precipitation is 600 - 900 mm. Brown mountain-forest, grassy mountain-meadow lands are spread. Bushy and sparse forest meadows and broad-leaved forests are common in the middle highlands. The forests are dominated by oak (*Quercus* sp.), beech (*Fagus orientalis*), Caucasian hornbeam (*Carpinus caucasica*). There are subalpine and alpine meadows in the highlands.

Forests rise here to 2000 - 2400 m. The high mountain forests mainly consist of oriental oak (*Quercus macranthera*), oriental beech (*Fagus orientalis*), birch (*Betula pendula*), Trautvetter's maple (*Acer trautvetteri*), boisseri gooseberry (*Sorbus boisseri*), common forest cherry (*Padus racemosa*). The subalpine vegetation of the area covers hills of 1800-2600 m.



Hachagaya mountain with Azerbaijan and Turkey flags (2200 m)



Shyr-Shyr Waterfall

Plants such as blueberry (*Vaccinium myrtillus*), windflower (*Anemone fasciculata*), Eastern betony (*Betonica orientalis*), common sage (*Salvia glutinosa*), flaming mohn (*Papaver fugax*), monkshood (*Aconitum nasutum*), gentiana (*Gentiana septemfida*), showy mullein (*Verbascum* sp.), Iberian geranium (*Geranium ibericum*), garlic-leaved bellflower (*Campanula alliariifolia*), forest raspberry (*Rubus idaeus*), common selfheal (*Prunella vulgaris*), etc. are found in this area.

The main plants of the alpine altitude belong to the cereals and *Carex* family. These plants create alpine carpets here. The alpine meadows are covered by Caucasian cumin (*Canon caucasicum*), Caucasian Lady's-mantle (*Alchemilla caucasica*), rock plantain (*Plantago saxatilis*), meadow clover (*Trifolium ambiguum*), carex (*Carex tristis*), Steven dandelion (*Taraxacum stevenii*), sibbaldia (*Sibbaldia parvifolia*), trident bellflower (*Campanula trident ala*), minuartia (*Minuartia aizoides*).

Fauna. Animals-wild goat (*Capra aegagrus*), roe deer (*Capreolus capreolus*), brown bear (*Ursus arctos*), wolf (*Canis lupus*) and birds-bearded reedling (*Panurus biarmicus*), osprey (*Pandion haliaetus*), Spanish sparrow (*Passer hispaniolensis*), stone sparrow (*Petronia petronia*), Caucasian grouse (*Lyrurus mlokosiewiczzi*), Caucasian snowcock (*Tetraogallus caucasicus*), etc. occur in the area.

The lichen and moss flora of the waterfall area is very rich. Lichen species-*Caloplaca caesiorufa*, *C.decipiens*, *C.erythrocarpa*, *C. ferruginea*, *C.flavovirescens*, *Xanthoria elegans*, *Teloschistes lacunosus*, *Thelidium mesotrophum*, *Verrucaria acrotella*, *V.floerkeana*, *V.glaucina*, *V.ferruginea*, *Endocarpon adscendens*, *V.nigrescens*, *Diplischistes ocellatus*, *Lecidea convexa*, *L.lapicida*, *Rhizocarpon cinerovirens*, *R.geographicum*, *R.geminatum*, *L.frustulosa*, *L.polytropha*, *Lecanora cenisea* and moss species - *Andrea rupestris*, *Polytrichum formosum*, *P.piliferum*, *Saelania glaucescens*, *Dicranella heteromalia*, *Cynodontium polycarpum*, *Dichodontium pellucidum*, *Dicranum fuscescens*, *D.mayus*, *D.scoparium*, *Tortella tortuosa* *Schistidium convertum* are spread on large rocks.

Botrychium lunarium, *Ophioglossum lusitanicum*, *Osmunda regalius*, *Cheilanthes pteridioides*, *Adiantum capillus-veneris*, *Asplinium septentrionale*, *Cystopteris montana* species of pteridophytes on the rocks in the waterfall form a stepped background. Species of the genera *Saxifraga*, *Campanella*, *Diantus*, *Heracleum*, *Sedum*, *Thymus*, *Plantago* also form a characteristic background on the rocks.

165 higher flowering plants belonging to 26 genera in 16 families, 7 pteridophytes belonging

to 7 genera in 7 families, 21 lichens belonging to 18 genera in 9 families, 14 moss species belonging to 12 genera in 9 families were detected by Shyr-Shyr Waterfall located in the Gadabay region. According to the ecology of the area, species are divided into mesophytes, xerophytes, xeromesophytes, and hydrophytes.

Bioecological Characteristics of Fern Species of *Asplenium Septentrionale* (L.) Hoffm Which Has Been Found on the High Mountain Slopes of Gadabey District

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Abstract

Asplenium septentrionale (L.) Hoffm. (northern spleenwort or forked spleenwort) belongs to the Aspleniaceae family and has been described from North America, Europe and Asia. The species was first described by Linnaeus in 1753. It is usually found at an altitude of 900-4100 m above sea level. In the world, the Aspleniaceae family includes 700 species of ferns. The species is widespread in acidic rocks.



Asplenium septentrionale is an evergreen, winter-hardy, petrophytic, herbaceous, small fern that grows in dense clusters. Rhizomes are short, dark red, brown in color. The rhizome creeps upward for a short time, the apex is scaly. Length 2-4 mm, edges complete. leaves are simple, glabrous, 4-15 cm long. The bottom of the leaves is dark reddish brown, and the upper part is green. Leaves are monomorphic, there is no difference in shape and size between fertile and sterile leaves.

It differs from other ferns by its dichotomous division, the formation of narrow blades in the form of a fork at the ends, and the fact that the leaves have sori joint along the line. Sori are linear and long, connate at maturity and cover the entire lower surface of the leaves. The sori are covered with thin, pale black indus with all edges. The size of the sori is 5-15 mm. Spores ripen in June-August. The structure of the leaves is tree-like and 1-2 forks, reminiscent of the needles of a divided pine leaf.

Its composition is rich in organic acids and nitrogen-containing compounds. The leaves also contain flavonoids. In medicine, its leaves are used as an astringent, expectorant for lung diseases, jaundice, ascites, and scurvy. The decoction obtained from its leaves is taken in the form of a decoction for respiratory diseases.

Although it has a wide distribution range in some countries, *Asplenium septentrionale* is considered a rare plant species in the states of Colorado, Wyoming, California and Oregon and is included in the Red Book.

Keywords: fern, spices, spleenwort, rock, petrophyte

Skeletal Osteology and Skull Variation of Three *Blanus* Species (Squamata: Amphisbaenia) in Turkey

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Abstract

Blanus is a genus of small and limbless worm lizards that found in various parts of Europe, Africa, Western Asia, and North, Central and South America. To describe the cranial and postcranial osteology of three *Blanus* species (*Blanus alexandri*, *B. aporus* and *B. strauchi*), the wet-preserved/cleared-and-stained specimens were studied in detail. Diagnostic differences of both cranial and postcranial skeletal elements are found in the shape of the parietal, frontal, nasal, maxilla, coronoid bones and the number of presacral vertebrae. In addition, geometric morphometrics is a better way for analysis of morphological variation and change. The result of the analysis showed that *B. strauchi* is morphologically distinct from *B. aporus* species while no morphological variation in *B. alexandri*.

Keywords: Blanidae, *Blanus*, skeletal osteology, geometric morphometrics

The Scientific Importance of Dividing the Bozach Sheep Breed into Intragenous Types

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Abstract

The goal of selection and breeding should be aimed at improving the meat, dairy, and wool qualities of the breed and the breed group, while maintaining the positive characteristics of the breed. The division of the Bozach sheep breed into intragenous types shows that it has a greater maturity potential.

Groups created as a result of fertile fetuses are distinguished by their fertility and the superiority of quality indicators within the breed. It is advisable to take into account the puppies of the selected best breeding animals as soon as they are born, to check them in advance, and to allocate the best grazing areas for the separated babies.

After the Bozach breed was divided into inbred types, a detailed explanation of the improvement of the breeding quality of the inbred types was given as a result of using only high-quality rams of those types. After obtaining meat-wool and wool-meat directions corresponding to early maturity characteristics, identification of fertile rams distinguished by their high productivity and good breeding qualities was shown. This means that it is essential to create genealogical groups for the new types of the Bozach genus created in the western region of the republic to be used in other zones.

Increasing such mother herds across the zone increases the possibility of creating future promising breeding herds. Due to the majority of lambs in the herd, meat productivity also increases in fast-growing breed groups. However, it can be allowed to make up a large percentage of breeding sheep in the herd if the average productivity indicators of these types are higher than the productivity of the breed itself.

We would like to note that the purpose of our research work is to study the effect of gestation time and live weight of mothers on the fertility indicators of the puppies obtained in order to reveal the genetic potential of the new type of semi-coarse-wool Bozach sheep, at the same time to distinguish different types of productivity and compare the productivity indicators of the created herds to determine the effectiveness of selection. It consists of analyzing its importance. Based on this goal, the following tasks were performed:

- Organization of feeding of Anac and Bosphorus sheep in pastures.
- Creation of groups from puppies obtained from early fertilized ewes.
- Comparative study of productivity of selection of sheep of different farm types.
- Grouping of early (farash) lambs obtained from different gestation periods and studying the live weight of lambs at different ages
- Study of meat productivity and skin productivity of different groups of lambs.
- Biometric analysis of the results of the research and economic analysis of the conducted scientific research by groups.

Keywords: sheep, selection, breed, meat, wool, productivity, meat, milk

Second Biology Session

Study of the Effect of Nutrition on Longevity Level in Gerontological Age Groups

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Abstract

In the study, age-related changes in elderly, elderly and long-lived people living in Ganja city were monitored and scientific analysis was carried out. As a result of our research, it was determined that elderly, elderly and long-lived people prefer natural, plant-based foods and whitening products.

In our country, a large part of the population aged 65 and over lives under the influence of diseases caused by poor nutrition. Unhealthy nutrition is an important risk factor for obesity, diabetes, cardiovascular diseases, bone and muscle system diseases seen in this age group. Loss of appetite with advancing age is a common condition. Conditions that are common in the elderly such as reduced taste and smell, reduced ability to distinguish tastes, dry mouth, dental problems, difficulty swallowing, constipation have a negative effect on appetite and can cause weight loss.

Research method. During the study, a sphygmomanometer was used to determine arterial blood pressure, an Accu-Chek portable express analyzer and an Accu-Chek Softlix lancet were used to determine the level of sugar in the blood.

Our research shows that the most common foods used by the elderly population are beans, dairy products and other plant-based products. These people use a lot of fruits and vegetables throughout the year. Different types of fruits and vegetables show their effect in the treatment of a number of symptoms in addition to their vitamin content. The long-lived do not choose any food from one another. Food products with optimal quality for nutrition show their effect for prolonging life. Some of the people involved in the research are people born and raised in Kalbajar, Lachin and Jabrayil districts. They have been living in Ganja since 1993. These people, who lived in mountainous areas, had a healthy diet, and led an active lifestyle, associate their longevity with a healthy lifestyle. Also, the genetic factor plays an important role here. Compared to the previous era, numerous environmental and social problems, the impurity of the food consumed, and the increase in psychological tension and stress lead to the shortening of people's lives. As at any age, good nutrition is very important for maintaining good health in the elderly.

Keywords: gerontology, old and elderly people, longevity, healthy food

Age Structure and Growth Pattern in a Population of *Mediodactylus Heterocercus* (Blanford, 1874) (Squamata: Gekkonidae) from Şanlıurfa Province, Türkiye

Kamil Candan^{1,2}, Elif Yıldırım Caynak^{1,2}, Yusuf Kumlutaş^{1,2}, Ahmet Buluç¹, Çetin Ilgaz^{1,2}

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Abstract

The present study obtains information about some life history features such as lifespan and age of sexual maturity in individuals belonging to the *Mediodactylus heterocercus*, using the skeletal chronology method. The age ranged between 4-9 years in males and 3-10 in females from the Güzelköy (Haliliye, Şanlıurfa) population of the species, with mean values varying between 6.25 ± 1.60 (SD) and 5.21 ± 1.55 respectively. The age to reach sexual maturity was determined as 3 years for both sexes. It was determined that the mean age of the individuals did not show a significant difference between the gender ($p=0.779$). The mean values of head + trunk length (SVL) were calculated as 41.90 ± 4.31 (33.53-46.69 mm) in males and 39.16 ± 5.05 (30.18-48.29 mm) in females. It was concluded that the difference between the sexes in terms of SVL measurements was not statistically significant ($p=0.412$). It was concluded that there was a significant relationship between age and SVL ($p=0.001$).

Keywords: Skeletal chronology, *Mediodactylus heterocercus*, lifespan, age of sexual maturity, Türkiye

The Ecological Situation of the Ganga River and Its Branches

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Abstract

The first microbiological studies in reservoirs in Azerbaijan were conducted in the 50s of the last century by M.A. Salmanov in different branches of the Kur river. The global pollution has not bypassed the waters of the Ganja River. The pollution of the waters of this river makes it unusable and seriously affects the large water bodies. This causes the ecological tension of water in terms of microbiological and sanitary. Although the river network is dense, there are problems in providing the Western region with clean water. There is a great need to study the river waters polluted by anthropogenic factors. Taking into account all this, in our research work, the physical chemical properties and microbiological condition of the river waters were studied in the seasons of the year in order to carry out a comprehensive analysis of some tributaries of Ganjachay, Zincirlichay, Dastafurchay, Khanbulag, Danagyransu, Ziylanchay, Gochazchay.

30 water samples were taken from the stations on the route designated for conducting research in these river waters, and more than 50 analyzes were conducted. Y.J. Sorokin bathometer was used to obtain water samples. The total number of microorganisms was grown in peptone medium, and the group of coliform bacteria was grown in Endo medium by filtration through a 3Ne membrane filter. Thesaprotrophic bacteria were cultured by deep inoculation on fleshy peptone agar medium according to the Koch method. The biodestruction of organic matter and determination of oxygen was determined according to modern methods.

Just as there is a limit, a kind of "norm" for every event, process, and execution in nature, there is a limit to the amount of waste that is discharged into the rivers, causing an accident-level conflict in the ecosystem. From this point of view, the volume of water in the Ganja river channel should be at least 2-3 times higher than the current one for the neutralization of the sewage discharged into the Ganja river basin through its branches (Zincirlichay, Danagyransu, Zivlanchay, Gochazchay, Chimkirshay, Dastaturchay, Madyunchay, Daramirchay, Khanbulaq) must be many. One of the contrasting situations is that the mass of sewage in Ganja river water has increased by 5%. In the last 10 years, the amount of substances polluting the water of the Ganja River, the average annual mass, has been increasing. Thus, the mass of organic pollutants of allochthonous origin has increased by 5-10%, detergents by 10-15%, and solid sediments (residues) by 2 times in the last 10 years.

Compared to the last 10 years, the amount of saprophytic bacteria, the number of coliform-enterobacteria, and nitrate-nitrite salts have increased twice, and the amount of nitrate-nitrite salts has increased twice. The Ganja River, which was relatively clean in all the research years, has now become one of the polluting branches of the Kur River. The phytoplankton in the Ganja River is developing to the point of bloom, the water is completely depleted of oxygen.

From our investigations, we can conclude that because the branches of Ganja River (Zincirlichay, Danagyransu, Zivlanchay, Gochazchay, Chimkirshay, Dastaturchay, Madyunchay, Daramirchay, Khanbulag) are turbid, primary organic substances are not synthesized by phytoplankton. Therefore, the main organic substances in water are of anthropogenic origin and rich in proteins. The waste that is continuously discharged into the

Ganja River by residential areas is not completely destroyed in the distance between the branches. The self-cleaning processes are very weak in water enriched with easily assimilated organic substances, and therefore organic cyclization occurs in Middle Kur, which is extremely dangerous from an ecological point of view.

Keywords: Ganja River, microorganisms, anthropogenic factors

Determination of Interactions Between Ulvan Polysaccharide and Vascular Endothelial Growth Factor Receptor by Protein Docking Method

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Abstract

Cancer is the second most common cause of death in the world. Angiogenesis plays an essential role in tumor growth, maintenance and metastasis. The increased expression of vascular endothelial growth factor receptors (VEGFR), which are among the most important mediators of angiogenesis, has been identified in various types of cancer such as lung, colon, liver, and pancreas. Various molecules obtained from macroalgae are thought to be promising biomolecules for developing an effective treatment against cancer. In this context, there are many studies to date in which the effects of various algae extracts and/or metabolites obtained from algae on cancer cells have been investigated. *Ulva lactuca* is a green macroalgae found extensively in the Aegean Sea in the world and in our country. In this study, it was aimed to model the protein-protein interaction between the VEGFR-2 receptor and the Ulvan polysaccharide found in *Ulva lactuca* using in silico molecular simulation methods.

The AutoDock Vina software was used for protein-protein docking simulations and the crystal structure in the PDB (PubMed: 10368301) database was used for the VEGFR-2 receptor. The models with the most favorable affinity values from the docking results were selected, and their 3D structures were examined using the PyMOL application. Protein-ligand binding energies were studied using the Biovia Discovery Studio Visualizer.

In docking analysis, we found Ulvan polysaccharide has a high binding affinity to the VEGFR-2 receptor and the amino acids Asp1141, His1144, Gly1145 and Arg1124 by hydrogen bonding. (Figure 1). Our results showed that Ulvan polysaccharides are a potential target for the VEGFR-2 receptor, and these findings highlight its potential as a candidate biomolecule for anti-cancer studies.

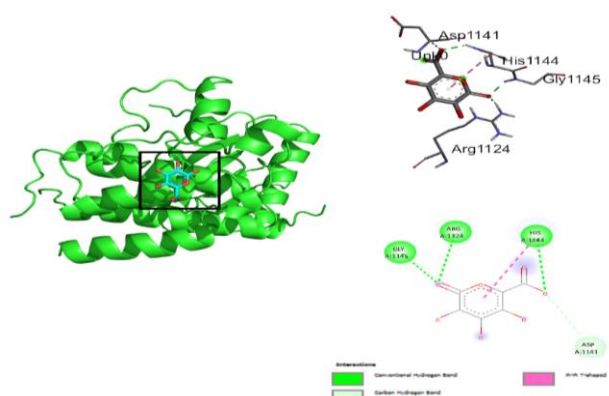


Figure 1. Visualization of protein-protein coupling analysis of VEGFR1 receptor with Ulvan polysaccharide

Keywords: *Ulva lactuca*, Ulvan polysaccharides, VEGFR2, Molecular docking

Bacteriosis of Chekil Varieties in Azerbaijan Disease and Preventive Fight Against It Preparation of Events

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Abstract

In the presented article, in the observations made on 30 trees, it was recorded that the presence of diseased branches began not in early spring, but in early summer. Thus, while the number of diseased branches was 0.83% in June, this indicator increased to 12.50% in late summer and early autumn. The greatest increase was observed in the third decade of August during the growing season and remained unchanged (12.50%) until the end of the season.

Among the investigated variety samples, Ko makit, Seydyuro, Boku-Vase varieties were infected with the disease up to 20.0%, but Tadjikskaya bezsemyannaya variety infection was able to increase to 26.66%. Although this variety has been enriched with some biomorphological indicators valuable for initial selection.

Akachi, Taka-Vase, Pozniy-104, Surkh-tut, SANIISH-5, Forma-2-1/4 varieties and forms were superior to others due to their tolerance to infection with specific strains.

Keywords: agriculture, variety-specimen, mulberry tree, mulberry leaf, cocoon, bacteriosis disease, disease - pests, control measures, selective samples, damage caused

Although Komakit, Seydyuro, and Boku-Vase varieties were infected with the disease up to 20.0% among the investigated variety samples, the infection rate for the Tadjikskaya bezsemyannaya variety could rise to 26.66%. Although this variety has been enriched with valuable traits for initial selection with some biomorphological indicators.

Akachi, Taka-Vase, Pozniy-104, Surkh-tut, SANIISH-5, Forma-2-1/4 varieties and forms are more resistant to disease than others. With the observations carried out on 30 trees, it was recorded that the presence of diseased branches began not in early spring, but in early summer. Thus, while the number of diseased branches was 0.83% in June, this indicator increased to 12.50% in late summer and early autumn. The greatest increase was observed in the third decade of August during the growing season and remained unchanged until the end of the season.

Among the researched varieties and forms, Ko makit, Seydyuro, Boku-Vase varieties were infected with the disease up to 20.0%, but Tadjikskaya bezsemyannaya variety infection was able to rise to 26.66%. Although this variety has been enriched with some biomorphological indicators valuable for initial selection. Akachi, Taka-Vase, Pozniy-104, Surkh-tut, SANIISH-5, Forma-2-1/4 varieties and forms differed from others in that they are more resistant to disease.

Pathological material was collected from stationary and route areas and the formation of bacteria was studied by planting in artificial nutrient medium. The period of occurrence of bacteriosis disease and the extent of its spread have been determined. Although the effects of several drugs against bacteriosis have been tested and preventive measures against bacteriosis have been applied, in the end, it is appropriate to use only preventive control methods, not chemical control methods against bacteriosis in mulberry plants.

The Dynamics of Eeg Waves Changes Due to The Emotional Stress of The Exam Process in The Parietal and Occipital Lobes of 21-Year-Old Young People

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Abstract

One of the factors causing stress in society is exam stress. Someone is able to cope with their emotions, someone comes out of this test with less damage to their health and mental state. However, there are those who lose themselves under the influence of excitement, cannot cope with excitement, and even if they prepare well for the exams, they cannot achieve good results. Therefore, exam stress is considered one of the main reasons for eliminating anxiety in students. In many cases, the exam becomes a traumatic situation for students, it has a negative effect on the mental and physiological condition of students.

The main goal of the study was to study the dynamics of the amplitude and frequency changes of EEG (Electroencephalogram) waves in the occipital lobes of the brain during the emotional stress of the exam process in students aged 21, before and after the exam.

There were no significant differences in the amplitude of EEG delta and theta waves of 21-year-old students from the effect of exam stress. However, the amplitude of EEG alpha waves in the left and right parietal part of the brain increased after the normal day. In contrast, reductions in the amplitude of beta waves were obtained. As it can be seen, the amplitude of EEG delta and theta waves changes weakly due to the effect of the emotional tension in both vertebrae before and after the exam, but the amplitude of alpha waves increases sharply, and the amplitude of beta waves decreases after the exam. Before the exam, the EEG delta and beta waves in the left hemisphere of the brain did not change, the amplitude of theta and alpha waves increased after the exam. even after the exam, the amplitude of EEG delta and theta waves in the left part of the brain decreased very weakly, alpha waves increased after the exam, beta waves did not change before the exam in the left part, increased after the exam and decreased in the right part. The frequency of EEG delta-theta-beta waves increased before and after the test in the left and right hemispheres, and alpha waves decreased. These results show that emotional stress has a different effect on the frequency of EEG waves in the left and right brain regions both before and after the exam. Therefore, in both cases, the EEG has both a strengthening and a slowing effect on the frequency of the waves.

According to our results, the reasons for the development of emotional tension in the exam situation are of different degrees in different students. The main reason for this is the lack of self-confidence in obtaining the necessary results in the exam process after the exam. In fact, the exam is a psycho-emotional stress that has various effects on the functional state of the whole body. The emergence of emotional tension during the exam is the price of both the subjective and objective state of the student. All students feel anxious while waiting for the exam. The neurophysiological correlator of emotional stress in the exam situation of students is the activities of different regions of the brain, and according to the Spielberger test, students with high excitement reactivity also have high or low EEG rhythms in one or another part of the brain before and after the exam.

Keywords: waves, amplitude of waves, frequency of waves, examination process, emotional tension

Chemistry Session

New Tetradymite-Type Layered Phases in the GeTe-SnTe-Bi₂Te₃ System

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Abstract

Layered materials with tetradymite-type structures have been increasingly attracting attention in the past years due to their unique physical and chemical properties. Ternary compounds formed in AIVTe-BV₂Te₃ (AIV = Ge, Sn; BV = Sb, Bi) type pseudobinary systems are particularly interesting in this consideration since these layered phases are experimentally proven to exhibit topological insulator behavior. Obtention of solid solutions based on these phases is of great interest in terms of optimization of the different properties.

The present work reports information about the synthesis and characterization of new tetradymite-type phases in the GeTe-SnTe-Bi₂Te₃ system which provides guidance for the composition design of layered phases for synthesis and single crystal growth.

The alloys of the title system were synthesized using the direct reaction of pre-synthesized starting binary compounds - GeTe, SnTe, and Bi₂Te₃ at 800°C for 5 hours, and quenched in cold water while they were still molten state. The alloys were then annealed at 500°C for 1 month to bring them to the close equilibrium state. All obtained alloys were examined using differential thermal analysis, powder X-ray diffraction, and scanning electron microscopy techniques.

A solid-phase equilibrium diagram of the GeTe-SnTe-Bi₂Te₃ system at 300K was constructed according to differential thermal analysis and powder X-ray diffraction data. It was revealed that continuous series of solid solutions with the tetradymite-type structure are formed in 5 sections of the system: Ge₃Bi₂Te₆-Sn₃Bi₂Te₆, Ge₂Bi₂Te₅-Sn₂Bi₂Te₅, GeBi₂Te₄-SnBi₂Te₄, GeBi₄Te₇-SnBi₄Te₇, and GeBi₆Te₁₀-SnBi₆Te₁₀. The system contains wide areas of substitutional solid solutions in the boundary GeTe-SnTe system as well. The obtained tetradymite-type solid solutions are of great interest as materials with topological insulator properties.

Keywords: tetradymite, layered materials, GeTe-SnTe-Bi₂Te₃

Manipulation of Brightness and Decay Kinetics of LuAG: Ce³⁺ and YAG: Ce³⁺ by Simple Metal Oxides in Polymeric Matrices

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Abstract

Red, green and yellow phosphors are critically important for optoelectronic applications including screen technologies, light emitting diodes (LEDs) and WLEDs. On the other hand, efficient phosphors are still expensive due to the rare earths used as activators or synthesizers in their structure. Therefore, manipulation of their spectral properties is still a hot research topic. In this work, light-induced interactions of commercially available green and yellow garnets with the light-harvesting materials of TiO₂, ZnO and CuO have been investigated in terms of excitation, emission and decay kinetics. When the lutetium aluminum garnet (LuAG: Ce³⁺) and yttrium aluminum garnet (YAG: Ce³⁺) are encapsulated along with the nanocrystalline metal oxides in a polymethylmethacrylate (PMMA) matrix, the absorption and emission efficiency of the phosphors distinctly enhanced compared to their additive-free form. In parallel to the emission intensities, the quantum yield (EQY) of LuAG: Ce³⁺-ZnO-CuO enhanced from 88.4 to 116.4%, with respect to the additive-free-LuAG: Ce³⁺. Similarly, in YAG: Ce³⁺ based samples, the presence of the ZnO in the composite resulted in the enhancement of the EQE from 80.6 to 98.1. The steady-state and decay time based experimental studies have confirmed that metal oxides act like donors and phosphors as acceptors when encapsulated in a polymeric matrix at a critical concentration.

Keywords: phosphors, metal oxide, nanoparticles, luminescence

Study of the Effect of Different Types of Imidazolines Obtained on the Basis of Natural Petroleum Acids on the Antistatic Properties of Diesel Fuel

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Abstract

As it is known, during the rapid transportation of diesel fuels, there is a possibility of an explosion hazard, which is explained by the very low electrical conductivity of diesel fuels. During rapid transport of hydrotreated diesel fuels, the risk of explosion is more likely, which is explained by the removal of heteroatom compounds, which are considered natural antistatics, in the diesel fuel during the hydrotreating process. Thus, these compounds prevent the increase in the density of electrostatic charges, which are formed due to friction during the transportation of diesel fuel and create the danger of explosion even from a small spark.

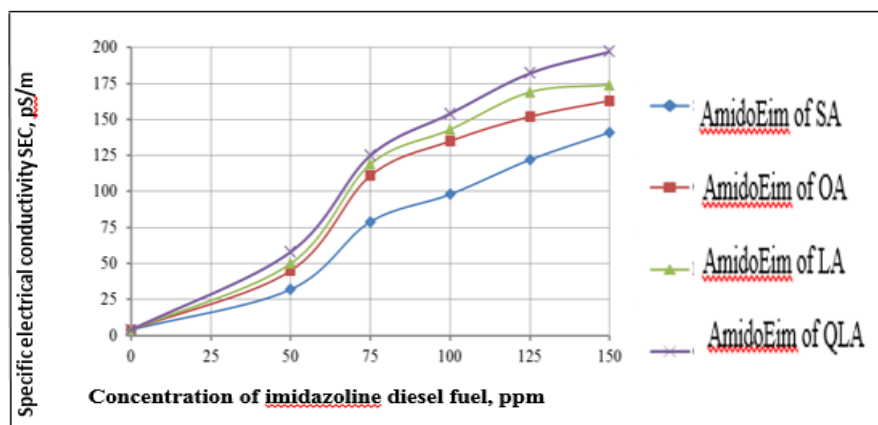
However, according to the requirements of modern standards, the hydrotreating process of diesel fuels is an important process in terms of preventing environmental pollution. With this in mind, many researches are being carried out to improve the antistatic property of hydrotreated diesel fuels, among which the most investigated is the injection of antistatic additives into diesel fuel. Antistatic additives are compounds containing various polar groups ($-\text{NO}_2$, $-\text{COOH}$, $-\text{OH}$, $-\text{NH}_2$, etc.).

Since the imidazolines synthesized in the research contain polar groups such as $-\text{NH}_2$, $=\text{NH}$, $-\text{OH}$, $-\text{NH}-\text{CO}-$, it was considered appropriate to study the effect of these compounds on the antistatic properties of diesel fuels.

Deep hydrotreated diesel fuel was used in the research work, and the specific electrical conductivity SEC of this diesel fuel was determined to be 4 pS/m. According to the requirements set for the diesel fuel's SEC, the SEC should be higher than 150 pS/m in order to minimize the risk of explosion during rapid transportation of diesel fuels. Considering this, it becomes clear that the diesel fuel taken does not meet the requirement of the standard.

In order to study the effect of imidazolines of individual fatty acids IFA on the antistatic properties of diesel fuel, these additives were added to diesel fuel at 50-150 ppm (0.005-0.015%) was added in the concentration range.

Figure 1 shows the effect of FYT on the antistatic property of aminoethyl imidazolines of diesel fuel.



Studies show that amidoethyl imidazolines of fatty acids FA also increase the antistatic effect of diesel fuel. It was found that amidoethyl imidazolines in 50 ppm, the concentration of diesel fuel increases in the range of 32-58 pS/m, depending on the content of imidazoline in diesel fuel. If this concentration is raised to 150 ppm, then the SEC increases to 141-197 pS/m. Stearic acids of amidoethylimidazolines have been shown to have a low antistatic effect, while QLA of amidoethyl imidazoline has been shown to have a high antistatic effect.

Keywords: imidazolines, natural petroleum acids, diesel fuels

Optical Chemical Sensor Studies: Some Examples of Different Designs and Applications

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Abstract

Optical Chemical sensors can be defined as miniaturized devices which can exhibit real time and on-line optical response in presence of specific compounds or ions even in complex matrices. Their advantages include high sensitivity, selectivity and rapid response times when compared with the classical analytical techniques. They can also be miniaturized, integrated into portable devices, and can be used in real-time monitoring applications, for remote sensing purposes and measurements in harsh environments. Due to these advantages, the field of optical chemical sensors has been a growing research area over the last decades. The most widely used techniques employed in optical chemical sensors are optical absorption and luminescence techniques including both steady state and time resolved based measurements.

This study will tell about some different sensor designs and applications constructed in our laboratories over the last 10 years till to the present day. Since the past years, various sensing designs, including fiber optical based sensors; sol gel-based sensors, thin film polymer-based sensors, electrospinning-based fiber sensors, nanosensors or sensor matrices containing nanoparticles have been under development by our research group. The applications of these sensors include some trace metal ion sensing of mercury, iron, aluminum and copper. We have also designed some gas sensors which can respond to different gases such as oxygen, carbon dioxide and nitric oxide. In the case of luminescence-based sensors, advantageous lifetime-based sensing is also employed besides steady state detection in many applications. Sensitivity, stability, selectivity, repeatability and robustness of the sensors were evaluated for the characterization of the sensor performances.

Keywords: Optical chemical sensors, fluorescence, nanoparticles

Crown Ethers in the Separation Process of Optical Isomers

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Abstract

We have developed a chromatography method for the separation of optical isomers of physiologically active amines. Due to the presence of an asymmetric carbon atom, the crown ether (1,2,10,11-dibenzo-5-methyl-14-hydroxy-16-crown-5) consists of a racemate containing two enantiomers. Using the method of Shabanov and Tong Kang Shon, we first performed the separation of these enantiomers by column chromatography.

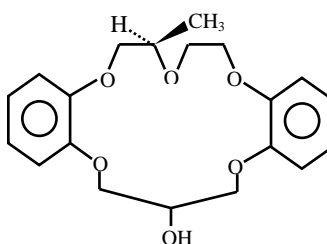


Figure 1. Chemical structure of 1,2,10,11-dibenzo-5-methyl-14-hydroxy-16-crown-5

For this purpose, racemic mixture of L(S)-alanine of the crown ether has been separated into the individual diastereoisomers (R,S- and S,S-) by column chromatography. Individual diastereoisomers had been subjected to hydrolysis and obtained S- and R- enantiomers of crown ether.

In order to use the obtained S-enantiomer of the crown ether as an adsorbent, it is implanted on the surface of a silica gel (MSK) and filled into a glass column. An aqueous-alcoholic solution (1:2) of diastereoisomers of the racemate L (S)-alanine ester of phenamine passes through the surface of the adsorbent in a chromatographic column.

Since the R, S-diastereoisomers are poorly retained in the cavities of crown ether, it comes first from the column.

S,S-diastereoisomer is held by adsorbent strongly, remains in the column, by washing with the eluent from the column comes easily.

As eluent it was taken aqueous-alcoholic solution (1:10). Diastereoisomers (R,S- and S,S-) are hydrolyzed with a basic medium to give the corresponding individual R- and S-enantiomers of phenamine. The structures of the enantiomers were confirmed IR- and NMR spectra.

Keywords: chromatography, optical isomers, crown ether, silica gel

Polymers-by-Design for Safer Bio/Materials

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Abstract

Biopolymers are a leading class of functional materials suitable for high-value applications and are of great interest to researchers and professionals across various disciplines. Interdisciplinary research is important to understand the basic and applied aspects of biopolymers to address several complex problems associated with good health and well-being. To reduce the environmental impact and dependence on fossil fuels, a lot of effort has gone into replacing synthetic polymers with biodegradable materials or finding an optimal solution by combining their properties, especially with those ones derived from natural resources. Structure-properties relationship can be a tool to modulate/design the properties of the final bio/material for a specific application e.g. drug delivery system or bio adhesivity on different substrates. Present study refers to strategies of adapting the structure and architecture of a multicomponent system to get the desired properties e.g. controlled delivery, self-assembly behaviour of natural derived polymers, particularly involving chitosan and alginate.

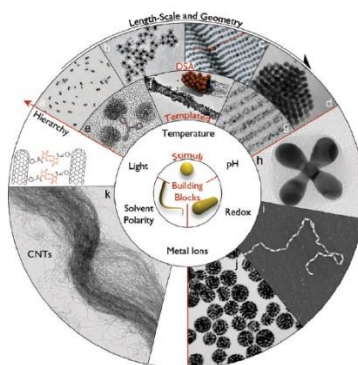


Figure 1. The spontaneous and reversible organization of molecular units into ordered structures

Keywords: chitosan, alginate, drug delivery, biocompatible, non-toxic, self-assembly

Biophytoremediation of Soils Contaminated with Oil and Heavy Metals

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Abstract

It is known that oil is one of the main pollutants of soil and water, in addition to being the most widely used mineral. The problem of environmental pollution with oil and some heavy metals is particularly relevant in many regions of Azerbaijan, especially in the Absheron Peninsula, where there is a high level of traditional oil production and pollution as a result.

According to the literature, plants are also used to clean the environment from heavy metals. This technology is based on the ability of many pollution-resistant plants to accumulate heavy metals in their upper parts. Soil-inhabiting microorganisms greatly influence the composition and mobility of heavy metals in the soil. It has been determined that heavy metals can be accumulated by plants, in this case the rate of absorption depends on the type of metals in the growing medium and also the nature of the microorganisms in the root zone.

In recent years, the approach using the combined metabolic potential of microorganisms and plants in biophytoremediation technology is considered as promising.

The purpose of this study is to develop methods of cleaning soils contaminated with oil and heavy metals by using the complex of the association of oil-degrading microorganisms with plants capable of accumulating metal ions and taking into account the soil-climate characteristics of the region.

In this study the Gala deposit located on the Absheron Peninsula was chosen as a research object. At the initial stage, soil samples were taken from the area contaminated with oil and heavy metals, and their physicochemical and microbiological properties were determined. At the same time, efficient plant species settled in those areas - metal accumulators, as well as active microorganisms - destructors which were typical for this soil were selected.

During the conducted studies, the amount of oil (3.85%, 6.6%, 7.2%, 12.2%), physicochemical (moisture, pH) and microbiological indicators were determined in all samples. The number of microorganisms, including the amount of hydrocarbon-oxidizing microorganisms living in oil-contaminated soils, was determined. Thus, the number of bacteria (106) is greater than the amount of fungi (102) and yeast fungi (102) in the studied soil. The number of hydrocarbon-oxidizing microorganisms in oil-contaminated samples (11·104) is higher than in the control (29·102). Cultures capable of assimilating the components of Gala oil were separated and cultivated on the basis of the prepared synthetic nutrient mediums that ensured the maximum activity of microorganisms.

During the conducted experiment (30 days), corn and sunflower were selected for the biophytoremediation process. The joint effect of these plants with selected hydrocarbon-oxidizing microorganisms has led to the effective utilization of the studied oil pollution and some heavy metals. In the studied soil samples (6.6%), the breakdown of pollution made 21.7-23% (sunflower) and 18-21% (corn).

Keywords: biophytoremediation, oil, heavy metals, microorganisms, plants