

AL-FARABI KAZAKH
NATIONAL UNIVERSITY



INFORMATION
about publication activity
FACULTY OF BIOLOGY AND BIOTECHNOLOGY

№	Наименование публикации	Выходные данные (doi статьи)	Аннотация статьи	Ссылка для цитирования (Ф.И.О., название статьи, название, номер и/или выпуск, том журнала, страницы, doi статьи)
1.	PHYTOMANAGEMENT: PERSPECTIVES OF USING OF PHYTOREMEDIATION TECHNOLOGY IN KAZAKHSTAN	DOI: https://doi.org/10.1051/e3sconf/202015901003	ABSTRACT: The content of heavy metals around the metallurgical plants of East Kazakhstan in the soil and plants growing around these plants was studied. It was determined the concentration of heavy metals in soils, plant organs, it was calculated bioconcentration factor and the level of extraction of heavy metals by sunflower and lawn grasses. The study of sunflower plants and lawn grasses showed that the studied species accumulated a significant amount of heavy metals mainly in the roots. Sunflower plants and lawn grasses had high accumulation activity and accumulated a significant amount of heavy metals in their organs. Determination of	Saule Atabayeva*, Saule Kenzhebayeva, Ravilya Alybayeva, Saltanatm Asrandina and Sabina Shoinbekova Phytomanagement: perspectives of using of phytoremediation technology in Kazakhstan// E3S Web Conf. - 2020.- Vol. 159.- Article Number 0100 Number of page - 12 The 1st International Conference on Business Technology for a Sustainable Environmental System (BTSES-2020) Chapter 1: Global Environmental Change and Environmental Management.

			the content of heavy metals in the soil showed a significant removal of heavy metals from the soil, which indicates a high degree of phytoextraction of heavy metals by the studied plant species.	
2.	RESPONSE OF PLANTS TO CADMIUM STRESS	DOI: https://doi.org/10.26577/ijbch.2020.v13.il.11	ABSTRACT: In this article, we discuss cadmium pollution in the environment and the various ways plants take up cadmium and respond to its accumulation. The increased development of metallurgical and mining industries is primarily responsible for the increases in cadmium pollution in the environment. Another significant source of cadmium contamination of agricultural plants is the widespread use of phosphorus fertilizers, which contain cadmium. Cadmium reduces the growth and development of plants. Cadmium in the soil also competes with the basic essential mineral elements thereby reducing their uptake by plants. This article reviews the published data on the cellular and molecular mechanisms of cadmium uptake by plants, its metabolic transformations, effects on nutrient status of plants, modulation of cadmium response by polyamines and amino acids, and the growth of plants. Strategies to reduce cadmium uptake and accumulation are also discussed.	Atabayeva S.D., Minocha S., Minocha R., Rakhymgozhina A., Nabieva A., Nurmahanova A.S., Kenzhebayeva S.S., Alybayeva R.A. Response of plants to cadmium stress// International journal of Biology and Chemistry- 2020. - 13 N1 -P. 109-117

3.	IRON-DEFICIENCY RESPONSE AND DIFFERENTIAL EXPRESSION OF IRON HOMEOSTASIS RELATED GENES IN SPRING WHEAT (TRITICUM AESTIVUM) MUTANT LINES WITH INCREASED GRAIN IRON CONTENT	DOI: https://doi.org/10.1071/cp21136 (if=2,286; q1 in agronomy and crop science)	ABSTRACT: Iron (Fe) is essential for plant growth and human health. Fe deficiency reduces yield and quality traits of wheat (<i>Triticum aestivum</i> L.). Grains of modern bread wheat varieties contain low levels of Fe, and Fe uptake and translocation in wheat grown in Fe conditions have not been studied in detail. This study investigates Fe homeostasis and biofortification in genetically stable spring wheat Almaken and Zhenis M ₅ mutant lines, developed with 200 Gy for higher grain Fe content. Mutant lines and parents were analysed for the expression of genes involved in Fe homeostasis under normal and deficient Fe. Wheat homologues of genes that participated in phyto siderophore (PS) synthesis and transport were significantly upregulated in the Fe-limited roots of Almaken M/1 and both Zhenis M/2 mutant lines, emphasising the role of deoxymugineic acid (DMA) in iron acquisition. The combined overexpression of <i>SAMS</i> , <i>NASI</i> , <i>TaNAAT</i> , <i>DMAS</i> and <i>TO M</i> was also revealed in the roots of Almaken M/1 and both Zhenis M5 mutant lines, suggesting their involvement in PS synthesis, Fe chelation and transport. Under Fe deficiency, levels of <i>TaYSIA</i> encoding the wheat homologues of the metal-NA transporter YSL, also showed 2.6-, 5.1- and 5.9-fold increases in the roots of Almaken M/1 and both Zhenis M5 mutant lines, respectively. Vacuolar iron transporters (<i>VIT2</i>), natural	Kenzhebayeva S.S., Atabayeva S.D., Sarsu F. Iron-deficiency response and differential expression of iron homeostasis related genes in spring wheat (<i>Triticum aestivum</i>) mutant lines with increased grain iron content// <i>Crop and Pasture Science</i> - 2021 Published online: 27 October 2021 https://www.publish.csiro.au/cp/CP21136 6
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			<p>resistance associated-macrophage protein (<i>NRAMP</i>) genes and the transcription factor basic-loop-helix (<i>bHLH</i>) were significantly upregulated under Fe starvation in shoots. Fe-deficiency-related genotype-dependent and tissue-specific gene expression differences provide new insights into genes involved in iron homeostasis and biofortification genes in wheat.</p>	
4.	<p>KINETICALLY MODELLED APPROACH OF XANTHAN PRODUCTION USING DIFFERENT CARBON SOURCES: A STUDY ON MOLECULAR WEIGHT AND RHEOLOGICAL PROPERTIES OF XANTHAN</p>	<p>DOI: https://doi.org/10.1016/j.ijbiomac.2021.10.163 INTERNATIONAL JOURNAL OF BIOLOGICAL MACROMOLECULES</p>	<p>ABSTRACT: The present study emphasizes improving the overall yield, productivity and quality of xanthan by <i>Xanthomonas campestris</i> using different carbon sources via optimizing the fermentation media and kinetic modelling work. After optimization, six carbon sources and one nitrogen source were selected for xanthan production in 5 L bioreactor. Kinetic modelling was applied to assess the experimental fermentation data and to check its influence on scale-up production. In this work, xanthan production reached 40.65 g/L with a growth-associated rate constant (α) of 2.831, and highest specific growth rate (μ_m) of 0.37/h while using maltose as the sole carbon source. Furthermore, rheological properties were determined, and Herschel-Bulkley model was employed to assess the experimental data. Interestingly, xanthan obtained from sucrose and glucose showed the highest yield stress (τ_0) of 12.50 ± 0.31 and 7.17 ± 0.21. Moreover, the highest xanthan</p>	<p>Ali Mohsin^{a1} Kanagat Akbota Akyliyaevna^{ab1} Waqas QamarZaman^c Muhammad HammadHussain^a Muhammad ZubairMohsin^a SarahAl-Rashed^d XinTan^a XiweiTian^a KistaubayevaAida^b MuhammadTariq^c Muhammad SalmanHaider^{fg} Imran MahmoodKhan^h SobiaNiazi^h YingpingZhuang^a MeijinGuo^a Kinetically modelled approach of xanthan production using different carbon sources: A study on molecular weight and rheological properties of xanthan. International Journal of Biological Macromolecules</p>

			<p>molecular weight of 3.53×10^7 and 3.25×10^7 g/mol were also found with sucrose and glucose. At last, the proposed mechanism of sugar metabolism and xanthan biosynthesis pathway were described. Conclusively, maltose appeared as the best carbon source for maximum xanthan production: while sucrose and glucose gave qualitatively best results. In short, this systematically modelled approach maximizes the potential output and provides a solid base for continuous cultivation of xanthan at large-scale production.</p>	
5.	<p>CELL IMMOBILIZATION FOR EFFICIENT ENZYMES PRODUCTION</p>	<p>EURASIAN JOURNAL OF BIOSCIENCE THIS LINK IS DISABLED, 2020, 14(1), CTP. 2075–2078</p>	<p>ABSTRACT: Cells catalysis is efficient methodology that has been extensively applied in various biological processes. However, industrial strains are vulnerable to environmental change, leading to poor stability and productivity. In this regards, large potentialities are embedded in immobilized cells. In particular, the immobilization techniques are of great significance in improving the catalytic performance of natural biocatalysts. Effective method of enzyme production by immobilization of microbial cells on solid career in submerged conditions has been developed. It was determined that design of proposed equipment gives the opportunity to increase enzymatic activity of immobilized cells compared to free cells by several times. A cultivation of <i>Aspergillus oryzae</i> M has been carried out</p>	<p>Blieva, R., Suleimenova, Z., Kalieva, A., ...Tynybekov, B., Sydykbekova, R. Cell immobilization for efficient enzymes production EurAsian Journal of BioScience this link is disabled, 2020, 14(1), ctp. 2075–2078</p>

			for 49 days by immobilization of fungal cells in submerged conditions of growth. Enzymatic activity was enhanced significantly after 6 days of cultivation of immobilized cells and keeps the same value for 49 days of fungal cultivation. The alpha-amylase activity has been increased to 696 U/ml.	
6.	FC RECEPTOR IS INVOLVED IN NK CELL FUNCTIONAL ANERGY INDUCED BY MIAPACA2 TUMOR CELL LINE	DOI: 10.1080/08820139.2020.1813757 (IF=3.657)	ABSTRACT: Impaired NK cytotoxicity has been linked to poor cancer prognosis, but its mechanisms are not clearly established. Increasing data demonstrate that NK cells lose cytotoxicity after interaction with NK cellsensitive tumor cells. In this paper, we provide evidence that the human adenocarcinoma cell line MiaPaCa2 and TNF α and TGF β treated MiaPaCa2 cultures (MiaPaCa2-TT) induced functional anergy of NK cells via FGL2 protein. MiaPaCa2-TT cultures decreased expression of IFN γ , CD107a, DNAM-1, and stimulated expression of PD1 by NK cells, as well as inhibited their cytotoxic activity in a greater manner compared to the parental culture. More importantly, we found that cocultivation with anergized NK cells decreased expression of IFN γ and CD107a by naïve NK cells, which supports the hypothesis of NK cell functional anergy transmission. The obtained results suggest a mechanism by which tumor cells may inhibit cytotoxic functions of tumor-infiltrating and circulating NK cells in cancer	Yekaterina O. Ostapchuk, Yuliya V. Perfilyeva, Aikyn Kali, Raikhan Tleulieva, Oxana Yu. Yurikova, Gulshan E. Stanbekova, Boris V. Karalnik & Nikolai N. Belyaev (2020) Fc Receptor is Involved in Nk Cell Functional Anergy Induced by Miapaca2 Tumor Cell Line, Immunological Investigations.

7.	<p>PROSPECTS FOR THE CREATION OF A WASTE-FREE TECHNOLOGY FOR WASTEWATER TREATMENT AND UTILIZATION OF CARBON DIOXIDE BASED ON CYANOBACTERIA FOR BIODIESEL PRODUCTION.</p>	<p>JOURNAL OF BIOTECHNOLOGY. - 2020. - (Q1, H INDEX-147, SJR-0.99, PERCENTILE-90) DOI: 10.1016/J.JBIOTEC.2020.10.010</p>	<p>ABSTRACT: Current fresh water and energy shortage determines the need to study the possibilities of using living objects in bioenergy and environmental purification technologies. The development of waste-free technologies allows waste recycling, which saves raw materials and energy, in turn, reducing waste generation. The effect of different carbon dioxide concentrations and wastewater from households on the growth of cyanobacteria was studied in order to determine their capabilities in the purification processes. It was found that the optimal CO₂ concentration for the cultivation of cyanobacteria <i>Cyanobacterium</i> sp. IPPAS B-1200 and <i>Desertifilum</i> sp. IPPAS B-1220 was 10 %, and for the <i>Cyanobacterium aponinum</i> IPPAS B-1201 – 5%. It was revealed that the cultivation of the cyanobacterium <i>Cyanobacterium</i> sp. IPPASB-1200 on wastewater from the water storage reduces the concentration of organic pollutants and, accordingly, improves the physicochemical properties of water. The cleaning percentage for selected pollutants was 68–100 %. It was shown that the most optimal ratio of wastewater to nutrient media for cyanobacteria cultivation were 25:75 and 50:50. The lipid content (%/dry weight) in the biomass of the studied strains of cyanobacteria ranges from 15 to 22% after cultivation in wastewater. It was determined that the strains of <i>Cyanobacterium</i> genus were the most</p>	<p>Kenzhegul Bolatkhan, Assem K. Sadvakasova, Bolatkhan K. Zayadan, Ardak B. Kakimova, Fariza K. Sarsekeyeva, Bekzhan D. Kossalbayev, Ayshat M. Bozieva, Saleh Alwasel, Suleyman I. Allahverdiev. // Journal of Biotechnology. – 2020- 324, pp. 162-170. www.elsevier.com/locate/jbiotec</p>
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			<p>suitable for the production of biodiesel according to their fatty acids composition. It was determined that lipids were composed of only saturated and monounsaturated fatty acids. As a result of the studies, the optimal conditions for the growth of <i>Cyanobacterium</i> sp. IPPAS B-1200 were determined. This microorganism has a good potential to produce biodiesel as a producer of saturated and monounsaturated middle-chain-length fatty acids.</p>	
8.	<p>PREDICTION OF CLUSTERS OF MIRNA BINDING SITES IN MRNA CANDIDATE GENES OF BREAST CANCER SUBTYPES</p>	<p>DOI: 10.7717/PEERJ.8049 (83% 35/209 GENERAL AGRICULTURAL AND BIOLOGICAL SCIENCES)</p>	<p>ABSTRACT: The development of breast cancer (BC) subtypes is controlled by distinct sets of candidate genes, and the expression of these genes is regulated by the binding of their mRNAs with miRNAs. Predicting miRNA associations and target genes is thus essential when studying breast cancer. The MirTarget program identifies the initiation of miRNA binding to mRNA, the localization of miRNA binding sites in mRNA regions, and the free energy from the binding of all miRNA nucleotides with mRNA. Candidate gene mRNAs have clusters (miRNA binding sites with overlapping nucleotide sequences). mRNAs of EPOR, MAZ and NISCH candidate genes of the HER2 subtype have clusters, and there are four clusters in mRNAs of MAZ, BRCA2 and CDK6 genes. Candidate genes of the triple-negative subtype are targets for multiple miRNAs. There are 11 sites in CBL</p>	<p>Aisina D., Niyazova R., Atambayeva S., Ivashchenko A. Dana Aisina* , Raigul Niyazova, Shara Atambayeva and Anatoliy Ivashchenko // PeerJ 7:e8049</p>

			<p>mRNA, five sites in MMP2 mRNA, and RAB5A mRNA contains two clusters in each of the three sites. In SFN mRNA, there are two clusters in three sites, and one cluster in 21 sites. Candidate genes of luminal A and B subtypes are targets for miRNAs: there are 21 sites in FOXA1 mRNA and 15 sites in HMGA2 mRNA. There are clusters of five sites in mRNAs of ITGB1 and SOX4 genes. Clusters of eight sites and 10 sites are identified in mRNAs of SMAD3 and TGFB1 genes, respectively. Organizing miRNA binding sites into clusters reduces the proportion of nucleotide binding sites in mRNAs. This overlapping of miRNA binding sites creates a competition among miRNAs for a binding site. From 6,272 miRNAs studied, only 29 miRNAs from miRBase and 88 novel miRNAs had binding sites in clusters of target gene mRNA in breast cancer. We propose using associations of miRNAs and their target genes as markers in breast cancer subtype diagnosis.</p>	
<p>9.</p>	<p>EXTRACELLULAR VESICLES, STEM CELLS AND THE ROLE OF MIRNAS IN NEURODEGENERATION</p>	<p>DOI : https://doi.org/10.2174/1570159X196662108 17150141 (96%9/246 PHARMACOLOGY (MEDICAL))</p>	<p>ABSTRACT: There are different modalities of intercellular communication governed by cellular homeostasis. In this review, we will explore one of these forms of communication called extracellular vesicles (EVs). These vesicles are released by all cells in the body and are heterogeneous in nature. The primary function of EVs is to share information through their cargo consisting of proteins,</p>	<p>Belkozhayev M. Ayaz ,Al-Yozbaki Minnatallah ,George Alex ,Ye Niyazova Raigul ,Sharipov O. Kamalidin ,Byrne J. Lee ,Wilson M. Cornelia, “Extracellular vesicles, stem cells and the role of miRNAs in neurodegeneration”, Current Neuropharmacology 2021; 19.</p>

			<p>lipids and nucleic acids (mRNA, miRNA, dsDNA etc.) with other cells, which have a direct consequence on their microenvironment. We will focus on the role of EVs of mesenchymal stem cells (MSCs) in the nervous system and how these participate in intercellular communication to maintain physiological function and provide neuroprotection. However, deregulation of this same communication system could play a role in several neurodegenerative diseases such as Alzheimer's disease, Parkinson's disease, Amyotrophic lateral sclerosis, multiple sclerosis, prion disease and Huntington's disease. The release of EVs from a cell provides crucial information to what is happening inside the cell and thus could be used in diagnostics and therapy. We will discuss and explore new avenues for the clinical applications of using engineered MSC-EVs and their potential therapeutic benefit in treating neurodegenerative diseases.</p>	
<p>10.</p>	<p>EFFECTS OF SUNLIGHT EXPOSURE AND VITAMIN D SUPPLEMENTATION ON HIV PATIENTS.</p>	<p>DOI: https://doi.org/10.1016/j.jsbmb.2020.105664</p>	<p>ABSTRACT: Unlike many vitamins derived predominantly from food sources, vitamin D is produced endogenously in the skin upon exposure to sunlight. Ethnicity, skin pigmentation, socioeconomic status, geographic location, climate and sunscreen; all of these factors contribute to the amount of insolation for any given individual. Insufficient insolation creates the prerequisites for vitamin D deficiency.</p>	<p>Akimbekov, N.S., Ortoski, R.A., Razzaque, M.S. Effects of sunlight exposure and vitamin D supplementation on HIV patients. <i>J. Steroid Biochem. Mol. Biol.</i> 2020, 200. 105664.</p>

			<p>This is particularly true in HIV-infected individuals, who are highly vulnerable to vitamin D insufficiency/deficiency, as it plays a huge role in the musculoskeletal and cardiovascular systems. Antiretroviral therapy may also be a factor in vitamin D deficiency. Today, as the issues of preventing common skeletal and non-skeletal diseases with HIV-infected people are becoming highly relevant, the maintenance of vitamin D levels through exposure to sunlight or supplementation appears to be an effective and safe solution.</p>	
11.	<p>THE EFFECT OF LEONARDITE-DERIVED AMENDMENTS ON SOIL MICROBIOME STRUCTURE AND POTATO YIELD.</p>	<p>DOI: https://doi.org/10.3390/agriculture10050147</p>	<p>ABSTRACT: Humic substances originating from various organic matters can ameliorate soil properties, stimulate plant growth, and improve nutrient uptake. Due to the low calorific heating value, leonardite is rather unsuitable as fuel. However, it may serve as a potential source of humic substances. This study was aimed at characterizing the leonardite-based soil amendments and examining the effect of their application on the soil microbial community, as well as on potato growth and tuber yield. A high yield (71.1%) of humic acid (LHA) from leonardite has been demonstrated. Parental leonardite (PL) and LHA were applied to soil prior to potato cultivation. The 16S rRNA sequencing of soil samples revealed distinct relationships between microbial community composition and the application of leonardite-based soil amendments. Potato tubers were planted in</p>	<p>Akimbekov, N., Qiao, X., Digel, I., Abdieva, G., Ualieva, P., Zhubanova, A. The Effect of Leonardite-Derived Amendments on Soil Microbiome Structure and Potato Yield. <i>Agriculture</i>. 2020, 10, 147.</p>

			pots in greenhouse conditions. The tubers were harvested at the mature stage for the determination of growth and yield parameters.	
12.	LIGNITE BIOSOLUBILIZATION BY BACILLUS SP. RKB 2 AND CHARACTERIZATION OF ITS PRODUCTS.	DOI: https://doi.org/10.1080/01490451.2019.1695022	ABSTRACT: Nowadays, the advancements of coal microbiology and biotechnology have been highly emphasized, providing leading-edge approaches in sustainable development of agriculture and the protection of the environment. The biosolubilization of low-rank coals, such as lignite and leonardite is a promising technology for converting these sedimentary rocks into valuable products. In this study, the process involved in lignite biosolubilization by Bacillus sp. RKB 2 was investigated. The biotransformed lignite and the produced humic substances were determined in vitro in a liquid medium and on a solid matrix. The bacterial strain was isolated from untreated Kazakhstani lignite and was shown to be capable of effectively solubilizing and transforming lignite (5% w/v). Fourier Transform Infrared (FTIR) and UHPLC-QqQ-MS/MS analyses were performed to examine the solubilization products and lignite humic substances processed by bacteria.	Akimbekov, N., Digel, I., Qiao, X., Tastambek, K., Zhubanova, A. Lignite Biosolubilization by Bacillus sp. RKB 2 and Characterization of its Products. Geomicrobiol. J. 2020, 37, 255–261.
13.	LIGNITE BIOSOLUBILIZATION AND BIOCONVERSION BY BACILLUS SP.: THE	DOI: https://doi.org/10.1080/17597269.2020.1753936	ABSTRACT: The vast metabolic potential of microbes in brown coal (lignite) processing and utilization can greatly contribute to	Akimbekov, N., Digel, I., Abdieva, G., Ualieva, P., Tastambek, K. Lignite biosolubilization and bioconversion by

	<p>COLLATION OF ANALYTICAL DATA.</p>		<p>innovative approaches to sustainable production of high-value products from coal. In this study, the multi-faceted and complex coal biosolubilization process by <i>Bacillus</i> sp. RKB 7 isolate from the Kazakhstan coal-mining soil is reported, and the derived products are characterized. Lignite solubilization tests performed for surface and suspension cultures testify to the formation of numerous soluble lignite-derived substances. Almost 24% of crude lignite (5% w/v) was solubilized within 14 days under slightly alkaline conditions (pH 8.2). FTIR analysis revealed various functional groups in the obtained biosolubilization products.</p>	<p><i>Bacillus</i> sp.: the collation of analytical data. <i>Biofuels</i>. 2021, 12(3), 247-258.</p>
<p>14.</p>	<p>DENTAL PLAQUE REMOVAL BY ULTRASONIC TOOTHBRUSHES.</p>	<p>DOI: https://doi.org/10.3390/dj8010028</p>	<p>ABSTRACT: With the variety of toothbrushes on the market, the question arises, which toothbrush is best suited to maintain oral health? This thematic review focuses first on plaque formation mechanisms and then on the plaque removal effectiveness of ultrasonic toothbrushes and their potential in preventing oral diseases like periodontitis, gingivitis, and caries. We overviewed the physical effects that occurred during brushing and tried to address the question of whether ultrasonic toothbrushes effectively reduced the microbial burden by increasing the hydrodynamic forces. The results of published studies show that electric toothbrushes, which combine ultrasonic and sonic (or acoustic and mechanic)</p>	<p>Digel I., Kern I., Geenen E-M., Akimbekov N. Dental Plaque Removal by Ultrasonic Toothbrushes. <i>Dent J</i> (Basel). 2020, 8(1), 28, 1-13.</p>

			actions, may have the most promising effect on good oral health. Existing ultrasonic/sonic toothbrush models do not significantly differ regarding the removal of dental biofilm and the reduction of gingival inflammation compared with other electrically powered toothbrushes, whereas the manual toothbrushes show a lower effectiveness.	
15.	VITAMIN D AND THE HOST-GUT MICROBIOME: A BRIEF OVERVIEW.	DOI: https://doi.org/10.1267/ahc.20011	ABSTRACT: There is a growing body of evidence for the effects of vitamin D on intestinal host-microbiome interactions related to gut dysbiosis and bowel inflammation. This brief review highlights the potential links between vitamin D and gut health, emphasizing the role of vitamin D in microbiological and immunological mechanisms of inflammatory bowel diseases. A comprehensive literature search was carried out in PubMed and Google Scholar using combinations of keywords “vitamin D,” “intestines,” “gut microflora,” “bowel inflammation”. Only articles published in English and related to the study topic are included in the review. We discuss how vitamin D (a) modulates intestinal microbiome function, (b) controls antimicrobial peptide expression, and (c) has a protective effect on epithelial barriers in the gut mucosa.	Akimbekov N.S., Digel I., Sherelkhan D.K., Lutfor A.B., Razzaque M.S. Vitamin D and the Host-Gut Microbiome: A Brief Overview. Acta histochemica et cytochemical. 2020, 53 (3), 33-42.
16.	THE RELEVANCE OF VITAMIN D IN THE ORAL HEALTH OF HIV INFECTED PATIENTS.	DOI: https://doi.org/10.1016/j.jsbmb.2021.105905	ABSTRACT: HIV infection affects 36.9 million people globally, and vitamin D deficiency is a	C.H. Mumena., M.H. Mudhihiri., R.Sasi., M.Mlawa., S.Nyerembe., N.S. Akimbekov., M.S. Razzaque. The

			<p>global public health concern for HIV patients. Approximately 70 %–80 % of HIV-infected patients have vitamin D deficiency. The deficiency is associated with many pathologies such as immune disorders, infectious diseases, chronic inflammation, oral diseases, as well as the fast progression of HIV. The causes of vitamin D deficiency in HIV infections include HIV itself, traditional factors such as less sun exposure, mal-absorption, hypercholesterolemia, seasonal variation, poor nutrition as well as some HAART drugs like efavirenz.</p>	<p>relevance of vitamin D in the oral health of HIV infected patients. J. Steroid Biochem. Mol. Biol. 2021, 211. 105905.</p>
17.	<p>SCREENING AND CHARACTERIZATION OF EMULSIFYING HYDROCARBON- DEGRADING BACTERIA FROM COASTAL WATERS OF THE CASPIAN SEA</p>	<p>DOI: 10.17818/NM/2021/2.2</p>	<p>ABSTRACT: As a result of 400 cultures screening isolated from the contaminated coastal zones of the Caspian Sea, 4 new strains were selected that had a stable growth and utilized oil with NaCl concentration close to that of seawater. <i>Stenotrophomonas chelatiphaga</i> wkal49, <i>Stenotrophomonas chelatiphaga</i> wkal51, <i>Sphingobacterium kitahiroshimense</i> wkar54, and <i>Achromobacter</i> sp. wkar55 were identified based on an analysis of the direct nucleotide sequence of the 16S rRNA gene fragment. The most active producers of extracellular bioemulsifiers were the <i>Stenotrophomonas chelatiphaga</i> wkal49 and <i>Stenotrophomonas chelatiphaga</i> wkal51 strains. Both demonstrated the highest hydrophobicity, emulsification index, and the highest value for decreasing oil viscosity.</p>	<p>Alla Goncharova, Karpenyuk T., Kalbaeva A., Mukasheva T., Bektyleuova N. Screening and Characterization of Emulsifying Hydrocarbon- Degrading Bacteria from Coastal Waters of the Caspian Sea DOI: 10.17818/NM/2021/2.2 “Naše more”, 2021 r., 68, #2 P.. 74 – 82 (Q-2)</p>

<p>18.</p>	<p>CHARACTERIZATION OF CADMIUM-TOLERANT ENDOPHYTIC FUNGI ISOLATED FROM SOYBEAN (GLYCINE MAX) AND BARLEY (HORDEUM VULGARE)</p>	<p>DOI: 10.1016/J.HELIYON.2021.E08240</p>	<p>ABSTRACT: Cadmium stress disrupts plant-microbial interactions and reduces plant growth and development. In plants, the tolerance to stress can be increased by inoculation with endophytic microorganisms. The aim of this study was to investigate the distribution of endophytic fungi in various plant organs of barley and soybean and evaluate their Cd removal ability. Two hundred fifty-three fungal strains were isolated from various organs of barley (<i>Hordeum vulgare</i> cv Arna) and soybean (<i>Glycine max</i> cv Almaty). The colonization rate ranged from 13.6% to 57.3% and was significantly higher in the roots. Ten genera were identified: <i>Fusarium</i>, <i>Penicillium</i>, <i>Aspergillus</i>, <i>Metarhizium</i>, <i>Beauveria</i>, <i>Trichoderma</i>, <i>Rhodotorula</i>, <i>Cryptococcus</i>, <i>Aureobasidium</i> and <i>Metschnikowia</i>. Twenty-three fungal strains have a Cd tolerance index from 0.24 to 1.12. Five strains (<i>Beauveria bassiana</i> T7, <i>Beauveria bassiana</i> T15, <i>Rhodotorula mucilaginosa</i> MK1, <i>Rhodotorula mucilaginosa</i> RH2, <i>Metschnikowia pulcherrima</i> MP2) with the highest level of Cd tolerance have minimum inhibitory concentrations from 290 to 2400 µg/ml. These fungi were able to remove Cd up to 59%. The bioaccumulation capacity ranged from 2.3 to 11.9 mg/g. Selected fungal strains could be considered as biological agents for their potential</p>	<p>Lyudmila Ignatova , Aida Kistaubayeva, Yelena Brazhnikova , Anel Omirbekova , Togzhan Mukasheva , Irina Savitskaya , Tatyana Karpenyuk , Alla Goncharova , Dilfuza Egamberdieva,, Alexander Sokolov Heliyon. 2021 Oct 22;7(11):e08240.</p>
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			application in the bioremediation of contaminated sites.	
19.	TRANSFER OF PERSISTENT ORGANIC POLLUTANTS IN FOOD OF ANIMAL ORIGIN – META-ANALYSIS OF PUBLISHED DATA	DOI 10.1016/J.CHEMOSPHERE.2020.128351 (SJR- 1.632, Q1 IN ENVIRONMENTAL SCIENCE)	ABSTRACT: The transfer of POPs in food of animal origin has been studied by a meta-analysis of 28 peer-reviewed articles using transfer rate (TR) for milk and eggs and bioconcentration factors (BCF) for eligible tissues after establishing an adapted methodology. TRs of the most toxic PCDD/Fs into milk were generally elevated and even higher into eggs. BCFs in excreting adult animals varied widely between studies complicating to hierarchize tissues or congeners, even if liver and fat seemed to bioconcentrate more than lean tissues. Short time studies have clearly shown low BCFs contrarily to field studies showing the highest BCFs. The BCFs of PCDD/Fs in growing animals were higher in liver than in fat or muscle. In contrast to easily bioconcentrating hexachlorinated congeners, octa- and heptachlorinated congeners barely bioconcentrate. PCB transfer into milk and eggs was systematically high for very lipophilic congeners. Highly ortho-chlorinated PCBs were transferred >50% into milk and eggs and even >70% for congeners 123 and 167 into eggs. BCFs of the most toxic PCBs 126 and 169 were	Amutova, F., Delannoy, M., Baubekova, A., Konuspayeva, G., & Jurjanz, S. (2021). Transfer of persistent organic pollutants in food of animal origin–meta-analysis of published data. Chemosphere, 262, 128351.

			<p>significantly higher than for less toxic congeners. BCFs seem generally low in PBDEs except congeners 47, 153 and 154. DDT and its metabolites showed high bioconcentration. Differences between tissues appeared but were masked by a study effect. In addition to some methodologic recommendations, this analysis showed the high transfer of POPs into eggs, milk and liver when animals were exposed justifying a strong monitoring in areas with POP exposure.</p>	
<p>20.</p>	<p>EVALUATION OF ENVIRONMENTAL CONTAMINATION BY TOXIC TRACE ELEMENTS IN KAZAKHSTAN BASED ON REVIEWS OF AVAILABLE SCIENTIFIC DATA</p>	<p>10.1007/S11356-021-14979-Z (SJR 0.845, Q1 IN ENVIRONMENTAL SCIENCE)</p>	<p>ABSTRACT: The environmental situation concerning pollution by (eco) toxic and persistent trace elements in Kazakhstan has been investigated by analytical reviews of scientific studies published over the past 20 years reporting concentrations of 10 toxic trace elements (TTE) observed in soil, sediments, or surface water. A database of 62 articles published in Kazakh, Russian, or English covered the majority of the territory of the country for soil and water samples but to a lesser extent for sediments. Reported concentrations were summarized using statistical parameters, then spatialized and finally classified in contamination classes according to local legislation. This analysis revealed some hotspots of TTE in surface waters (Cd and Pb), soil (As), and sediments (Cd and As). Hotspots of less toxic Cu, Zn, and Mn were also detected.</p>	<p>Baubekova, A., Akindykova, A., Mamirova, A., Dumat, C., & Jurjanz, S. (2021). Evaluation of environmental contamination by toxic trace elements in Kazakhstan based on reviews of available scientific data. <i>Environmental Science and Pollution Research</i>, 28(32), 43315-43328. doi10.1007/s11356-021-14979-z</p>

			<p>Spatialization of results allowed localization of these hotspots close to industrial sites, such as smelters or mining and metallurgic combines. Others have been shown to be close to disused mining sites or landfills with municipal waste. Methodological improvements for further studies have been suggested, such as to integrate more West Kazakhstan or remote areas in sampling campaigns, but also to describe more exhaustively the used analytical methods and to be more attentive to the speciation of the analyzed form of the element. Finally, a management strategy to strengthen a sustainable food policy has been proposed: to reduce emissions by modernization of industrial facilities and better waste management, to organize land use depending on the contamination levels, and to reduce the bioavailability of the toxic elements.</p>	
21.	<p>BIOLOGICAL FEATURES OF MEDICINAL PLANT ELAEAGNUS RHAMNOIDES GROWING AT SOUTH-EAST OF KAZAKHSTAN</p>	<p>DOI: 10.52571/PTQ.V17.N36.2020.349_PERIODICO36_PGS_334_345.PDF</p>	<p>ABSTRACT: Elaeagnus rhamnoides berries contain significant amounts of bioactive vitamins, lipids, carotenoids, and phenolic compounds. They are widely used as an ingredient in functional products, cosmetics, and pharmaceutical formulations to prevent and treat cardiovascular, stomach, skin, and liver diseases. Natural sea buckthorn populations are widespread in Kazakhstan. Data on phytochemical and diagnostic indicators are absent for E. rhamnoides</p>	<p>N. Kassimbekova, M., Kaliyeva, A., Kassymbayev, B., Medeuova, G., Mamytova N. Biological features of medicinal plant elaeagnus rhamnoides growing at south-east of Kazakhstan. // Periodico Tche Quimica.-2020.- Vol.36 – P. 334-345</p>

		<p>growing in Kazakhstan. In this work, seaberry from Kazakhstan was surveyed for diagnostic indicators, lipophilic and hydrophilic compounds. Analyses were conducted for main diagnostic indicators of leaves and fruits by standard microtechniques; fatty acid profiles by gas-chromatography; β-carotene by HPLCPDA; vitamin C and B by capillary electrophoresis, and pectin substances by titration. The main diagnostic indicators of leaves were stomatal anomocytic complex; corymbose and stellate hairs; conductive bundle - closed collateral; fruits - secretory passages and conducting bundles of a spiral type in the pulp parenchyma, and a large amount of fatty oil and aleuron grains in the embryo. In the oil from berry pulp/peel, the dominating fatty acids were palmitoleic and palmitic (28.53 and 30.03 %, respectively). Sea buckthorn seed oil, with its high α-linolenic levels and a near 1:1 ratio of ω-6:ω-3 fatty acids, represented a very balanced source of polyunsaturated fatty acids for human health and nutrition. β-Carotene content was 7.75 mg per kg, pectin substances – 3.27 %. In addition, the berries were rich in vitamins B complex (0.0035-0.014 mg/100g) and vitamin C (0.21 mg/100g). This work constitutes the first approach on knowledge about the phytochemical profile of <i>Elaeagnus rhamnoides</i> fruits from Kazakhstan and provides arguments multiple using of <i>E. rhamnoides</i>, both for fresh consumption and for industrial</p>	
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			preparations in the form of jams and related products (functional multivitamin food) as well as byproducts (seeds) as raw materials for the production of oils suitable to be marketed by the pharmaceutical, cosmetic and food industries.	
22.	KINETICALLY MODELLED APPROACH OF XANTHAN PRODUCTION USING DIFFERENT CARBON SOURCES: A STUDY ON MOLECULAR WEIGHT AND RHEOLOGICAL PROPERTIES OF XANTHAN	INTERNATIONAL JOURNAL OF BIOLOGICAL MACROMOLECULES DOI: https://doi.org/10.1016/j.ijbiomac.2021.10.163	ABSTRACT: The present study emphasizes improving the overall yield, productivity and quality of xanthan by <i>Xanthomonas campestris</i> using different carbon sources via optimizing the fermentation media and kinetic modelling work. After optimization, six carbon sources and one nitrogen source were selected for xanthan production in 5 L bioreactor. Kinetic modelling was applied to assess the experimental fermentation data and to check its influence on scale-up production. In this work, xanthan production reached 40.65 g/L with a growth-associated rate constant (α) of 2.831, and highest specific growth rate (μ_m) of 0.37/h while using maltose as the sole carbon source. Furthermore, rheological properties were determined, and Herschel-Bulkley model was employed to assess the experimental data. Interestingly, xanthan obtained from sucrose and glucose showed the highest yield stress (τ_0) of 12.50 ± 0.31 and 7.17 ± 0.21 . Moreover, the highest xanthan molecular weight of 3.53×10^7 and 3.25×10^7 g/mol were also found with sucrose and glucose. At last, the proposed mechanism of sugar metabolism and	Ali Mohsin ^{a1} Kanagat Akbota Akyliyaevna ^{ab1} Waqas QamarZaman ^c Muhammad HammadHussain ^a Muhammad ZubairMohsin ^a SarahAl-Rashed ^d XinTan ^a XiweiTian ^a KistaubayevaAida ^b MuhammadTariq ^c Muhammad SalmanHaider ^{fg} Imran MahmoodKhan ^h SobiaNiazi ^h YingpingZhuang ^a MeijinGuo ^a Kinetically modelled approach of xanthan production using different carbon sources: A study on molecular weight and rheological properties of xanthan. International Journal of Biological Macromolecules

			<p>xanthan biosynthesis pathway were described. Conclusively, maltose appeared as the best carbon source for maximum xanthan production: while sucrose and glucose gave qualitatively best results. In short, this systematically modelled approach maximizes the potential output and provides a solid base for continuous cultivation of xanthan at large-scale production.</p>	
23.	<p>EFFECT OF CADMIUM IONS ON SOME BIOPHYSICAL PARAMETERS AND ULTRASTRUCTURE OF ANKISTRODESMUS SP. B-11 CELLS</p>	<p>DOI 10.1134/S1021443720040196. (IF=1.198; SJR-0.38; Q 2 IN RUSSIAN JOURNAL OF PLANT PHYSIOLOGY)</p>	<p>ABSTRACT: Effects of low concentrations of cadmium ions on growth, photosynthesis, and cell ultrastructure of microalga Ankistrodesmus sp. B-11 were investigated. The addition of cadmium to growth medium at concentrations of 0.005–0.02 mg/L led to a significant decrease in the number of Ankistrodesmus sp. B-11 cells relatively to that in the untreated culture. The addition of cadmium at concentrations >0.05 mg/L completely stopped cell growth. Cadmium ions induced ultrastructural changes in the arrangement of thylakoids within the stroma, the detachment of thylakoid membranes with the formation of void interthylakoid spaces, and a significant increase in vacuolization of microalgal cells. Simultaneous measurements of fluorescence induction</p>	<p>B. K. Zayadana, A. K. Sadvakasova, D. N. Matorin, N. R. Akmuhanova, M. Kokocinski, N. P. Timofeev, Kh. Balouch and M. O. Bauenova. Effect of Cadmium Ions on Some Biophysical Parameters and Ultrastructure of Ankistrodesmus sp. B-11 Cells. Russian Journal of Plant Physiology, 67 (5), 845-854</p>

			<p>curves and redox transformations of photosystem I components on a microsecond time scale by means of a M-PEA-2 fluorometer revealed that cadmium ions inhibit electron transport in photosystem II (PSII). The quantum yield of electron transport in PSII (ϕE_0) and the performance index (PIABS) were found to decrease; the photoreduction of P700 pigment was decelerated, while energy dissipation (DIO/RC) and ΔpH-dependent nonphotochemical quenching (qE) increased significantly under the action of cadmium. The performance index (PIABS) was the most sensitive parameter; it can be used for the detection of early toxic effects of cadmium ions on algae.</p>	
24.	<p>POTENTIAL OF MICROALGAE PARACHLORELLA KESSLERI BH-2 AS BIOREMEDIATION AGENT OF HEAVY METALS CADMIUM AND CHROMIUM</p>	<p>DOI: https://doi.org/10.1016/j.algal.2021.102463 (if=4,401; sjr-1,044; q 1 in algal research)</p>	<p>ABSTRACT: The basis of biological remediation basically refers to environmentally friendly methods of extracting various xenobiotics, including heavy metals, from the wastewater of various industrial facilities, using the biochemical capabilities of naturally occurring organisms or their metabolites. In this regard, the assessment of the contribution of microalgae to the transformation of heavy metal compounds and the detoxification of the natural environment is very important and necessary. This paper presents an investigation of the effect of different</p>	<p>Meruyert O. Bauenova, Assemgul K. Sadvakasova, Zhuldyz O. Mustapayeva, Mikołaj Kokociński, Bolatkhan K. Zayadan, Maria Katarzyna Wojciechowicz, Nurziya R. Akmukhanova, Saleh Alwasel, Suleyman I. Allahverdiev. Potential of microalgae Parachlorella kessleri Bh-2 as bioremediation agent of heavy metals cadmium and chromium // Algal Research, V.59, P. 102463.</p>

			<p>concentrations of cadmium Cd²⁺ and chromium Cr^{2O7}²⁻ ions on the survival and ultrastructure of microalgae cells of <i>Parachlorella kessleri</i> Bh-2 and its ability to accumulate these metals in order to determine its bioremediational potential against these metals. It was determined that the culture of <i>Parachlorella kessleri</i> Bh-2 is resistant to concentrations of cadmium (0.3 mg l⁻¹) and chromium (30 mg l⁻¹) ions. It was found that heavy metals in these concentrations are actively transported through the cell membrane and accumulate in the cytoplasm of cells, causing an increase in the number of vacuoles with electron-dense deposits, granulation of the cytoplasm and an increase in the number of starch grains in the microalgae cells. Analysis of the content of total polysaccharides showed a noticeable increase in the concentration of polysaccharides by exposure to concentrations of Cd (II) - 0,3 mg l⁻¹ and Cr (VI) - 30 mg l⁻¹.</p>	
25.	<p>SCREENING AND CHARACTERIZATION OF EMULSIFYING HYDROCARBON- DEGRADING BACTERIA FROM COASTAL WATERS OF THE CASPIAN SEA</p>	<p>DOI: 10.17818/NM/2021/2.2 (IF=1.625; Q3).</p>	<p>ABSTRACT: As a result of 400 cultures screening isolated from the contaminated coastal zones of the Caspian Sea, 4 new strains were selected that had a stable growth and utilized oil with NaCl concentration close to that of seawater. <i>Stenotrophomonas chelatiphaga</i> wkal49, <i>Stenotrophomonas</i></p>	<p>Goncharova, A., Karpenyuk, T., Kalbayeva, A., Mukasheva, T., Bektileuova, N. Screening and characterization of emulsifying hydrocarbon- degrading bacteria from coastal waters of the caspian sea Nase More, 2021, 68(2), сtp. 74–83</p>

			<p>chelatiphaga wkal51, Sphingobacterium kitahiroshimense wkar54, and Achromobacter sp. wkar55 were identified based on an analysis of the direct nucleotide sequence of the 16S rRNA gene fragment. The degree of oil degradation by these strains was above 50%. The hydrophobicity of the cell surface, emulsifying activity, the degree of influence on the viscosity of crude oil, and also the ability to produce surfactants were the four key factors that made up the studied parameters for the selected strains. The studied strains formed an emulsion layer on the surface of the culture medium. The most active producers of extracellular bioemulsifiers were the Stenotrophomonas chelatiphaga wkal49 and Stenotrophomonas chelatiphaga wkal51 strains. Both demonstrated the highest hydrophobicity, emulsification index, and the highest value for decreasing oil viscosity.</p>	
26.	<p>BIOLOGICAL EFFECTIVENESS OF CONSTRUCTED CONSORTIA IN MEOR</p>	<p>DOI: https://doi.org/10.14505//jemt.11.5(45).19 (0,192; Q3 ENVIRONMENTAL SCIENCE: MANAGEMENT, MONITORING, POLICY AND LAW).</p>	<p>ABSTRACT: Kazakhstan is one of the producers of oil and gas in the world. Also, Kazakhstan is a country which uses traditional methods of oil development. These methods are not economically beneficial in the development of oil since two-thirds of the oil remains in the ground. In this regard, 16 indigenous microorganisms were studied from the production water of the “Akingen” field located in Western Kazakhstan. It is known that biological</p>	<p><u>Kaiyrmanova, G.</u>, Shaimerdenova, U., Tapesheva, S., Magmiyayev, R., Yernazarova, A. Journal of Environmental Management and Tourism, [S.l.], v. 11, n. 5, p. 1222-1230, aug. 2020.</p>

			<p>preparations containing several symbiotic strains of microorganisms are important because they are more effective and improved with biotechnology properties than monobacterial preparations. Antagonistic activity of 16 indigenous strains of bacteria was examined by cross streak. In addition, the activities of the created consortia were studied (oil emulsification, production of acids and gas). 5 bacterial consortia were selected based on the study of the antagonistic relationships of strains and their activeness, including: 2 consortia consisting of 2 monostrains - P. aeruginosa D6: Bacillus sp. SR 1; P. aeruginosa D6: Bacillus sp. CL1; 2 consortia of 3 monostrains - P. aeruginosa D6: Bacillus sp. SR1: Bacillus sp. CL1; P. aeruginosa D6: Bacillus sp. CL1: Bacillus sp. D1X and one consortium of 4 monostrains P. aeruginosa D6: Bacillus sp. SR1: Bacillus sp. CL1: Bacillus sp. D1X.</p>	
27.	<p>DETERMINATION OF THE CONTENT OF BIOLOGICALLY ACTIVE SUBSTANCES IN SOME AQUATIC HIGHER PLANTS</p>	<p>DOI: http://dx.doi.org/10.30848/pjb2021-5(23), Q3, процентиль -49</p>	<p>ABSTRACT: The article identifies the following biologically active substances in the surface and the underground parts of Eichhornia crassipes, Pistia Stratiotes, and Lemna minor aquatic plants (roots, stems, leaves): alkaloids, anthraquinones, proteins, tannins, flavonoids, phenolic compounds, polysaccharides, anthraquinones, and coumarins. A brief overview of scientific works has been given for certain types of biologically</p>	<p>Yernazarova, G. I., Ramazanova, A. A., Turasheva, S. K., & Ablaihanova, N. T. (2021). «Determination of the content of biologically active substances in some aquatic higher plants». Pak. J. Bot, 53(5), 1893-1899.</p>

			active substances and their biological activity, importance, biosynthesis, and genetic transfer. The results of this research show that high amount of biologically active substances (BAS) was found in Eichhornia crassipes aquatic plant in terms of tannins, which in the roots amounted to 7.476%, and in the above-ground part — to 6.73%. The content of polysaccharides was 5.907%, and in the roots — 2.642%. By the amount of BAS detected in the composition of Pistia stratiotes aquatic plant, polysaccharides content in the aerial part was 3.073%, and in the roots — 4.881%, the content of flavonoids in the aerial part was 4.833%, and in the roots — 3.716%. Among BAS in Lemna minor water plant, the content of flavonoids was 5.463%.	
28.	IMMOBILIZATION OF DAIRY STARTER ON WHEAT BRAN ENHANCE VIABILITY UNDER ACID AND BILE STRESS // APPLIED FOOD BIOTECHNOLOGY – 2020. – VOL.7 (4). – P. – 215 – 223.	DOI/URL https://doi.org/10.22037/afb.v7i4.29723 q3, if=1.49	ABSTRACT: Survival of beneficial microorganisms in human gut faces many challenges. Immobilization on dietary fibers not only increases the viability of probiotic cultures, but also improves intestinal microbiota composition and decreases several diseases. Therefore, the objective of this study was to assess effects of wheat bran immobilization on survival of multiple species dairy starters under high acidity and bile salts conditions.	Yelena Oleinikova, Alma Amangeldi, Makpal Yelubaeva, Aigul Alybaeva, Sadanov Amankeldy, Margarita Saubenova, Anna Chizhaeva, Aida Aitzhanova, Ramza Berzhanova Immobilization of dairy starter on wheat bran enhance viability under acid and bile stress // Applied Food Biotechnology – 2020. – Vol.7 (4). – P. – 215 – 223. CiteScore no baze Scopus 60%.
29.	OPTIMIZATION OF MICROBIAL ASSISTED PHYTOREMEDIATION OF	DOI: https://doi.org/10.1080/15226514.2020.1825330 ,	ABSTRACT: 580 microbial strains were isolated from the rhizosphere of the plants Cucurbita	Asil Nurzhanova, Togzhan Mukasheva, Ramza Berzhanova, Sergey Kalugin, Anel Omirbekova, Annett Mikolasch

	SOILS CONTAMINATED WITH PESTICIDES	q2, if=3,212	pepo L. and Xanthium strumarium grown on soil contaminated with dichlorodiphenyltrichloroethane (DDT) and its metabolites. During the cultivation, two bacterial strains were selected because of their ability to grow on media containing 0.5-5.0 mg L ⁻¹ of dichlorodiphenyl dichloro ethylene (DDE) as the sole carbon source. They were identified as Bacillus vallismortis and Bacillus aryabhatai. Both of these species were shown to have a high capacity for the utilization of DDE - more than 90% of which was consumed after 21 days of cultivation. Laboratory experiments were carried out then to assess the possibility of using these strains for the decontamination of organochlorine pesticides (OCPs) contaminated soils. Inoculation of C. pepo and X. strumarium with our isolates B. vallismortis and B. aryabhatai resulted in a reduction of the pollutant stress to the plants as shown by an increase both in aboveground and in root biomass. The microorganisms enhanced the uptake and phytostabilization potential of C. pepo and X. strumarium and can be applied for the treatment of DDE contaminated soils.	Optimization of microbial assisted phytoremediation of soils contaminated with pesticides // International Journal Phytoremediation опубликовано 01 октября 2020
30.	MONILIELLA SPATHULATA, AN OIL-DEGRADING YEAST, WHICH PROMOTES GROWTH OF BARLEY IN OIL-POLLUTED SOIL	DOI: https://doi.org/10.1007/s00253-020-11011-1 q1, if=3,93, sjr 1.06, процентиль 85%	ABSTRACT: The yeast strain Moniliella spathulata SBUG-Y 2180 was isolated from oil-contaminated soil at the Tengiz oil field in the Atyrau region of Kazakhstan on the basis of its unique ability to use crude oil and its components as the sole carbon and	Annett Mikolasch, & Togzhan Mukasheva, Ramza Berzhanova, & Anel Omirbekova & Anne Reinhard1 & Daniele Zühlke1 & Mareike Meister & Katharina Riedel1 & Tim Urich1 & Frieder Schauer Moniliella spathulata, an oil-degrading yeast, which promotes

			<p>energy source. This yeast used a large number of hydrocarbons as substrates (more than 150), including n-alkanes with chain lengths ranging from C10 to C32, monomethyl- and monoethyl-substituted alkanes (C9–C23), and n-alkylcyclo alkanes with alkyl chain lengths from 3 to 24 carbon atoms as well as substituted monoaromatic and diaromatic hydrocarbons. Metabolism of this huge range of hydrocarbon substrates produced a very large number of aliphatic, alicyclic, and aromatic acids. Fifty-one of these were identified by GC/MS analyses. This is the first report of the degradation and formation of such a large number of compounds by a yeast. Inoculation of barley seeds with <i>M. spathulata</i> SBUG-Y 2180 had a positive effect on shoot and root development of plants grown in oil-contaminated sand, pointing toward potential applications of the yeast in bioremediation of polluted soils.</p> <ul style="list-style-type: none"> • <i>Moniliella spathulata</i> an oil-degrading yeast • Increase of the growth of barley 	<p>growth of barley in oil-polluted soil // Applied Microbiology and Biotechnology Received, 2021, 105(1), PP. 401–415</p>
31.	<p>CHARACTERIZATION OF CADMIUM-TOLERANT ENDOPHYTIC FUNGI ISOLATED FROM SOYBEAN (GLYCINE MAX) AND BARLEY (HORDEUM VULGARE)</p>	<p>DOI: https://doi.org/10.1016/j.heliyon.2021.e08240 q1, if=2,85</p>	<p>ABSTRACT: Cadmium stress disrupts plant-microbial interactions and reduces plant growth and development. In plants, the tolerance to stress can be increased by inoculation with endophytic microorganisms. The aim of this study was to investigate the distribution of endophytic fungi in various plant organs of barley and soybean and evaluate their Cd removal ability.</p>	<p>Aida Kistaubayeva, Yelena V Brazhnikova, Togzhan Mukasheva, Anel Omirbekova Characterization of cadmium-tolerant endophytic fungi isolated from soybean (<i>Glycine max</i>) and barley (<i>Hordeum vulgare</i>) // Heliyon 7(11) 2021. – Volume 7, Issue 11, November 2021. Q1 CiteScore по базе Scopus 75%%. SJR 0.46</p>

			<p>Two hundred fifty-three fungal strains were isolated from various organs of barley (<i>Hordeum vulgare</i> cv Arna) and soybean (<i>Glycine max</i> cv Almaty). The colonization rate ranged from 13.6% to 57.3% and was significantly higher in the roots. Ten genera were identified: <i>Fusarium</i>, <i>Penicillium</i>, <i>Aspergillus</i>, <i>Metarhizium</i>, <i>Beauveria</i>, <i>Trichoderma</i>, <i>Rhodotorula</i>, <i>Cryptococcus</i>, <i>Aureobasidium</i> and <i>Metschnikowia</i>.</p> <p>Twenty-three fungal strains have a Cd tolerance index from 0.24 to 1.12. Five strains (<i>Beauveria bassiana</i> T7, <i>Beauveria bassiana</i> T15, <i>Rhodotorula mucilaginosa</i> MK1, <i>Rhodotorula mucilaginosa</i> RH2, <i>Metschnikowia pulcherrima</i> MP2) with the highest level of Cd tolerance have minimum inhibitory concentrations from 290 to 2400 µg/ml. These fungi were able to remove Cd up to 59%. The bioaccumulation capacity ranged from 2.3 to 11.9 mg/g.</p>	
32.	<p>SCREENING AND CHARACTERIZATION OF EMULSIFYING HYDROCARBON-DEGRADING BACTERIA FROM COASTAL WATERS OF THE CASPIAN SEA</p>	<p>DOI: 10.17818/NM/2021/2.2. Q3, IF=0,841 SJR 0.33</p>	<p>ABSTRACT: As a result of 400 cultures screening isolated from the contaminated coastal zones of the Caspian Sea, 4 new strains were selected that had a stable growth and utilized oil with NaCl concentration close to that of seawater. <i>Stenotrophomonas chelatiphaga</i> wkal49, <i>Stenotrophomonas chelatiphaga</i> wkal51, <i>Sphingobacterium kitahiroshimense</i> wkar54, and <i>Achromobacter</i> sp. wkar55 were identified based on an analysis of the direct</p>	<p>Alla Goncharova, Tatyana Karpenyuk, Aliya Kalbayeva, Togzhan Mukasheva, Nurgul Bektileuova Screening and Characterization of Emulsifying Hydrocarbon-Degrading Bacteria from Coastal Waters of the Caspian Sea // Naše more” 68(2)/2021., pp. 74-82</p>

			<p>nucleotide sequence of the 16S rRNA gene fragment. The degree of oil degradation by these strains was above 50%. The hydrophobicity of the cell surface, emulsifying activity, the degree of influence on the viscosity of crude oil, and also the ability to produce surfactants were the four key factors that made up the studied parameters for the selected strains. The studied strains formed an emulsion layer on the surface of the culture medium. The most active producers of extracellular bioemulsifiers were the <i>Stenotrophomonas chelatiphaga</i> wka149 and <i>Stenotrophomonas chelatiphaga</i> wka151 strains. Both demonstrated the highest hydrophobicity, emulsification index, and the highest value for decreasing oil viscosity.</p>	
33.	<p>IRON-DEFICIENCY RESPONSE AND DIFFERENTIAL EXPRESSION OF IRON HOMEOSTASIS RELATED GENES IN SPRING WHEAT MUTANT LINES WITH INCREASED GRAIN IRON CONTENT</p>	<p>CROP & PASTURE SCIENCE https://doi.org/10.1071/cp21136</p>	<p>ABSTRACT: Iron (Fe) is essential for plant growth and human health. Fe deficiency reduces yield and quality traits of wheat (<i>Triticum aestivum</i> L.). Grains of modern bread wheat varieties contain low levels of Fe, and Fe uptake and translocation in wheat grown in Fe conditions have not been studied in detail. This study investigates Fe homeostasis and biofortification in genetically stable spring wheat Almaken and Zhenis M5 mutant lines, developed with 200 Gy for higher grain Fe content. Mutant lines and parents were analysed for the expression of genes involved in Fe homeostasis under normal</p>	<p>Saule S. Kenzhebayeva, Saule D. Atabayeva, Fatma Sarsu. Iron-deficiency response and differential expression of iron homeostasis related genes in spring wheat mutant lines with increased grain iron content // Crop & Pasture Science . – 2021. – Published online: 27 October 2021</p>

			<p>and deficient Fe. Wheat homologues of genes that participated in phytosiderophore (PS) synthesis and transport were significantly upregulated in the Fe-limited roots of Almaken M/1 and both Zhenis M/2 mutant lines, emphasising the role of deoxymugineic acid (DMA) in iron acquisition. The combined overexpression of SAMS, NAS1, TaNAAT, DMAS and TOM was also revealed in the roots of Almaken M/1 and both Zhenis M5 mutant lines, suggesting their involvement in PS synthesis, Fe chelation and transport. Under Fe deficiency, levels of TaYS1A encoding the wheat homologues of the metal-NA transporter YSL, also showed 2.6-, 5.1- and 5.9-fold increases in the roots of Almaken M/1 and both Zhenis M5 mutant lines, respectively. Vacuolar iron transporters (VIT2), natural resistance associated-macrophage protein (NRAMP) genes and the transcription factor basic-loop-helix (bHLH) were significantly upregulated under Fe starvation in shoots. Fe-deficiency-related genotype-dependent and tissue-specific gene expression differences provide new insights into genes involved in iron homeostasis and biofortification genes in wheat.</p>	
34.	<p>NEW SPRING WHEAT MUTANT RESOURCES WITH YELLOW RUST RESISTANCE, IMPROVED GRAIN MORPHOMETRIC PARAMETERS, AND HIGH</p>	<p>DOI: https://doi.org/10.26577/eje.2021.v68.i3.06</p>	<p>ABSTRACT: Genetic variability in bread wheat concerning grain nutritional quality and physical morphometric parameters, which is a required prerequisite to improve modern varieties is limited. It is</p>	<p>Kenzhebayeva S.S. Shoinbekova S.A., Zharassova D., Miatzhanova K.D., Abekova A., Asrandina S.Sh. Moahid Ajmal Javid. Вестник КазНУ им. Аль-Фараби, Серия экологическая, 2021, №3 (68), 55-63.</p>

	GRAIN PROTEIN CONTENT.		<p>also important to combine the improved grain quality characteristics with tolerance to abiotic and biotic stresses including fungal disease such as yellow rust, the most common wheat disease that significantly reduces its production. The goal of present study was to broaden the genetic variation of spring bread wheat on the basis of a rust resistant cv. Kazakhstanskay-19 and mutational selection. The doses of gamma irradiation of 300 Gy, 350 Gy, and 400 Gy treatments were applied to develop new M₄ mutant lines and search advanced resources which combine yellow rust resistance, improved grain morphometric parameters, and high grain protein content. The 300 Gy and 350 Gy radiation doses showed a significantly highest effect in an increase in grain area with the same level of action, showing its increased efficiency to cause mutations in the genes related to with this grain characteristics. The grain features such as length recorded significant variation only through 300 Gy treatment, indicating that only this lowest dose is effective for the improvement comparing with the higher level of radiation.</p>	
35.	AN APPROACH OF QUANTUM CHEMICAL METHODS FOR THE DEVELOPMENT AND SUBSTANTIATION OF THE	DOI: 10.21608/ejchem.2021.69873.353 7 q3	ABSTRACT: The main research direction uses computational computer programs that establish the structural features of new modified piperidine compounds. The	Boshkayeva, A., Sayakova, G., Kiyekbayeva, L., Bekbayeva, L., Dyusenova, N., Akhmetova, G., Mamurova, A., Akhmetova, A. An approach of quantum chemical methods

	<p>STRUCTURE OF NEW PIPERIDINE COMPOUNDS</p>		<p>analysis of molecular models of piperidine derivatives using the semiempirical PM3 method of the HyperChem program (version 8.0.8) shows the practicality of synthesizing seven drugs and thermodynamic stability for the structures. All compounds have one nucleophilic reaction (oxygen in benzoyl radical) based on the calculations of the piperidine charges and their derivatives. The chemical stability of piperidine derivatives directly depends on the highest occupied molecular orbital (HOMO) energy gap and the lowest unoccupied molecular orbital (LUMO). All investigated model structures 4, 6, 7, 10 are nucleophiles. Compounds 2, 3, and 15 acts as electrophiles, attributed to the absence of benzyloxy radical in their structure. Based on the calculations of dipole moments, all the considered compounds have high polarity and will be readily soluble in almost all polar solvents: water and alcohol. This confirms the possibility of obtaining various dosage forms based on the investigated compounds on an industrial scale.</p>	<p>for the development and substantiation of the structure of new piperidine compounds (2021) Egyptian Journal of Chemistry, 64 (9), pp. 5143-5151. DOI: 10.21608/ejchem.2021.69873.3537</p>
<p>36.</p>	<p>ANATOMIC-MORPHOLOGICAL AND PHYTOCHEMICAL STUDY OF A RARE SPECIES - RHEUM WITTRÖCKII LUNDSTR</p>	<p>DOI: https://doi.org/10.26577/ijbch.2020.v13.i2.09</p>	<p>ABSTRACT: The article presents the features of the anatomical and morphological structure of the vegetative organs of <i>Rheum wittrockii</i> Lundstr. and the results of its qualitative and quantitative phytochemical analyses. The structure of the leaf shows the presence of calcium oxalate druses, which</p>	<p>Kobylyna, T.N., Mukhitdinov N.M., Abidkulova K.T., Kurbatova N.V., Kudrina N.O., Alimkulova M.B., Zaltauskaite J. Anatomic-morphological and phytochemical study of a rare species - <i>Rheum wittrockii</i> Lundstr.// International Journal of Biology and</p>

		<p>are located mainly under the layer of columnar mesophyll, along the Central part of the leaf blade. Druses in the spongy parenchyma are clearly distinguished and have an almost spherical shape with a peculiar needle-like structure. In the main vein, sections of the sclerenchymic lining are adjacent to the conducting bundle. The covering tissue of the roots has a secondary structure and is represented by a three-layer periderm. In the cells of the main parenchyma of the cortex, numerous calcium oxalate druses are found, which have a round-crystal configuration and are collected in small groups. The vessels of the root xylem are large with ladder and mesh perforation. Features of the main stem parenchyma are its larger, rounded-oblong or oval shape with slightly thickened cell walls. The revealed anatomical features can be used in the case of the diagnosis of medicinal plant raw materials. The study of the chemical composition, the study of biological activity and the development of new herbal medicines is relevant. As a result of studying the chemical composition of the ethanol extract of <i>Rheum wittrokii</i> obtained by extracting 96% ethanol, 8 main components were identified. Rhizomes are dominated by chrysophanic acid with an identification probability of 41.4%. The presence of components was found: chrysarobin, chrysophanic acid, emodin-3-methyl</p>	<p>Chemistry, [S.l.], v. 13, n. 2, p. 69-79, jan. 2021. ISSN 2409-370X.</p>
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			ether, emodin-1,3,8-trihydroxy-6-methylanthracene-9,10-dione, which are directly involved in the body's metabolism, providing antioxidant, antiseptic and anti-cancer effects, and also help in the removal of toxins from the body, which has a beneficial effect on the liver, increasing the level of glycogen.	
37.	ARCHITECTURAL TRAITS IN RESPONSE TO SALINITY OF WHEAT PRIMARY ROOTS	DOI: 10.30848/PJB2020-3(39) (IF=0,949; Q3 IN BOTANY).	<p>ABSTRACT:</p> <p>In this study, morphological and anatomical properties of a rare species <i>Anthemis trotziana</i> Claus were investigated. Morphology structure of flower, seed, leaf, root and anatomical structure of root, stem, leaves and molecular phylogenetics <i>Anthemis trotziana</i> from Aktobe region of the Kazakhstan are also studied. <i>Anthemis trotziana</i> Claus (Asteraceae) is a rare and an endemic species of the Volga region and the Western Kazakhstan. The species is calcifite, occurs on sediments of cretaceous rocks and for research features substratum were studied regarding chemical structure of soil from different horizon. The anatomical results showed that the roots have tetrachium xylem rays and schizogenic channels. When comparing the anatomical structure of virginal roots in three populations, it was found that the morphometric parameters of plants in the 1-2nd populations were high, while the data of the 3rd population were lower. The epidermis of the leaf is strongly cutinized and leaves are isolateral, the</p>	Izbastina, K., Kurmanbayeva, M., Bazargaliyeva, A., Ablaihanova, N., Inelova, Z., Moldakaryzova, A., . . . Turuspekov, Y. (2020). Morphological, anatomical structure and molecular phylogenetics of <i>anthemis trotziana</i> claus. <i>Pakistan Journal of Botany</i> , 52(3), 935-947.

			<p>palisade mesophyll is found on both sides of the leaf. This is peculiar to xerophilous plants. The abundance of essential oils clearly indicates the healing characteristics of the plant and is the basis for studying of essential oils of the leaf. In the paper, also were determined unique molecular markers of the species and used for the creation of a phylogenetic tree. To clarify the taxonomic provision of rare <i>A. trozkiana</i> phylogenetic analysis based on the change of the sequence ITS nrDNA of Anthemideae representatives was conducted. For molecular research DNA analysis on phylogeny of <i>A. trozkiana</i> was conducted based on ITS (internal transcribed spacers) markers. Alignment of Anthemis sequences was performed using nucleotide sequences available at the NCBI and MEGA 6 package. The Neighbor Joining phylogenetic tree suggested that <i>A. trozkiana</i> along with <i>A. marschalliana</i>, <i>A. fuculosa</i>, and <i>A. calcarea</i> form a single cluster within Tanacetum clade, while other Anthemis species formed a separate Anthemis clade. © 2020, Pakistan Botanical Society. All rights reserved.</p>	
38.	<p>BIOMASS RESOURCES OF PHRAGMITES AUSTRALIS IN KAZAKHSTAN: HISTORICAL DEVELOPMENTS, UTILIZATION, AND PROSPECTS</p>	<p>DOI: https://doi.org/10.3390/resources9060074</p>	<p>ABSTRACT: Common reed (<i>Phragmites australis</i> (Cav.) Trin. Ex Steud.) is a highly productive wetland plant and a potentially valuable source of renewable biomass worldwide. There is more than 10 million ha of reed</p>	<p>Baibagysoy, A., Thevs, N., Nurtazin, S., Waldhardt, R., Beckmann, V., Salmurzauly, R. Biomass resources of <i>Phragmites australis</i> in Kazakhstan: Historical developments, utilization, and prospects</p>

			<p>area globally, distributed mainly across Eurasia followed by America and Africa. The literature analysis in this paper revealed that Kazakhstan alone harbored ca. 1,600,000-3,000,000 ha of reed area, mostly distributed in the deltas and along the rivers of the country. Herein, we explored the total reed biomass stock of 17 million t year⁻¹, which is potentially available for harvesting in the context of wise use of wetlands. The aim of this paper is to reveal the distribution of reed resource potential in wetland areas of 13 provinces of Kazakhstan and the prospects for its sustainable utilization. Reed can be used as feedstock as an energy source for the production of pellets and biofuels, as lignocellulosic biomass for the production of high strength fibers for novel construction and packaging materials, and innovative polymers for lightweight engineering plastics and adhesive coatings. Thereby, it is unlikely that reed competes for land that otherwise is used for food production. © 2020 by the authors.</p> <p>КЛЮЧЕВЫЕ СЛОВА АВТОРА: Bioeconomy; Central Asia; Feedstock; Reed beds; Soviet socialist republics; Utilization; Wetlands</p>	<p>(2020) Resources, 9 (6), статья № 74, .</p>
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<p>39.</p>	<p>CHEMICAL RESEARCH AND BIOLOGICAL ACTIVITY OF PLANTS OF THE GENUS ATRAPHAXIS (A. SPINOSA)</p>	<p>DOI: https://doi.org/10.32014/2020.2518-1491.107</p>	<p>ABSTRACT: In this article identifies new sources of obtaining biological substances from plants of the genus <i>Atraphaxis (A. spinosa)</i> prepared in the Almaty region. According to well - known methods, the analysis of indicators and standards of raw material quality-humidity, total ash, sulphate ash, insoluble ash in 10% hydrochloric acid-was developed and carried out. Micro- and macroelements determined by atomic absorption spectroscopy. Analysis of the elemental composition shows that iron predominates from microelements, and sodium, potassium and calcium from macronutrients. Conditions for obtaining a biologically active complex from the aboveground part of <i>Atraphaxis spinosa</i> developed for the first time. The optimal conditions for obtaining the complex are extractant – 50% ethanol, the ratio of extractant and raw materials – 1:8, double extraction time – 48 hours, temperature – 22 - 26 °C. The lipophilic composition identified by chromatography-mass spectroscopy. Since lipophilic fractions of plant samples include such classes of compounds as fatty acids; mono-; di-; triglycerides, phospholipids, sterols, Sterol esters, glycolipids, fat-soluble vitamins, they can considered not only as nutritional products, but also as possible pharmacological agents. The content of lipophilic components – 26 organic compounds-was determined. It found that</p>	<p>Chemical research and biological activity of plants of the genus <i>Atraphaxis (A. spinosa)</i></p>
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			<p>A. spinosa contains a large amount of di - (2-ethylhexyl) phthalate (54.66%) and β-sitosterol (13.11%). A complex study of plant resources as medicinal raw materials provides for the chemical study of biologically active substances and biological screening of extracts and individual compounds obtained from plants. In most cases, the extract showed a wide range of antibacterial activity against the used strains of microorganisms.</p>	
40.	<p>EFFECT OF SULFUR-CONTAINING AGROCHEMICALS ON GROWTH, YIELD, AND PROTEIN CONTENT OF SOYBEANS (GLYCINE MAX (L.) MERR)</p>	<p>DOI: 10.1016/j.sjbs.2021.04.073 (if=4,234; q1 in agricultural and biological sciences).</p>	<p>ABSTRACT: In this study, effect of different forms of sulfur-containing agrochemicals on growth, yield, and protein content of soybean grains have been evaluated. Three forms were used, such as powdery, solute, and pasty, in which elemental sulfur is contained in a nanostructured state. Plants treated with powdered and solute sulfur-containing agrochemicals had the highest growth and grain yield values, and the effect of applying pasty sulfur-containing agrochemicals did not differ from the control, in which there was low yield on all variants. The use of powdered and solute sulfur-containing agrochemicals increased all protein fractions in soybeans. The results show that the use of powdered and solute sulfur-containing agrochemicals is necessary to boost the yield of soy and increase the supply of proteins in the grains. A key factor in the availability of sulfur for soybean plants is the conversion of sulfur to a nanodisperse state. This study</p>	<p>Effect of sulfur-containing agrochemicals on growth, yield, and protein content of soybeans (<i>Glycine max</i> (L.) Merr)</p>

			provides relevant information about sulfur-containing agrochemicals, which can promote higher seed yields and increase the content of protein in soybeans.	
41.	EFFECT OF SULFUR-CONTAINING AGROCHEMICALS ON GROWTH, YIELD, AND PROTEIN CONTENT OF SOYBEANS (GLYCINE MAX (L.) MERR)	DOI: 10.1016/j.sjbs.2020.11.033 q1	ABSTRACT: In this study, effect of different forms of sulfur-containing agrochemicals on growth, yield, and protein content of soybean grains have been evaluated. Three forms were used, such as powdery, solute, and pasty, in which elemental sulfur is contained in a nanostructured state. Plants treated with powdered and solute sulfur-containing agrochemicals had the highest growth and grain yield values, and the effect of applying pasty sulfur-containing agrochemicals did not differ from the control, in which there was low yield on all variants. The use of powdered and solute sulfur-containing agrochemicals increased all protein fractions in soybeans. The results show that the use of powdered and solute sulfur-containing agrochemicals is necessary to boost the yield of soy and increase the supply of proteins in the grains. A key factor in the availability of sulfur for soybean plants is the conversion of sulfur to a nanodisperse state. This study provides relevant information about sulfur-containing agrochemicals, which can promote higher seed yields and increase the content of protein in soybeans.	Effect of sulfur-containing agrochemicals on growth, yield, and protein content of soybeans (<i>Glycine max</i> (L.) Merr)
42.	FEATURES OF AGE-RELATED CONDITIONS OF THE CRAMBE	DOI:	ABSTRACT:	Kupriianov A.N., Turalin B.A., Kurbatova N.V., Kurmanbaeva M.S.,

	TATARIA SEBEÓK IN WESTERN KAZAKHSTAN	https://www.proquest.com/docview/2394935784 (IF 0,16; Q4 IN IN AGRICULTURAL AND BIOLOGICAL SCIENCES (MISCELLANEOUS))	<p>The study of age-related conditions is necessary to assess the state of populations and develop the measures for its protection. <i>C. tataria</i> is rare throughout the range, its habitats are often destroyed and the plant needs widespread protection. Despite the high degree of rarity and threat of plant destruction in natural populations, there is extremely little information about the characteristics of age-related states of <i>C. tataria</i>. The aim of our research was to study the age-related states of <i>C. tataria</i> in the northwestern part of Kazakhstan. Three periods and 8 age-related states were distinguished in the ontogenesis of <i>C. tataria</i>. The duration of ontogenesis from seedlings to the old generative state makes from 12 to 30 years. In the most arid conditions, plants remain in a virgin state indefinitely without starting to bloom, forming invasive-regressive cenopopulations. Vegetative buds on a shortened shoot are formed only among young generative species; they are not formed among middle-aged and old generative species. The incompleteness of age-related conditions does not provide population stability decrease and indicates a high plasticity of the species under extreme conditions of Cretaceous hills.</p>	Abidkulova K.T., Bazargaliyeva A.A. Features of age-related conditions of the <i>Crambe tataria</i> Sebeók in Western Kazakhstan // <i>Eurasia J Biosci.</i> 2020. – Vol. 14. - Issue 1. – P.177-182. SJR 0,124
43.	FLORISTIC ANALYSIS OF PLANT COMMUNITIES WITH THE PARTICIPATION OF A NARROW TIEN SHAN	(if=0,17; q4 in ecology) https://www.researchgate.net/publication/353738905_floristic_analysis_of_plant_communities_with_t	ABSTRACT: <i>Taraxacum kok-saghyz</i> L.E.Rodin is a promising natural rubber source and an alternative to <i>Hevea brasiliensis</i> (Willd. ex	Anna A. Ivashchenko, Nashtay Mukhitdinov, Karime T. Abidkulova, Abibulla Ametov, Alexander Tashev, and Alibek Ydyrys. Floristic analysis of

	<p>ENDEMIC, TARAXACUM KOK-SAGHYZ L.E. RODIN.</p>	<p>he_participation_of_a_narrow_tie n_shan_en- _demic_taraxacum_kok- saghyz_lerodin</p>	<p>A. Juss.) Mull.Arg. At the same time, T. kok-saghyz is a narrow endemic and a rare species with decreasing population size due to degradation of its natural habitat. Therefore, it is listed in the Red Data Book of Kazakhstan. Despite a large number of studies addressed various characteristics of this plant, the data on the floristic composition of plant communities it is part of are limited. The aim of our studies was to assess the floristic composition of plant communities with the participation of T. kok-saghyz. The article presents the most complete, up-to-date list of the flora comprising 169 species belonging to 110 genera and 35 families. We present the results of an analysis including taxonomic, chorological and ecological data, identified the basic spectrum consisting of 29 species which are the most characteristic indicators of the plant communities studied. For the first time, the 'core' of the flora was determined, consisting of 14 species. According to the habitat type, most of the basic spectrum was formed by mountain species (14) including one narrow endemic (Ketmentau), followed by Palaeartic species (8). According to ecological preferences, the following groups were distinguished: mesophytes (9 species), mesoxerophytes (7 species), and halophytes of various types (9 species). The share of species preferring saline habitats (halophytes) was 31.4 %. The most similar (Koch's index of biotal dispersity of 23.1 %) were communities at</p>	<p>plant communities with the participation of a narrow Tien Shan endemic, Taraxacum kok-saghyz L.E. Rodin. // Forestry Ideas, 2021, Vol. 27, No. 1: 195-209.</p>
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			the western border of the surveyed area, and the value of the index gradually decreased towards the eastern border (from 22.7 % to 18.7 %). The results obtained can be important in the further studies on the populations of <i>T. kok-saghyz</i> , in searching for potential habitats and organizing population monitoring.	
44.	HIERACIUM PILOSELLA L. – НОВЫЙ АДВЕНТИВНЫЙ ВИД ДЛЯ ФЛОРЫ ТЯНЬ-ШАНЯ (КАЗАХСТАН)	DOI: https://doi.org/10.14258/turczaninowia.24.1.3 (if=0,35; q3 in ecology)	ABSTRACT: Приводятся сведения о находке <i>Hieracium pilosella</i> L. в долине реки Иссык на северном склоне хребта Заилийский Алатау. Описано местообитание вида, состав растительного сообщества с его участием, представлены данные о плотности популяции вида, соотношении генеративных и вегетативных особей. Появление этого адвентивного вида в ближайших окрестностях г. Алматы в последнее десятилетие связано, скорее всего, с усиливающейся рекреационной нагрузкой на данной территории.	Иващенко А. А., Абидкулова К. Т. <i>Hieracium pilosella</i> L. – новый адвентивный вид для флоры Тянь-Шаня (Казахстан) // <i>Turczaninowia</i> , 2021. Т. 24. № 1. С. 21-24. URL: http://turczaninowia.asu.ru/article/view/9289 .
45.	INFLUENCE OF NEW SULFUR-CONTAINING FERTILIZERS ON PERFORMANCE OF WHEAT YIELD	DOI: 10.1016/j.sjbs.2021.04.073 (if=4,234; q1 in agricultural and biological sciences).	ABSTRACT: Wheat is the main cereal crop in Kazakhstan and fertilizers play an important role in enhancing harvest growth. In this study, the impact of new sulfur-containing fertilizers on the growth and yield of wheat was evaluated, and the resistance of varieties to <i>Puccinia triticina</i> Erikss was investigated. (Also known as <i>Puccinia recondite</i> Rob. ex Desm.) For	Kurmanbayeva, M., Sekerova, T., Tileubayeva, Z., Kaiyrbekov, T., Kusmangazinov, A., Shapalov, S., Bachilova, N. (2021). Influence of new sulfur-containing fertilizers on performance of wheat yield. <i>Saudi Journal of Biological Sciences</i> , 28(8), 4644-4655.

			<p>recommendations in agriculture. The study was conducted from 2017 to 2020 in a nursery and greenhouse. The sulfur-containing fertilizer contains nutrients that allow you to extend the duration of absorption by the plant, thereby extending the period of their availability to plants, compared to conventional preparations. By encapsulating molten elemental sulfur and impregnating with a solution of calcium polysulfide, a long-acting compound based on amorphous and monocalcium phosphate was developed. The sulfur is in a water-soluble sulfate form, which, in turn, is slowly oxidized by bacteria and retained in the soil. Three different types of the developed sulfur-containing nanoparticle have been used to test in greenhouses and nurseries: powdered, pasty sulfur-containing composition, and a solution of calcium polysulfide. The results showed that the use of powdered and dissolved sulfur-containing fertilizers contributed to the early ripeness and increased productivity of wheat. Wheat varieties were tested for the presence of key Lr genes that determine resistance to brown rust. The Omskaya 29 sample showed an immune response according to phytopathological assessment, and molecular screening revealed four resistance genes. The new sulfur-containing product is recommended for improving wheat productivity in agriculture, and the Omskaya 29 variety</p>	
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			can also be used as a valuable breeding material resistant to brown rust.	
46.	MORPHOLOGICAL, ANATOMICAL STRUCTURE AND MOLECULAR PHYLOGENETICS OF ANTHEMIS TROTZKIANA CLAUS	PAKISTAN JOURNAL OF BOTANY, VOLUME NO. 53(2): 2020. – P. 935-947 (IF 0.972, Q3 IN PLANT SCIENCES) DOI: 10.30848/PJB2020-3(39)	ABSTRACT: In this study, morphological and anatomical properties of a rare species <i>Anthemis trotzkiana</i> Claus were investigated. Morphology structure of flower, seed, leaf, root and anatomical structure of root, stem, leaves and molecular phylogenetics <i>Anthemis trotzkiana</i> from Aktobe region of the Kazakhstan are also studied. <i>Anthemis trotzkiana</i> Claus (Asteraceae) is a rare and an endemic species of the Volga region and the Western Kazakhstan. The species is calcifite, occurs on sediments of cretaceous rocks and for research features substratum were studied regarding chemical structure of soil from different horizon. The anatomical results showed that the roots have tetrachium xylem rays and schizogenic channels. When comparing the anatomical structure of virginal roots in three populations, it was found that the morphometric parameters of plants in the 1-2nd populations were high, while the data of the 3rd population were lower. The epidermis of the leaf is strongly cutinized and leaves are isolateral, the palisade mesophyll is found on both sides of the leaf. This is peculiar to xerophilous plants. The abundance of essential oils clearly indicates the healing characteristics of the plant and is the basis for studying of essential oils of the leaf. In the paper, also	Izbastina, K., Kurmanbayeva, M, Bazargaliyeva, A., Ablaihanova, N., Inelova, Z. , Moldakaryzova, A., Mukhtubaeva, S., Turuspekov, Y Morphological, anatomical structure and molecular phylogenetics of <i>Anthemis Trotzkiana</i> claus // Pakistan Journal of Botany, Volume No. 53(2): 2020. – P. 935-947

			<p>were determined unique molecular markers of the species and used for the creation of a phylogenetic tree. To clarify the taxonomic provision of rare <i>A. trozckiana</i> phylogenetic analysis based on the change of the sequence ITS nrDNA of Anthemideae representatives was conducted. For molecular research DNA analysis on phylogeny of <i>A. trozckiana</i> was conducted based on ITS (internal transcribed spacers) markers. Alignment of Anthemis sequences was performed using nucleotide sequences available at the NCBI and MEGA 6 package. The Neighbor Joining phylogenetic tree suggested that <i>A. trozckiana</i> along with <i>A. marschalliana</i>, <i>A. fuciculosa</i>, and <i>A. calcarea</i> form a single cluster within Tanacetum clade, while other Anthemis species formed a separate Anthemis clade.</p>	
47.	<p>NEUROPHARMACOLOGICAL EFFECTS OF QUERCETIN: A LITERATURE-BASED REVIEW</p>	<p>DOI: 10.3389/fphar.2021.665031 q1</p>	<p>ABSTRACT: Quercetin (QR) is a natural bioactive flavonoid that has been lately very studied for its beneficial properties in many pathologies. Its neuroprotective effects have been demonstrated in many in vitro studies, as well as in vivo animal experiments and human trials. QR protects the organism against neurotoxic chemicals and also can prevent the evolution and development of neuronal injury and neurodegeneration. The present work aimed to summarize the literature about the neuroprotective effect of QR using known database sources. Besides,</p>	<p>Islam, M.S., Quispe, C., Hossain, R., Islam, M.T., Al-Harrasi, A., Al-Rawahi, A., Martorell, M., Mamurova, A., Seilkhan, A., Altybaeva, N., Abdullayeva, B., Docea, A.O., Calina, D., Sharifi-Rad, J. Neuropharmacological Effects of Quercetin: A Literature-Based Review (2021) <i>Frontiers in Pharmacology</i>, 12, № 665031.</p>

			<p>this review focuses on the assessment of the potential utilization of QUR as a complementary or alternative medicine for preventing and treating neurodegenerative diseases. An up-to-date search was conducted in PubMed, Science Direct and Google Scholar for published work dealing with the neuroprotective effects of QUR against neurotoxic chemicals or in neuronal injury, and in the treatment of neurodegenerative diseases. Findings suggest that QUR possess neuropharmacological protective effects in neurodegenerative brain disorders such as Alzheimer’s disease, Amyloid β peptide, Parkinson’s disease, Huntington's disease, multiple sclerosis, and amyotrophic lateral sclerosis. In summary, this review emphasizes the neuroprotective effects of QUR and its advantages in being used in complementary medicine for the prevention and treatment o of different neurodegenerative diseases.</p>	
48.	<p>PASTORAL FARMING IN THE ILI DELTA, KAZAKHSTAN, UNDER DECREASING WATER INFLOW: AN ECONOMIC ASSESSMENT</p>	<p>DOI: https://doi.org/10.3390/agriculture10070281</p>	<p>ABSTRACT: Article River deltas provide the most productive pastures in Central Asia. Simultaneously they are highly vulnerable to water inflow changes. The aim of this study was to conduct an economic assessment of the short-and medium-term effect of reduced water inflow on farmers’ performance within the Ili Delta. Primary data were collected through 35 interviews with farmers and additional experts in</p>	<p>Baranowski, E., Thevs, N., Khalil, A., Baibagyssov, A., Iklassov, M., Salmurzauli, R., Nurtazin, S., Beckmann, V. Pastoral farming in the ili delta, Kazakhstan, under decreasing water inflow: An economic assessment (2020) Agriculture (Switzerland), 10 (7), статья № 281, pp. 1-29.</p>

			<p>2015. Production parameters for three types of individual farms were estimated and entered into a full cost accounting. Contribution margins were calculated for three scenarios: (I) sufficient water inflow (normal situation), (II) decreasing water inflow, and (III) significantly reduced water inflow (worst case). Farmers purchase hay to adapt to pasture production loss due to decreasing water inflow. This more than doubled the variable costs of worst case in comparison to normal situation for small-, medium-, and large-scale type of individual farm. Monte Carlo simulation indicates a risk of 74% (small-scale farm) and 3% (medium-scale farm) that already variable costs will exceed revenues. 2020 by the authors. Licensee MDPI, Basel, Switzerland.</p> <p>КЛЮЧЕВЫЕ СЛОВА АБТОРА: Central Asia; Contribution margin analysis; Ili Delta; Individual farm; Monte Carlo simulation; Net farm income from operations; Pastoral farming.</p>	
49.	<p>PHOTOSYNTHETIC ACTIVITY OF TRITICUM DICOCCUM × TRITICUM AESTIVUM ALLOPLASMIC LINES DURING VEGETATION IN CONNECTION WITH PRODUCTIVITY TRAITS</p>	<p>DOI: 10.32615/PS.2021.003 (IF=3,09; Q1 IN PLANT SCIENCES).</p>	<p>ABSTRACT: Drought is a key stressor under global climate change conditions around the world. Triticum dicoccum Shuebl is a species with high potential drought tolerance. Photosynthesis is the primary physiological process affected by water deficit. Rapid light curves (RLCs),</p>	<p>Terletskaya, N. V., Stupko, V. Y. U., Altayeva, N. A., Kudrina, N. O., Blavachinskaya, I. V., Kurmanbayeva, M. S., & Erezhetova, U. (2021). Photosynthetic activity of triticum dicoccum × triticum aestivum alloplasmic lines during vegetation in connection with productivity traits under</p>

	<p>UNDER VARYING MOISTER CONDITIONS</p>		<p>recorded using PAM-fluorometers, appear suitable for drought tolerance determination in breeding material. Chlorophyll fluorescence parameters at different vegetation stages, morphophysiological traits, and their relationship with the productivity were analyzed in nine alloplasmic lines (allolines) of <i>T. dicoccum</i> Shuebl × <i>T. aestivum</i> L. partially exposed to drought conditions. Quantum yield parameters at the beginning of RLC at the early vegetation stages correlated with the productivity of investigated lines. Parameters related to photosynthetic capacity had a stronger correlation with the productivity at the stages of subflag and flag formation. For drought tolerance screening, quantum yield of nonorganized energy passive dissipation is particularly promising. Chlorophyll fluorescence and productivity data confirm the potential of the presented breeding strategy in allolines D-d-05 and D-d-05b</p>	<p>varying moister conditions. <i>Photosynthetica</i>, 59(1), 74-83.</p>
<p>50.</p>	<p>QUALITY OF DRINKING WATER IN THE BALKHASH DISTRICT OF KAZAKHSTAN'S ALMATY REGION</p>	<p>DOI: https://doi.org/10.3390/w12020392</p>	<p>ABSTRACT: The thinly populated Balkhash District of Kazakhstan's Almaty Region lies in the lower reaches of the Ili-Balkhash basin, which is shared by China and Kazakhstan. The district is arid and heavily dependent on inflows of surface water, which are threatened by the effects of upstream population growth, economic development, and climate change. The</p>	<p>Nurtazin, S., Pueppke, S., Ospan, T., Mukhitdinov, A., Elebessov, T. Quality of drinking water in the Balkhash district of Kazakhstan's almaty region (2020) <i>Water (Switzerland)</i>, 12 (2), статья № 392, .</p>

			<p>quality of drinking water from centralized water systems and tube wells in nine villages of the district was analyzed, and the organoleptic properties of water from these sources was also assessed by an expert and via surveys of local residents. Although most samples met governmental standards for the absence of chemical impurities, high concentrations of mineralization, chlorides, boron, iron, and/or uranium were present in some well water samples. Levels of these pollutants were as much as 4-fold higher than governmental maxima and as much as 16-fold higher than concentrations reported previously in surface water. All centralized water samples met standards for absence of microbial contamination, but total microbial counts in some well water samples exceeded standards.</p> <p>КЛЮЧЕВЫЕ СЛОВА АБТОРА: Ili-Balkhash basin; Organoleptic analysis of groundwater; Risk identification and assessment; Rural Kazakhstan; Water quality.</p>	
51.	<p>THE CONTENT OF HEAVY METALS IN PLANTS OF PHYTOCENOSES OF FORMER STORAGE FACILITIES FOR PESTICIDES AT THE POINT OF BESQAYNAR, KYZYLKAIKAT, AND TAUKARATURYK</p>	<p>PAKISTAN JOURNAL OF BOTANY, VOLUME NO. 53(2): 2021. – P. 511-516 (IF 0.972, Q3 IN PLANT SCIENCES) DOI: 10.30848/PJB2021-2(33)</p>	<p>ABSTRACT: This article presents data on the determination of heavy metals (Pb⁺², Zn⁺², Cu⁺², Fe⁺², Ni⁺², Co⁺³, Mn⁺², Cr⁺², Cd⁺²) in plant samples collected from Almaty Region, Talgar District of Kazakhstan. For a number of reasons, plants cannot absorb</p>	<p>Inelova Z., Nurzhanova A., Yerubayeva G., Aitzhan M., Djansugurova L., Bekmanov B. The content of heavy metals in plants of phytocenoses of former storage facilities for pesticides at the point of Besqaynar, Kyzylkairat, and Taukaraturyk // Pakistan Journal of</p>

			<p>most of the heavy metals and, unlike animals, are able to accumulate them in large quantities. The following points were selected for sampling: Control point – Taukarutuk, 2 point – Besqaynar and 3 point – Kyzylkairat. <i>Rumex confertus</i>, <i>Artemisia annua</i>, and <i>Trifolium pratense</i> were identified as the most highly accumulating species of heavy metals in all three monitoring groups. It was investigated that, in the studied points, Besqaynar and Kyzylkairat, all presented plant samples have a large adsorption capacity for such elements as Cd^{+2} and Zn^{+2}. © 2021, Pakistan Botanical Society. All rights reserved.</p>	<p>Botany, Volume No. 53(2): 2021. – P. 511-516</p>
52.	<p>THE INFLUENCE OF ABIOTIC STRESS FACTORS ON THE MORPHOPHYSIOLOGICAL AND PHYTOCHEMICAL ASPECTS OF THE ACCLIMATION OF THE PLANT RHODIOLA SEMENOWII BORISS.</p>	<p>DOI: 10.3390/plants10061196 (if=4,19; q1 in biological sciences).</p>	<p>ABSTRACT: Plants of the Crassulaceae family are natural accumulators of many medicinal secondary metabolites (SM). This article describes the study of morphophysiological, anatomic and phytochemical responses of immature plants of <i>Rhodiola semenovii</i> under water deficit and (or) cold-stress conditions. Changes in biomass production due to water content in plant tissues such as a decrease in water deficit and an increase in cold stress were revealed. A significant decrease in the efficiency of the photosynthetic apparatus under stress conditions was noted, based on the parameters quantum efficiency of Photosystem II and electron transport rate and energy dissipated in Photosystem II.</p>	<p>Terletsкая, N. V., Korbozova, N. K., Kudrina, N. O., Kobylina, T. N., Kurmanbayeva, M. S., Meduntseva, N. D., & Tolstikova, T. G. (2021). The influence of abiotic stress factors on the morphophysiological and phytochemical aspects of the acclimation of the plant <i>rhodiola semenovii boriss</i>. <i>Plants</i>, 10(6)</p>

			<p>The greatest decrease in efficiency was pointed out in conditions of water shortage. The anatomical modulations of root and shoot of <i>R. semenovii</i> under stress conditions were found. For the first time, a detailed study of the chemical composition of the ethanol extract of root and shoot of <i>R. semenovii</i> under stress was carried out using gas chromatography–mass spectrometry. The qualitative and quantitative composition of SM associated with acclimation to the effects of abiotic stresses was determined. Both nonspecific and specific phytochemical changes caused by the action of water deficiency and cold treatment were identified. It has been shown that the antioxidant system in plant tissues is complex, multicomponent, depending on a number of natural and climatic factors. Further research should be focused on the use of abiotic stressors for the targeted synthesis of bioactive SMs valuable for pharmaceutical use.</p>	
53.	<p>ZOOPLANKTON COMMUNITY STRUCTURE IN SHALLOW SALINE STEPPE INLAND WATERS</p>	<p>WATER JOURNAL. – 2021. - 13(9).- 1164 P. (Q2, IF 3.103 ENVIRONMENTAL SCIENCES WATER RESOURCES)</p> <p>DOI: 10.3390/W13091164</p>	<p>ABSTRACT: Several shallow saline waters can be found in Central Asia in arid steppe climate, but our knowledge of their zooplankton community has been so far rather limited. The aim of our research was to provide data on the steppe zooplankton community in a large-scale regional study. Therefore, a baseline survey was carried out in 23 shallow inland waters of different salinity in Northern Kazakhstan. We measured the quantity and identified the taxonomic</p>	<p>Zsuga K., Inelova Z., Boros E. Zooplankton Community Structure in Shallow Saline Steppe Inland Waters // Water Journal. – 2021. - 13(9).- 1164 p.</p>

			<p>composition of zooplankton in the spring period and examined changes in community structure in correlation with salinity. Lesser salt concentration of the hyposaline–mesosaline waters was indicated by the presence of halophilic rotifer species: <i>Brachionus asplanchnoides</i> Br. <i>dimidiatus</i>, Br. <i>plicatilis</i>. Mesosaline and hypersaline waters were indicated by the presence of halobiont crustaceans: <i>Moina salina</i>, <i>Arctodiaptomus salinus</i>, <i>Cletocamptus retrogressus</i>. Very high concentration of salt was indicated by presence of <i>Artemia</i> alone which is the only group, that can tolerate and adapt to this extreme environment. In the hypersaline waterbodies at over 79 gL⁻¹ high TDS conditions a very simple tropical structure was found. <i>Artemia</i> playing monopolistic ecological function in the zooplankton community. We identified three characteristic groups of shallow inland saline waters based on their zooplankton composition.</p>	
54.	<p>THE EFFECT OF ROCKET FUEL ON THE MORPHOLOGICAL AND MORPHOMETRIC CHARACTERISTICS OF THE LUNGS OF RATS</p>	<p>DOI: https://plu.mx/a/-nfplhzsvoaqzllaee0aykw58wymxoda5nbufqn28ia</p>	<p>ABSTRACT: It is important to study the impact of the Baikonur, Saryshagan, Azgyr space rocket test sites located on the territory of Kazakhstan, as well as Kapustin Yar, which is very close to the border, on the landscape, animal habitat and local health and determine the impact. The areas in several areas where the detachable parts of the rocket launchers have fallen occupy a very large area [1]. The areas of collapse of</p>	<p>Abdullayeva B.A., Shalakhmetova T.M., Musanova G.A., Zharkova I.M., Askarbayeva K.A., Chunetova Zh.Zh., Kozhabayeva E. The effect of rocket fuel on the morphological and morphometric characteristics of the lungs of rats // <i>Systematic Reviews in Pharmacy</i> Том 11, Выпуск 12, Страницы 709 - 715 December 2020</p>

			<p>the detachable parts of the rocket launchers belong to the category of "ecological disaster zone" according to their ecological status, and the areas affected by these parts belong to the "ecological crisis zone". The atmosphere, natural and anthropogenic landscapes are heavily polluted with all classes of harmful substances: Asymmetric dimethylhydrazine (1,1-DMG), nitrosodimethylamine (NDMA), nitrogen tetraoxide, tetramethyltetrazen and other toxic substances [2-4]. Rocket complexes and rocket launches have a negative impact on all components of the environment and biological objects. There are reports that the number of animals living around the landfill is declining sharply, and some species are on the verge of extinction [1; 5]. Due to these circumstances, there is a need for regular environmental monitoring of these areas and morphological study of the structural components of the animals that inhabit these areas, arising from the current environmental situation in the country. There are reports that heptyl or asymmetric dimethylhydrazine, one of the main components of rocket fuels and lubricants, causes various diseases when ingested by humans and animals due to an accident or other circumstances during a rocket launch [2-3; 5]. 1,1- DMG is converted into other compounds in the soil, plants, as well as in the body, which in turn appears to be toxic to the body in general or to a particular organ [4]. © 2020</p>	
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			EManuscript Technologies. All rights reserved.	
55.	SCREENING OF WHEAT GENOTYPES FOR THE PRESENCE OF COMMON BUNT RESISTANCE GENES	HTTPS://DOI.ORG/10.1016/J.SJBS.2021.02.013 OPEN ACCESS JOURNAL SJR-0.710, ПРОЦЕНТИЛЬ 90	ABSTRACT: Common bunt is known to cause grain yield and quality losses in wheat due to bunt ball formation and infestation of the grain. The aim of this study is to identify for sources of resistance to common bunt in wheat genotypes using phytopathological and molecular methods. In general, studied 60 Kazakh and foreign wheat genotypes were found 15 samples with the Bt9, Bt8 and Bt11 genes. Carriers of the Bt10 gene include the five varieties. The four resistance genes, Bt8, Bt10, Bt11, Bt9, and Bt10 were identified in the Karasai variety. Phytopathological and molecular screening of Kazakh and foreign wheat genotypes selected 18 with genes for resistance to the disease. According to evaluation on an artificial infection 19 varieties showed an immune type of reaction. These varieties will be used in breeding programs as donors to create resistant varieties against the common bunt. Thus, approaches can reduce the level of fungicides use and the most effective method to control the common bunt.	Madenova A., Sapakhova Z., Bakirov S., Galymbek K., Yernazarova G., Kokhmetova A., Keishilov Zh Saudi Journal of Biological Sciences Volume 28, Issue 5, May 2021, Pages 2816-2823
56.	EFFECT OF COMMON BUNT (TILLETIA CARIES (DC) TUL) INFECTION ON AGRONOMIC TRAITS AND RESISTANCE OF WHEAT ENTRIES	DOI: 10.31830/2348-7542.2020.121 (ИМПАКТ ФАКТОР ЖУРНАЛА - SJR-0,24 SCOPUS, ПРОЦЕНТИЛЬ 38)	ABSTRACT: Wheat common bunt is a serious disease that may causes to yield losses of about 75-80% in wheat producing countries including Kazakhstan. This study	Madenova, A., Kokhmetova, A., Sapakhova, Z., Galymbek, K., Keishilov, Zh., Akan, K., Yesserkenov, A. Res. On Crops. 2020. 21 (4): 791-797

			<p>conducted during 2019 and 2020 at Almaty Region, Kazakhstan, aimed to screen Romanian and Turkish wheat entries for resistance to common bunt <i>Tilletia caries</i> (DC) Tul. As a result of the research, promising wheat entries were identified which are designed to increase resistance to common bunt. The seeds of different wheat genotypes were artificially inoculated with a mixture of the pathogen teliospores and planted in Almalyk village, Almaty region, Kazakhstan. Disease assessment for each genotype carried out at the maturity stage. The results showed that most of the tested wheat entries demonstrated a susceptible, moderate susceptible or resistant reaction to the disease. While such wheat entries, as five Romanian (RETEZAT, 02429GP-1, F08347G8, F06393GP10, F07270G2), one Turkish (262-TREGO/BTYSIB//ZARGANA-6/4/AU/CO652337//2*CA8-155/3), and one Kazakh wheat variety Almaly showed a high level of disease resistance. It was found that the combination of common bunt a complex of agronomically valuable traits distinguishes in wheat entries KATEA-1/3/059E//JAGGER/PECOS/4/AU/CO652337//2*CA8-155/3/F474S1-1.1,338K11//ANB/BUC/3/GS50A/4/TREGO/JGR8W/5/WELS2,TAM105/3/NE70654/BBY//BOW”S”/4/CENTURE*3/TA2450/5/TX71A1039.V1*3/AMI/BUC/HR-</p>	
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			C/6/ZARGANA3/ 6/BONITO-36,F08245G1, and PARTENER and exceeded standard variety Almaly. The identified resistant genotypes will be valuable in the breeding programs of Kazakhstan for the development of common bunt resistant wheat varieties. © 2020, Gaurav Society of Agricultural Research Information Centre. All rights reserved.	
57.	FUNCTIONAL-MORPHOLOGICAL FEATURES OF ENTEROSORBENT IN ANIMAL CELLS	DOI: 10.31838/SRP.2020.12.174 N/A	<p>ABSTRACT: Today it is impossible to present any human activity that is directly or indirectly not affected by live organisms of toxic substances that continue to grow. Studying the pathomorphology of change caused by and the effect of toxic substances at the intercellular and interfabric level plays a large role in understanding the pathogenesis of various diseases. One avenue of studying intercellular and interfabric relationship is the identification of interaction between fabrics facing impact of toxic substances. In the human body, this is especially relevant as the relationship between fabrics and their cellular elements helps to reveal morphofunctional features of cells. Toxic substances acting on an organism triggers morphofunctional processes that lead to destructive changes in organisms. Chronic poisoning with cadmium and lead, for instance, destroys animal cells, leading to the dysfunction of internal organs. An excess of cadmium</p>	<p>Yessimsiitova Zura, Ablaihanova Nurzhanyat, Tleubekkyzy Perizat, Beken Zaure, Ussipbek Botagoz, Kairat Bakytzhan, Yessenbekova Arailym, Functional-morphological features of enterosorbent in animal cells. Systematic Reviews in Pharmacy, 2020, 11(12), стр. 1190–1194 DOI: 10.31838/srp.2020.12.174</p>

			<p>interferes with the metabolism of metals, especially iron and calcium, distorts the effect of zinc and other metal enzymes, blocks sulfhydryl groups of enzymes and interrupts DNA synthesis. Lead interferes with biosynthesis, and is considered the strongest neurotoxin, causing aggressive reactions where it is present. In this experiment, morphological changes in the internal organs of white, not purebred, rats that are given 1.5 mg/kg of cadmium and 25 mg/kg of lead in an enterosorbent are investigated using 1 g/kg Ingo2 within 30 days of its use. Two groups of rats show strong destructive changes in their internal organs i.e. necrosis, puffiness, gidropic dystrophy, reduced pathological processes and increased compensatory reaction. Two other groups of rats show the effects of damage due to poisoning, but these effects are reduced after use of enterosorbent Ingo2. The results of this research demonstrate that the enterosorbent Ingo2 promotes efficiency in occluding cations of lead and cadmium.</p>	
58.	<p>ISSUES OF TYPE 2 DIABETES DISEASE EFFECTIVE TREATMENT IN KAZAKHSTAN</p>	<p>DOI: 10.29169/1927-5951.2020.10.03.5 (IF = 0.141; Q3 IN GENERAL PHARMACOLOGY, TOXICOLOGY AND PHARMACEUTICS)</p>	<p>ABSTRACT: In his address to the people, the First President of our country, emphasized the need to introduce innovative methods of treating socially significant diseases. Among these diseases, diabetes holds a special position. More than 14,000 new cases of diabetes mellitus are officially detected annually in Kazakhstan.</p>	<p>N.T. Ablaihanova, A.Y. Yessenbekova, Tazhiyeva Aigul, Z.B. Yessimsiitova, A.K. Saidakhmetova, A.E. Malibayeva, B.J. Sanbaeva, M. Molsadykkyzy. Issues of type 2 diabetes disease effective treatment in Kazakhstan. Journal of Pharmacy and Nutrition Sciences, 2020, 10(3), стр. 116–122 DOI: 10.29169/1927-5951.2020.10.03.5</p>

			<p>The real picture of the disease is difficult to compare with these data. This review discusses the prevalence of type 2 diabetes among the population of the Republic of Kazakhstan, and the causing factors such as age, race, genetic predisposition (OR = 3), obesity, glucose level and total cholesterol etc.</p> <p>It was found that the main complications and concomitant diseases of diabetes in residents of different regions are polyneuropathy – 22.4%, diabetic retinopathy – 14%, diabetic foot syndrome – 13.6%, arterial hypertension – 13.6% and coronary heart disease (CHD) – 14.4%. Only 1.8% of the population is diagnosed with type 2 diabetes, latent manifestations of type 2 diabetes mellitus, one in four people in Kazakhstan can be sick, 38% of adults aged 20-79 suffer from prediabetes, and 8.2% with diabetes. It is believed that by 2030 in Kazakhstan, there may be about a million patients with diabetes.</p> <p>Diabetes mellitus, in accordance with the Code of the Republic of Kazakhstan “On the health of the people and the health care system” belongs to the category of socially significant diseases.</p> <p>Therefore, the study of type 2 diabetes is one of the urgent problems of the public health in Kazakhstan.</p>	
59.	ESTIMATION OF EFFICIENCY OF USE OF DAIRY PRODUCTS ENRICHED WITH ENTER SORBENT DIETARY FIBERS ON	DOI: 10.29169/1927-5951.2020.10.03.3 (IF = 0.141; Q3 IN GENERAL PHARMACOLOGY,	ABSTRACT: At all times, the problem of healthy and wholesome food has been one of the most important problems facing human society.	N. Ablaihanova, Z. Yessimsiitova, U. Amzeyeva, A. Mukhitdinov, S. Mankibaeva, A. Zorbekova, S.N. Abdreshov, A. Kozhamzharova, A.

	IMMUNOPHYSIOLOGICAL INDICATORS OF THE RAT ORGANISM	TOXICOLOGY AND PHARMACEUTICS)	<p>This problem cannot be solved by simply increasing the amount of food consumed. Plant-based antioxidants are widely used for the prevention and treatment of diseases with the aim of eliminating free radicals from the body and restoring the body's antioxidant defense system. The article shows biochemical indicators that reflect the nature of changes in the early stages of the formation of response of the animal organism during toxic poisoning and the use of sour-milk products using enter sorbent dietary fiber from rice husk. With an increase in the dosage and frequency of CCl4 administration, the effect of deep poisoning and impaired lymph dynamics was obtained. Along with a decrease in the content of total protein and urea in lymph and blood plasma, an increase in ALT and AST levels in blood plasma by 2.5–3 times, as well as an increase in thymol test, were noted. Antioxidant defense mechanisms are universal in order to increase the body's vitality.</p>	<p>Konysbayeva,S. Tuleukhanov. Estimation of Efficiency of Use of Dairy Products Enriched with Enter Sorbent Dietary Fibers on Immunophysiological Indicators of the Rat Organism. Journal of Pharmacy and Nutrition Sciences, 2020, 10(3), стр. 92–100. DOI: 10.29169/1927-5951.2020.10.03.3</p>
60.	THE TRANSFORMATION OF ECOSYSTEMS OF THE ILI RIVER DELTA (KAZAKHSTAN) UNDER THE FLOW REGULATION AND CLIMATE CHANGE	<p>DOI: 10.15666/AEER/1802_24832498 (IF = 1,1; Q3 IN AGRONOMY AND CROP SCIENCE)</p>	<p>ABSTRACT: This paper presents the results of a study on the main reasons for the transformation of wetland ecosystems in the Delta of the Ili River in the period of 1979-2014. The study results are shown based on the analysis of multi-temporal satellite data Landsat, dynamics of hydrological regime of the river Ili,</p>	<p>Mukhitdinov, A., Nurtazin, S., Alimova, S., AblaihanovA, N., Yessimsiitova, Z., Salmurzauly, R., Margulan, I., Mirasbek, Y. The transformation of ecosystems of the ili river delta (Kazakhstan) under the flow regulation and climate change. Applied Ecology and Environmental Research, 2020, 18(2), стр. 2483–2498. DOI: 10.15666/aeer/1802_24832498</p>

			<p>climate conditions and features of economic activities of the local community, as well as fieldwork in the study region. Analysis of area changes of main types of hydromorphic and semi-hydromorphic ecosystems of Delta river Ili in high and medium on water discharge in the following (1979, 1993, 2000, 2010, and 2015) years. Increasing water consumption in China and in Kazakhstan part of the Ili-Balkhash basin due to the development of the agrarian and municipal sectors of economy especially in China, significantly exceed increasing flow of Ili River, caused by regional warming in the catchment part of Ili River Basin. The global warming has intensified the degradation of glaciers in mountain catchment areas of Ili River, this in the near future threatens with a decline in river flow and as a consequence lead to the deterioration of delta ecosystems and the desiccation of lake Balkhash similarly to the ecological disaster of the Aral Sea. Analysis of long-term (from 1970 to 2013) climatic data from three meteorological stations demonstrated a trend of the regional increase of average annual air temperature by 1.4 °C and decreasing of average annual precipitation by 10 mm. These factors also contribute to the transformation</p>	
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			process of hydromorphic ecosystems.	
61.	ЗАГРЯЗНЕНИЕ НЕФТЬЮ И СОПУТСТВУЮЩИМИ ТЯЖЕЛЫМИ МЕТАЛЛАМИ, РАДИОНУКЛИДАМИ И НАКОПЛЕНИЕ В ОРГАНИЗМЕ ГИДРОБИОНТОВ КАЗАХСТАНСКОЙ ЗОНЫ КАСПИЯ	DOI: 10.18799/24131830/2020/12/2939 (ИЗВЕСТИЯ ТОМСКОГО ПОЛИТЕХНИЧЕСКОГО УНИВЕРСИТЕТА, 2020, Т.331.- №12, СТР.60-67), IN SCOPUS.	ABSTRACT: Состояние экологической системы Каспийского моря и прибрежной зоны характеризуется как неблагоприятное. В ближайшей перспективе возможно резкое увеличение экологической нагрузки не только на казахстанской части Прикаспийско-го региона, но и по всей акватории средней и северной части моря. Причиной является интенсивное освоение нефтегазовых месторождений на континентальном шельфе Каспия (Кашаган). В составе добываемой нефти содержатся полиароматические углеводороды, представляющие широкий класс загрязнителей – устойчивых в окружающей среде органических соединений. Общеизвестно, что токсичные и канцерогенные эффекты полиароматических углеводородов обусловлены образованием их метаболитов. Пирен, относящийся к полиароматическим углеводородам, содержится во всех исследуемых пробах нефти. Установлено, что одним из основных метаболитов пирена является чрезвычайно токсичный бенз(а)пирен, обладающий сильнейшей канцерогенной активностью, способствующей возникновению опухолей в живых организмах.	Бигалиев А., Кожаметова А. Загрязнение нефтью и сопутствующие тяжелые металлы, радионуклиды в организме гидробионтов казахстанской зоны Каспия. Известия Томского политехнического университета. Инжиниринг георесурсов – 2020. – Т.331. - №12

			<p>Целью настоящего исследования является определение в организме тест-объектов пирена и его метаболита (бенз(а)пирена), а также сопутствующих нефтяному загрязнению тяжелых металлов и радионуклидов как объективного метода для оценки канцерогенного риска.</p> <p>В качестве тест-объектов (биоиндикаторов) из природных популяций отобраны гидробионты (рыбы, моллюски и полихета (<i>Nereis diversicolor</i>) и наземные обитатели прибрежной зоны Каспия – дождевые черви (<i>Eisenia fetida</i>). Методы атомно-адсорбционная спектрометрия и радиологические методы исследования. Проведен анализ способности гидробионтов и наземных представителей аккумулировать нефтепродукты, сопутствующие тяжелые металлы и радионуклиды. Изучены основные особенности накопления загрязнителей в организме тест-объектов, представляющих разные экосистемы исследуемой зоны; определена суммарная радиоактивность образцов.</p> <p>Проведено сравнение содержания нефтепродуктов, радионуклидов в органах и тканях гидробионтов.</p>	
62.	STUDY OF GENETIC EFFECTS OF RADIATION POLLUTION FROM CONTAMINATED	DOI: 10.26577/IJBCH.2020.V13.IL.09	ABSTRACT: An important element of the set of works to determine the degree of impact of	A. Bigaliev, L. Rihvanov, B. Bekmanov, A. Zamuraeva, L. Adilova, A. N. Kozhakhmetova. Study of genetic

	<p>TERRITORIES ON BIOTA AND HUMAN.</p>	<p>(INTERNATIONAL JOURNAL OF BIOLOGY AND CHEMISTRY - 2020. - 13, NO 1, 88), IN THOMPSON REUTER.</p>	<p>radiation contaminated territory on the environment and public health is the conduct of ecological-genetic and medical-biological research in the region. The purpose, the idea of this publication – based on the results of scientific research to analyze the current state of the habitat in radiation-contaminated territories. Genetic effects of the combined effect of radiation and non-radiation factors, unlike other mutagens, have not been studied sufficiently, and the results of this kind of research are rather contradictory. Industrial factors, the forceful action of full elementary evolutionary processes (mutational process, migration, isolation, etc.), can lead to qualitative transformations of the gene pool of populations. The study of chromosomal aberrations in natural populations and the human body acquires a special practical and theoretical significance in connection with the influence of factors of the changing habitat. In the review article the data of research obtained by using modern physics-chemical (AA-spectrometry, radiological), cytology and molecular-genetic methods are presented with the use of a complex of test systems in order to fully assess the effectiveness of the combined action of radiation and non-radiation factors. Observations in the field and experiments made it possible to establish a previously unknown fact that complexes of soil animals with chronic irradiation with doses of the order of 0.5-</p>	<p>effects of radiation pollution from contaminated territories on biota and human. International Journal of Biology and Chemistry - 2020. - 13, No 1, 88</p>
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			20 mSv/day experience clearly recorded oppression. Especially sensitive are earthworms <i>Eisenia fetida</i> . The quantitative dependence of the spectrum of structural and numerical aberrations of chromosomes was studied. The frequency of cells with chromosome aberrations averages 2.4%. Both structural (93.6%) and numerical aberrations (6.4%) of chromosomes were revealed. Among the cells with chromosome structure disorders, chromosomal type aberrations (67.04%) over chromatid (32.95%) prevailed, which indicates a predominant radiation exposure.	
63.	ЭКОЛОГО-ГЕНЕТИЧЕСКАЯ ОЦЕНКА ПОСЛЕДСТВИЙ ВЛИЯНИЯ РАДИАЦИИ НА ЗАГРЯЗНЕННЫХ ТЕРРИТОРИЯХ.	DOI: 10.18699/VJ20.675 (ВАВИЛОВСКИЙ ЖУРНАЛ ГЕНЕТИКИ И СЕЛЕКЦИИ. 2020;24(7):794-801), IN SCOPUS.	ABSTRACT: Объектами исследования являются районы Западно-Казахстанской области Республики Казахстан, прилегающие к полигону Капустин Яр: Бокейординский, Жангалинский, Жанибекский, Казталовский, Акжайыкский и Сырымский. Цель работы – радиоэкологическое обследование загрязненных территорий и исследование содержания загрязнителей в объектах среды, биоте (грызунах, рыбах и биосубстратах домашних животных) физико-химическими методами для оценки воздействия полигона на биоту и человека. Представлены результаты экспедиционных и лабораторных исследований объектов окружающей среды прилегающих к полигону	Бигалиев А.Б., Шалабаева К.З., Шимшиков Б.Е., Кобегенова С.С., Адилова Л.М., Кожахметова А.Н., Шарахметов С., Бурханова М.Н. Эколого-генетическая оценка последствий влияния радиации на загрязненных территориях. Вавиловский журнал генетики и селекции. 2020;24(7):794-801. DOI 10.18699/VJ20.675

			<p>районов. Приведены показатели гамма-съемки уровней радиационного фона обследуемых территорий, данные о загрязнении почвы, поверхностных и подземных вод, доминантных форм растений, биосубстратов (шерсти домашних животных: верблюда, лошади, коровы). Используются стандартные способы отбора проб, общепринятые методы исследования: радиологический и цитогенетический (микроядерный), атомно-абсорбционная спектрофотометрия. Проведено рекогносцировочное и радиоэкологическое обследование объектов окружающей среды с использованием аналитических методик, что позволило определить количественное содержание токсичных компонентов, приоритетных загрязнителей и радиоактивных изотопов. Установлено, что значения объемной активности природных и техногенных радионуклидов в пробах почвы, питьевой воды и биосубстратах (шерсти домашних животных, образцах периферической крови человека) из населенных пунктов соответствуют величине контрольного уровня для данного региона. Измерения гамма-излучений показали, что по периметру территории полигона и в близлежащих населенных пунктах уровень радиации находится в пределах 0.06–0.14 мкЗв/ч. Незначительное превышение уровня радиоактивности сохраняется вблизи</p>	
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64.	<p>TOXIC AND GENOTOXIC ACTIVITY OF RIVER WATERS OF THE KAZAKHSTAN</p>	<p>DOI: 10.1016/J.CHNAES.2021.01.011 (40 ПРОЦЕНТИЛЬ В ENVIRONMENTAL SCIENCE)</p>	<p>ABSTRACT: In this study, physicochemical, genotoxic, and mutagenic properties of water samples from 10 rivers of the Almaty region (Kazakhstan) were evaluated. Results: The results of the study demonstrated an increased level of mineralization and electrical conductivity that might be caused by the high concentration of dissolved mineral salts and ions such as Na⁺, K⁺, Ca²⁺, Cl⁻, SO₄²⁻, HCO₃⁻. The excess of Maximum Allowable Concentrations (MACs) for various heavy metals was revealed. The results of tests using the pXen7-lux biosensor showed toxic effects of river waters. At the same time, the studies involved lux biosensors pRecA-lux, pColD-lux, pSoxS-lux, pKatG-lux did not find any genotoxic and oxidative effects. However, toxicity and mutagenicity of the studied water samples was detected by using plant test (<i>Allium cepa</i> and <i>Hordeum vulgare</i>). Phytotoxic, cytotoxic (decrease in the mitotic index) and mutagenic (increase in the frequency of chromosomal aberrations) activity of the water samples was observed. The data of</p>	<p>Lovinskaya A., Kolumbayeva S., Begimbetova D., Suvorova M., Bekmagambetova N., Abilev S. Toxic and genotoxic activity of river waters of the Kazakhstan // <i>Shengtai Xuebao (Acta Ecologica Sinica)</i>. – 2021. - DOI: 10.1016/j.chnaes.2021.01.011</p>

			in vivo tests (<i>Danio rerio</i>) showed the high toxicity and teratogenicity of river waters for fish embryos at all stages of development. Conclusions: The results of this comprehensive study indicate that the contamination of the surface natural waters poses a threat to rivers dwellers and the human population in the rivers areas.	
65.	PHYTOREMEDIATION POTENTIAL OF MISCANTHUS SINENSIS AND IN ORGANOCHLORINE PESTICIDES CONTAMINATED SOIL AMENDED BY TWEEN 20 AND ACTIVATED CARBON	HTTPS://DOI.ORG/10.1007/S11356-020-11609-Y	ABSTRACT: The organochlorine pesticides (OCPs) have raised concerns about being persistent and toxic to the environment. Phytoremediation techniques show promise for the revitalization of polluted soils. The current study focused on optimizing the phytoremediation potential of <i>Miscanthus sinensis</i> And. (<i>M. sinensis</i>), second-generation energy crop, by exploring two soil amendments: Tween 20 and activated carbon (AC). The results showed that when <i>M. sinensis</i> grew in OCP-polluted soil without amendments to it, the wide range of compounds, i.e., α -HCH, β -HCH, γ -HCH, 2,4-DDD, 4,4-DDE, 4,4-DDD, 4,4-DDT, aldrin, dieldrin, and endrin, was accumulated by the plant. The introduction of soil amendments improved the growth parameters of <i>M. sinensis</i> . The adding of Tween 20 enhanced the absorption and transmigration to aboveground biomass for some OCPs; i.e., for γ -HCH, the increase was by 1.2, for 4,4-DDE by 8.7 times; this effect was due to the reduction of the hydrophobicity which made pesticides	Mamirova A., Pidlisnyuk V., , Amirbekov A., Ševců A., Nurzhanova A. Phytoremediation potential of <i>Miscanthus sinensis</i> and in organochlorine pesticides contaminated soil amended by Tween 20 and Activated carbon // Environmental Science and Pollution Research (2021) 28:16092–16106. Web science. Q 2, Impact Factor: 2.914.

			<p>more bioavailable for the plant. The adding of AC reduced OCPs absorption by plants, consequently, for γ-HCH by 2.1 times, 4,4-DDD by 20.5 times, 4,4-DDE by 1.4 times, 4,4-DDT by 8 times, α-HCH was not adsorbed at all, and decreased the translocation to the aboveground biomass: for 4,4-DDD by 31 times, 4,4-DDE by 2.8 times, and γ-HCH by 2 times; this effect was due to the decrease in the bioavailability of pesticides. Overall, the amendment of OCP-polluted soil by Tween 20 speeds the remediation process, and incorporation of AC permitted to produce the relatively clean biomass for energy.</p>	
66.	<p>PLANT–MICROBE ASSOCIATIONS IN PHYTOREMEDIATION.</p>		<p>ABSTRACT: Microorganisms are important partners with plants in phytotechnolog applications. Plant–microbe relationships in phytoremediation include those of rhizobacteria which colonize root surfaces and biodegrade organic contaminants and other organic matter; endophytic bacteria that colonize the inner surface of plant stems and biodegrade organic compounds; and plant growth promoting bacteria (PGPB) that have beneficial effects for plants. Plants produce organic substrates for the microbial populations. Because of root exudates, there are healthy numbers of bacteria near root surfaces that help with nutrient cycling and other ecosystem services. There is an emphasis on plant–microbe associations with</p>	<p>Nurzhanova A., Mamirova A., Trögl J., Nebeská D., Pidlisnyuk V. Plant–Microbe Associations in Phytoremediation –. Phytotechnology with Biomass Production: Sustainable Management of Contaminated Sites / ed. Erickson L.E., Pidlisnyuk V.V. CRC press Taylor & Francis Group, - 2021. - P. 123–140. Web science Identifiers: LCCN 2021021263 (print) LCCN 2021021264 (ebook) ISBN 9780367522803 (hardback) ISBN 9781003082613 (ebook)</p>

			Miscanthus; studies are conducted with and without PGPBs in soils contaminated with metals. Effects of PGPBs on bioconcentration factor and translocation factor are reported for Miscanthus growing in metal contaminated soil.	
67.	ECOLOGICAL RISK ASSESSMENT AND LONG-TERM ENVIRONMENTAL POLLUTION CAUSED BY OBSOLETE UNDISPOSED ORGANOCHLORINE PESTICIDES	HTTPS://DOI.ORG/10.1080/03601234.2021.1913931	<p>ABSTRACT: Obsolete organochlorine pesticides (OSPs) are currently prohibited as persistent organic pollutants that contaminate the environment. If undisposed, they continue to pollute soil and water, to accumulate in the food chain and to harm plants, animals and the human body. The aim of the study was to assess water and soil pollution around the storehouses of undisposed, banned OSPs and their possible genotoxic effect. The storehouses in four villages near Almaty, Kazakhstan were investigated. Chemical analysis confirmed contamination of water and soil around storehouses with OSPs. The genotoxic effect of water and soil samples was evaluated using model objects: <i>S.typhimurium</i>, <i>D.melanogaster</i>, sheep lymphocytes cultures and human lymphocytes cultures. It was found that water and soil samples caused mutagenic effect in all model systems. They increased the frequency of revertants in <i>Salmonella</i>, the frequency of lethal mutations in <i>Drosophila</i> chromosomes, and the frequency of chromosome aberrations in cultures of human and sheep lymphocytes. Although a genotoxic effect was</p>	<p>Mit N., Cherednichenko O., Mussayeva A., Khamdiyeva O., Amirgalieva A., Begmanova M., Tolebaeva A., Koishekenova G., Zaypanova S., Pilyugina A., Amandykova M., Tlenshieva A. Nurzhanova, A., Mamorova A. <u>Bekmanov</u> B., <u>Djansugurova</u> L. Ecological risk assessment and long-term environmental pollution caused by obsolete undisposed organochlorine pesticides .. JOURNAL OF ENVIRONMENTAL SCIENCE AND HEALTH, PART B 2021, VOL. 56, NO. 5, 490–502 https://doi.org/10.1080/03601234.2021.1913931 Scopus/ Impact Factor: 1.990</p>

			demonstrated for each of these models, various models showed different sensitivity to the effects of pesticides and they varied degree of response. The association between the total content of OCPs in soil and the level of mutations for different model systems was discovered.	
68.	POTENTIAL ROLE OF PLANT GROWTH-PROMOTING BACTERIA IN MISCANTHUS X GIGANTEUS PHYTOTECHNOLOGY APPLIED TO THE TRACE ELEMENTS CONTAMINATED SOILS	HTTPS://DOI.ORG/10.1016/J.IBIOD.2020.105103	<p>ABSTRACT: The second-generation energy crop <i>Miscanthus x giganteus</i> (<i>M. xgiganteus</i>) is a perspective plant for phytoremediation of contaminated lands and the production of biomass. The excellent quality biomass can be ensured by adding soil amendments or inoculation of the plant by plant growth-promoting bacteria (PGPB). The main goal of the current study was to research the influence of PGPB <i>Bacillus altitudinis</i> strain KP-14 isolated from the post-mining aged contaminated soil in Všebořice dump, Ústí nad Labem to the phytoremediation parameters and biomass production of <i>M. xgiganteus</i>. The experiment was done in the greenhouse conditions using the initial aged soil contaminated by the following trace elements (TEs): V, Cr, Mn, Ni, Cu, Zn, Sr, Pb and the same aged soil, additionally artificially contaminated by Pb. The results showed that PGPB treatment increased the growth process and leaves, stems, and roots biomass at harvest by 49%, 86%, and 76%, respectively. In the presence of <i>B. altitudinis</i> strain KP-14, the translocation factor decreased, the uptake index of TEs remained low and the</p>	Pidlisnyuk V., Mamirova A., Pranaw K., Shapoval P., Trogl J., Nurzhanova A. Potential role of plant growth-promoting bacteria in <i>Miscanthus x giganteus</i> phytotechnology applied to the trace elements contaminated soils // International Biodeterioration & Biodegradation. – 2020. – Vol. 155. – P. 105103. https://doi.org/10.1016/j.ibiod.2020.105103 Web science Q1. IF 4.100

			process can be classified as phytostabilization. The finding showed that the application of PGPB strain could be used in the sustainable production of <i>M. xiganteus</i> at the TEs contaminated soil.	
69.	OPTIMIZATION OF MICROBIAL ASSISTED PHYTOREMEDIATION OF SOILS CONTAMINATED WITH PESTICIDES	HTTPS://DOI.ORG/10.1080/15226514.2020.1825330	<p>ABSTRACT:</p> <p>580 microbial strains were isolated from the rhizosphere of the plants <i>Cucurbita pepo</i> L. and <i>Xanthium strumarium</i> grown on soil contaminated with dichlorodiphenyltrichloroethane (DDT) and its metabolites. During the cultivation, two bacterial strains were selected because of their ability to grow on media containing 0.5–5.0 mg L⁻¹ of dichlorodiphenyldichloroethylene (DDE) as the sole carbon source. They were identified as <i>Bacillus vallismortis</i> and <i>Bacillus aryabhatai</i>. Both of these species were shown to have a high capacity for the utilization of DDE – more than 90% of which was consumed after 21 days of cultivation. Laboratory experiments were carried out then to assess the possibility of using these strains for the decontamination of organochlorine pesticides (OCPs) contaminated soils. Inoculation of <i>C. pepo</i> and <i>X. strumarium</i> with our isolates <i>B. vallismortis</i> and <i>B. aryabhatai</i> resulted in a reduction of the pollutant stress to the plants as shown by an increase both in aboveground and in root biomass. The microorganisms enhanced the uptake and phytostabilization potential of <i>C.</i></p>	<p>Nurzhanova A., Mukasheva T., Berzhanova R., Kalugin S., Omirbekova A., Mikolasch A. Optimization of microbial assisted phytoremediation of soils contaminated with pesticides // J. Phytoremediation. Taylor & Francis, - 2021. - Vol. 23, № 5. - P. 482–491.</p> <p>Web science Q2. IF 2.570</p>

			<i>pepo</i> and <i>X. strumarium</i> and can be applied for the treatment of DDE contaminated soils.	
70.	VISUALIZATION, PROPERTIES, AND FUNCTIONS OF GABAERGIC HIPPOCAMPAL NEURONS CONTAINING CALCIUM-PERMEABLE KAINATE AND AMPA RECEPTORS	DOI: 10.1134/S1990747820010109	<p>ABSTRACT: Calcium-permeable kainate (CP-KARs) and AMPA (CP-AMPARs) receptors of the brain neurons are active participants of synaptic plasticity and neurotransmitter release trigger. In this paper, CP-KARs and CP-AMPARs were identified in hippocampal neuroglial culture on 14-17 day of cultivation by a characteristic Ca²⁺ response to a selective agonist of CP-KARs and CP-AMPARs, domoic acid (DA), and to a selective agonist of CP-KARs, ATPA. It was shown that DA at a concentration of 300 nM caused a rapid intracellular Ca²⁺ concentration increase in two minor subpopulations of neurons. Both subpopulations were found to be GABAergic neurons that were positively stained with antibodies against glutamate decarboxylase 65 and 67 (GAD65/67). The antagonist of CP-AMPARs, NASPM, did not suppress Ca²⁺ response to DA in the neurons of the first subpopulation. The selective agonist of CP-KARs, ATPA, increased [Ca²⁺]_i to the same extent as DA only in the first subpopulation of GABAergic neurons. An inhibitor of GABA(A) receptors, bicuculline, did not increase the amplitude of Ca²⁺ response to DA in this subpopulation, indicating the absence of CP-KARs in the postsynaptic membrane, where GABA(A) receptors are</p>	Zinchenko, V.P., Gaidin, S.G., Teplov, I.Y., Dolgacheva, L.P., Tuleuhanov, S.T. Visualization, Properties, and Functions of GABAergic Hippocampal Neurons Containing Calcium-Permeable Kainate and AMPA Receptors // Biological Membrane. – 2020. Vol. 14(1). – P. 44-53.

			<p>located. Thus, these GABAergic neurons can be attributed to neurons containing CP-KARs, which are apparently located in the presynaptic membrane of the GABAergic neurons. The $[Ca^{2+}]_i$ increase caused by the DA application in the second subpopulation was completely suppressed by NASPM, an inhibitor of CP-AMPARs. NASPM reduced the Ca^{2+} oscillations amplitude in the same subset, indicating the involvement of CP-AMPARs in the Ca^{2+} impulse formation during synchronous calcium activity. For this reason, the neurons of this subpopulation can be attributed to the GABAergic neurons containing CP-AMPARs. Most of the neurons in the hippocampal cell culture (70-85%) were not stained with antibodies against GAD65/67 and responded to the DA by increasing the calcium oscillations frequency with a delay. The amplitude of DA-induced oscillations increased in the presence of NASPM in the subpopulation of inhibitory neurons containing CP-KARs, indicating their innervation by inhibitory neurons containing CP-AMRARS. This increase in the Ca^{2+} oscillation amplitude in the inhibitory neurons containing CP-KARs correlated with a decrease in the amplitude of synchronous calcium activity in a large subpopulation ($42 \pm 6\%$ of cells) of glutamatergic neurons, suggesting innervation of the latter by inhibitory neurons containing CP-KARs. Thus, GABAergic neurons containing CP-KARs</p>	
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			and CP-AMPARs can work in tandem, controlling the activity of individual subpopulations of neurons.	
71.	PARTICIPATION OF CA²⁺-PERMEABLE AMPA RECEPTORS IN SYNAPTIC PLASTICITY	DOI: 10.1134/S1990747820030046	<p>ABSTRACT: AMPA receptors are the key molecules of excitatory and inhibitory synapses and are involved in synaptic plasticity. Cognitive functions of the brain such as signal perception, processing and analysis of information, memory, storage and exchange of information are reduced when the processes controlling the assembly of AMPA receptors, membrane trafficking and synapse-specific expression are impaired. The content of the receptors in synapses is regulated by exocytosis, endocytosis, and receptor recycling. Auxiliary subunits and partners modulate the function of AMPA receptors. Ca²⁺-permeable AMPA receptors (CP-AMPA) not containing the GluA2 subunit are involved in multiple forms of the synaptic plasticity, including longterm potentiation and depression, and play an important role in maintaining the correct balance between excitation and inhibition in the brain. The activation of CP-AMPA in neurons provides a fast postsynaptic Ca²⁺ entry, which triggers the processes modifying synaptic functions through the interaction with other Ca²⁺-transporting systems. The purpose of this review is to draw the attention of researchers to recent advances in the participation of CP-AMPA receptors in synaptic plasticity.</p>	Dolgacheva L.P., Tuleukhanov S.T., Zinchenko V.P. Participation of Ca ²⁺ -Permeable AMPA Receptors in Synaptic Plasticity. Biochemistry (Moscow), Supplement Series A: Membrane and Cell Biology, 2020, Vol. 14, No. 3, pp. 194–204.

72.	<p>CURCUMIN AND CARNOSIC ACID COOPERATE TO INHIBIT PROLIFERATION AND ALTER MITOCHONDRIAL FUNCTION OF METASTATIC PROSTATE CANCER CELLS.</p>	<p>DOI: HTTPS://DOI.ORG/10.3390/ANTIOX10101591</p>	<p>ABSTRACT: Anticancer activities of plant polyphenols have been demonstrated in various models of neoplasia. However, evidence obtained in numerous in vitro studies indicates that proliferation arrest and/or killing of cancer cells require quite high micromolar concentrations of polyphenols that are difficult to reach in vivo and can also be (geno)toxic to at least some types of normal cells. The ability of certain polyphenols to synergize with one another at low concentrations can be used as a promising strategy to effectively treat human malignancies. We have recently reported that curcumin and carnosic acid applied at non-cytotoxic concentrations synergistically cooperate to induce massive apoptosis in acute myeloid leukemia cells, but not in normal hematopoietic and non-hematopoietic cells, via sustained cytosolic calcium overload. Here, we show that the two polyphenols can also synergistically suppress the growth of DU145 and PC-3 metastatic prostate cancer cell cultures. However, instead of cell killing, the combined treatment induced a marked inhibition of cell proliferation associated with G₀/G₁ cell cycle arrest. This was preceded by transient elevation of cytosolic calcium levels and prolonged dissipation of the mitochondrial membrane potential, without generating oxidative stress, and was associated with defective oxidative phosphorylation encompassing</p>	<p>Ossikbayeva, S., Khanin, M., Sharoni, Y., Trachtenberg, A., Tuleukhanov, S., Sensenig, R., Rom, S., Danilenko, M., & Orynbayeva, Z. (2021). Curcumin and Carnosic Acid Cooperate to Inhibit Proliferation and Alter Mitochondrial Function of Metastatic Prostate Cancer Cells. // Antioxidants (Basel, Switzerland), 10(10), 1591. https://doi.org/10.3390/antiox10101591</p>
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			<p>mitochondrial dysfunction. The above effects were concomitant with a significant downregulation of mRNA and protein expression of the oncogenic kinase SGK1, the mitochondria-hosted mTOR component. In addition, a moderate decrease in SGK1 phosphorylation at Ser422 was observed in polyphenol-treated cells. The mTOR inhibitor rapamycin produced a similar reduction in SGK1 mRNA and protein levels as well as phosphorylation. Collectively, our findings suggest that the combination of curcumin and carnosic acid at potentially bioavailable concentrations may effectively target different types of cancer cells by distinct modes of action. This and similar combinations merit further exploration as an anticancer modality.</p> <p>Keywords: OxPhos; SGK1; carnosic acid; cell cycle; curcumin; prostate cancer.</p>	
73.	<p>SYSTEMATIC ANALYSIS OF COMBINED ANTIOXIDANT AND MEMBRANE-STABILIZING PROPERTIES OF SEVERAL LAMIACEAE FAMILY KAZAKHSTANI PLANTS FOR POTENTIAL PRODUCTION OF TEA BEVERAGES</p>	<p>HTTPS://DOI.ORG/10.3390/PLANTS10040666</p>	<p>ABSTRACT: One of the most important compounds that exhibit a wide range of biological activities with especially strong antioxidant action are plant polyphenols. In the course of the experiment, the dose-dependent effects of polyphenols-rich extracts isolated from the <i>Lamiaceae</i> family Kazakhstani plants were studied on the processes of lipid peroxidation and on the degree of erythrocytes hemolysis. The activity of aqueous-ethanolic extracts from dried parts of plants, such as <i>Origanum vulgare</i>, <i>Ziziphora bungeana</i>,</p>	<p><i>Ydyrys, A., Zhaparkulova, N., Aralbaeva, A., Mamataeva, A., Seilkhan, A., Syraiyl, S., Murzakhmetova, M. Systematic analysis of combined antioxidant and membrane-stabilizing properties of several lamiaceae family Kazakhstani plants for potential production of tea beverages. Plants 2021, 10(4), 666; https://doi.org/10.3390/plants10040666</i></p>

			<p><i>Dracocephalum integrifolium</i>, <i>Mentha piperita</i>, <i>Leonurus turkestanicus</i>, <i>Thymus serpyllum</i>, and <i>Salvia officinalis</i>, was studied in a Wistar rat model. Lipid peroxidation (LPO) in liver microsomes was assessed by measuring malondialdehyde content in the form of thiobarbituric acid-reacting substances (TBARS). Estimation of osmotic resistance of isolated erythrocytes was evaluated based on hemoglobin absorbance. The amount of total phenolics in the extracts was measured using the Folin-Ciocalteu reagent method. Based on the results, <i>Thymus serpyllum</i> extract exhibited a significantly higher antioxidant activity ($IC_{50} = 3.3 \pm 0.7$) compared to other plant extracts. Accordingly, among the extracts studied, those from <i>Salvia officinalis</i>, <i>Thymus serpyllum</i>, and <i>Origanum vulgare</i> show the most pronounced membrane-stabilizing activity. Antioxidant and antihemolytic properties of green tea and <i>Origanum vulgare</i> extract mixtures were similar to that of each individual plant extract. Similar results were obtained when the green tea extract was mixed with <i>Mentha piperita</i>, <i>Ziziphora bungeana</i>, and <i>Dracocephalum ntegrifolium</i> extracts, indicating no discernible synergistic interaction.</p>	
74.	BIOACTIVE COMPOUNDS AND ANTIRADICAL ACTIVITY OF	https://doi.org/10.3390/agronomy10121897	ABSTRACT: It is important to search for new sources of bioactive, natural compounds, because	Kubczak, M., Khassenova, A.B., Skalski, B., Michlewska, S., Wielanek, M., Aralbayeva, A.N., Murzakhmetova,

	THE ROSA CANINA L. LEAF AND TWIG EXTRACTS		customers are paying more attention to food quality. Fruits and berries from horticultural plants are known to be good sources of agents beneficial for human well-being and could serve as natural preservatives in the food industry. However, more recent research indicates that other plant organs can also be rich in nutrients. Our study focused on characterizing an unexplored source, namely leaf and twig extracts from <i>Rosa canina</i> . The chemical composition of these extracts was analyzed and their in vitro activity measured. HPLC analysis of the content of phenolics, vitamins and amino acids revealed that the leaf and twig extracts were found to be rich in bioactive compounds with potent antioxidant properties. The greatest differences between bioactive phenolic compounds in leaf and twig extracts related mainly to <i>p</i> -coumaric acid, myricetin, ellagic acid, cyanidin, procyanidin and quercetin, whereas salicylic acid levels were similar in both types of extract. Interactions with human serum albumin were investigated, and some conformational changes in protein structure were observed. Further analysis (lipid peroxidation, protein carbonylation, thiol group oxidation, DPPH inhibition and ROS inhibition) confirmed that both leaf and twig extracts exhibited antioxidant and antiradical scavenging activities. Cytotoxicity and hemotoxicity assays confirmed very low toxicity of the extracts towards human	M.K., Zamaraeva, M., Skłodowska, M., Bryszewska, M., Ionov, M. Bioactive compounds and antiradical activity of the rosa canina l. Leaf and twig extracts // <i>Agronomy</i> 2020 , 10(12), 1897
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			cells over the range of concentrations tested. Our results indicate that both extracts could serve as non-toxic sources of bioactive compounds with antiradical properties.	
75.	EFFECTS OF ALMATY CITY ECOLOGICAL FACTORS ON STUDENTS BLOOD INDICES	DOI: 10.1051/e3sconf/202016904005	<p>ABSTRACT: This research gives an insight into the main features of the cardiovascular system's statistical and dynamic, as well as young local and foreign citizens in Almaty city adaptation indices. 1500 analysis of blood indices was carried out before and after the physical workload. Hematological research were carried out based on N. M. Mykolayiv method and included the erythrocytes and leukocytes count in peripheral blood vessel and absolute number of lymphocytes . Foreign students' absolute amount of leukocytes and erythrocytes in the peripheral blood vessels and the phagocytic activity of neutrophil were different from local students' indices.</p>	Baidalet, T., Ydyrys, A., Imanaliyeva, M., Askarova, Z., Srailova, G., Murzakhmetova, M., Tuleukhanov, S. Effects of Almaty city ecological factors on students blood indices // E3S Web of Conferences 169, c.
76.	EEG COHERENCE METRICS FOR VIGILANCE: SENSITIVITY TO WORKLOAD, TIME-ON-TASK, AND INDIVIDUAL DIFFERENCES	DOI: https://doi.org/10.1007/s10484-020-09461-4 (IF=2.000; Q2 in Neuropsychology and Physiological Psychology).	<p>ABSTRACT: The vigilance decrement in performance is a significant operational issue in various applied settings. Psychophysiological methods for diagnostic monitoring of vigilance have focused on power spectral density measures from the electroencephalogram (EEG). This article addresses the diagnosticity of an alternative set of EEG measures, coherence between different electrode sites. Coherence metrics may index the</p>	Kamzanova, A., Matthews, G. & Kustubayeva, A. EEG Coherence Metrics for Vigilance: Sensitivity to Workload, Time-on-Task, and Individual Differences. Appl Psychophysiol Biofeedback 45, 183–194 (2020).

			functional connectivity between brain regions that supports sustained attention. Coherence was calculated for seven pre-defined brain networks. Workload and time-on-task factors primarily influenced alpha and theta coherence in anterior, central, and inter-hemispheric networks. Individual differences in coherence in inter-hemispheric, left intro-hemispheric and posterior networks correlated with performance. These findings demonstrate the potential applied utility of coherence metrics, although several methodological limitations and challenges must be overcome.	
77.	MAJOR DEPRESSION AND BRAIN ASYMMETRY IN A DECISION-MAKING TASK WITH NEGATIVE AND POSITIVE FEEDBACK	DOI: https://doi.org/10.3390/sym12122118 (IF=2.713; Q1 in Multidisciplinary Digital Publishing Institute (MDPI)).	ABSTRACT: Depressed patients are characterized by hypoactivity of the left and hyperactivity of the right frontal areas during the resting state. Depression is also associated with impaired decision-making, which reflects multiple cognitive, affective, and attentional processes, some of which may be lateralized. The aim of this study was to investigate brain asymmetry during a decision-making task performed in negative and positive feedback conditions in patients with Major Depressive Disorder (MDD) in comparison to healthy control participants. The electroencephalogram (EEG) was recorded from 60 MDD patients and 60 healthy participants while performing a multi-stage decision-making task. Frontal, central, and parietal alpha asymmetry were analyzed with	Kustubayeva, A., Kamzanova, A., Kudaibergenova, S., Pivkina, V., Matthews, G. Major depression and brain asymmetry in a decision-making task with negative and positive feedback. <i>Symmetry</i> , 2020, 12(12), стр. 1–25, 2118

			EEGlab/ERPlab software. Evoked potential responses (ERPs) showed general lateralization suggestive of an initial right dominance developing into a more complex pattern of asymmetry across different scalp areas as information was processed. The MDD group showed impaired mood prior to performance, and decreased confidence during performance in comparison to the control group. The resting state frontal alpha asymmetry showed lateralization in the healthy group only. Task-induced alpha power and ERP P100 and P300 amplitudes were more informative biomarkers of depression during decision making. Asymmetry coefficients based on task alpha power and ERP amplitudes showed consistency in the dynamical changes during the decision-making stages. Depression was characterized by a lack of left dominance during the resting state and left hypoactivity during the task baseline and subsequent decision-making process. Findings add to understanding of the functional significance of lateralized brain processes in depression.	
78.	MORPHOLOGICAL, ANATOMICAL STRUCTURE AND MOLECULAR PHYLOGENETICS OF ANTHEMIS TROTZKIANA CLAUS	DOI 10.30848/PJB2020-3(39)	ABSTRACT: In this study, morphological and anatomical properties of a rare species <i>Anthemis trotziana</i> Claus were investigated. Morphology structure of flower, seed, leaf, root and anatomical structure of root, stem, leaves and molecular phylogenetics <i>Anthemis</i>	Izbastina, K., Kurmanbayeva, M., Bazargaliyeva, A., Mukhtubaeva, S., Turuspekov, Y., Ablayhanova N.T. Pakistan Journal of Botany, 2020, 52(3), стр. 935–947

			<p>trotzkiana from Aktobe region of the Kazakhstan are also studied. <i>Anthemis trotzkiana</i> Claus (Asteraceae) is a rare and an endemic species of the Volga region and the Western Kazakhstan. The species is calcifite, occurs on sediments of cretaceous rocks and for research features substratum were studied regarding chemical structure of soil from different horizon. The anatomical results showed that the roots have tetrachium xylem rays and schizogenic channels. When comparing the anatomical structure of virginal roots in three populations, it was found that the morphometric parameters of plants in the 1-2nd populations were high, while the data of the 3rd population were lower. The epidermis of the leaf is strongly cutinized and leaves are isolateral, the palisade mesophyll is found on both sides of the leaf. This is peculiar to xerophilous plants. The abundance of essential oils clearly indicates the healing characteristics of the plant and is the basis for studying of essential oils of the leaf. In the paper, also were determined unique molecular markers of the species and used for the creation of a phylogenetic tree. To clarify the taxonomic provision of rare <i>A. trotzkiana</i> phylogenetic analysis based on the change of the sequence ITS nrDNA of Anthemideae representatives was conducted. For molecular resear chDNA analysis on phylogeny of <i>A. trotzkiana</i> was conducted based on ITS (internal transcribed spacers) markers. Alignment of</p>	
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			<p>Anthemissequences was performed using nucleotide sequences available at the NCBI and MEGA 6 package. The Neighbor Joining phylogenetic tree suggested that <i>A. troztkiana</i> along with <i>A. marschalliana</i>, <i>A. fuciculosa</i>, and <i>A. calcarea</i> form a single cluster within Tanacetum clade, while other Anthemis species formed a separate Anthemis clade.</p>	
79.	<p>THE TRANSFORMATION OF ECOSYSTEMS OF THE ILI RIVER DELTA (KAZAKHSTAN) UNDER THE FLOW REGULATION AND CLIMATE CHANGE</p>	<p>DOI: 10.15666/aeer/1802_24832498</p>	<p>ABSTRACT: This paper presents the results of a study on the main reasons for the transformation of wetland ecosystems in the Delta of the Ili River in the period of 1979-2014. The study results are shown based on the analysis of multi-temporal satellite data Landsat, dynamics of hydrological regime of the river Ili, climate conditions and features of economic activities of the local community, as well as fieldwork in the study region. Analysis of area changes of main types of hydromorphic and semi-hydromorphic ecosystems of Delta river Ili in high and medium on water discharge in the following (1979, 1993, 2000, 2010, and 2015) years. Increasing water consumption in China and in Kazakhstan part of the Ili-Balkhash basin due to the development of the agrarian and municipal sectors of economy especially in China, significantly exceed increasing flow of Ili River, caused by regional warming in the catchment part of Ili River Basin. The global warming has intensified the degradation of glaciers in mountain catchment areas of Ili River, this</p>	<p>Mukhitdinov, A., Nurtazin, S., Alimova, S., Margulan, I., Mirasbek, Y., Ablayhanova N.T. Applied Ecology and Environmental Research, 2020, 18(2), стр. 2483–2498</p>

			<p>in the near future threatens with a decline in river flow and as a consequence lead to the deterioration of delta ecosystems and the desiccation of lake Balkhash similarly to the ecological disaster of the Aral Sea. Analysis of long-term (from 1970 to 2013) climatic data from three meteorological stations demonstrated a trend of the regional increase of average annual air temperature by 1.4 °C and decreasing of average annual precipitation by 10 mm. These factors also contribute to the transformation process of hydromorphic ecosystems.</p>	
80.	<p>ESTIMATION OF EFFICIENCY OF USE OF DAIRY PRODUCTS ENRICHED WITH ENTER SORBENT DIETARY FIBERS ON IMMUNOPHYSIOLOGICAL INDICATORS OF THE RAT ORGANISM</p>	<p>DOI: 10.29169/1927-5951.2020.10.03.3</p>	<p>ABSTRACT: At all times, the problem of healthy and wholesome food has been one of the most important problems facing human society. This problem cannot be solved by simply increasing the amount of food consumed. Plant-based antioxidants are widely used for the prevention and treatment of diseases with the aim of eliminating free radicals from the body and restoring the body's antioxidant defense system. The article shows biochemical indicators that reflect the nature of changes in the early stages of the formation of response of the animal organism during toxic poisoning and the use of sour-milk products using enter sorbent dietary fiber from rice husk. With an increase in the dosage and frequency of CCl4 administration, the effect of deep poisoning and impaired lymph dynamics was obtained. Along with</p>	<p>Ablaikhanova, N., Yessimsiitova, Z., Amzeyeva, U., Konysbayeva, A., Tuleukhanov, S. Journal of Pharmacy and Nutrition Sciences, 2020, 10(3), стр. 92–100</p>

			<p>a decrease in the content of total protein and urea in lymph and blood plasma, an increase in ALT and AST levels in blood plasma by 2.5-3 times, as well as an increase in thymol test, were noted. Antioxidant defense mechanisms are universal in order to increase the body's vitality.</p>	
81.	<p>ISSUES OF TYPE 2 DIABETES DISEASE EFFECTIVE TREATMENT IN KAZAKHSTAN</p>	<p>DOI: 10.29169/1927-5951.2020.10.03.5</p>	<p>ABSTRACT: In his address to the people, the First President of our country, emphasized the need to introduce innovative methods of treating socially significant diseases. Among these diseases, diabetes holds a special position. More than 14,000 new cases of diabetes mellitus are officially detected annually in Kazakhstan. The real picture of the disease is difficult to compare with these data. This review discusses the prevalence of type 2 diabetes among the population of the Republic of Kazakhstan, and the causing factors such as age, race, genetic predisposition (OR = 3), obesity, glucose level and total cholesterol etc. It was found that the main complications and concomitant diseases of diabetes in residents of different regions are polyneuropathy-22.4%, diabetic retinopathy-14%, diabetic foot syndrome-13.6%, arterial hypertension-13.6% and coronary heart disease (CHD)-14.4%. Only 1.8% of the population is diagnosed with type 2 diabetes, latent manifestations of type 2 diabetes mellitus, one in four people in Kazakhstan can be sick, 38% of</p>	<p>Ablaikhanova, N.T., Yessenbekova, A.Y., Aigul, T., Sanbaeva, B.J., Molsadykkyzy, M. Journal of Pharmacy and Nutrition Sciences, 2020, 10(3), стр. 116–122</p>

			adults aged 20-79 suffer from prediabetes, and 8.2% with diabetes. It is believed that by 2030 in Kazakhstan, there may be about a million patients with diabetes. Diabetes mellitus, in accordance with the Code of the Republic of Kazakhstan "On the health of the people and the health care system" belongs to the category of socially significant diseases. Therefore, the study of type 2 diabetes is one of the urgent problems of the public health in Kazakhstan.	
82.	FUNCTIONAL-MORPHOLOGICAL FEATURES OF ENTEROSORBENT IN ANIMAL CELLS	DOI: 10.31838/srp.2020.12.174	ABSTRACT: Today it is impossible to present any human activity that is directly or indirectly not affected by live organisms of toxic substances that continue to grow. Studying the pathomorphology of change caused by and the effect of toxic substances at the intercellular and interfabric level plays a large role in understanding the pathogenesis of various diseases. One avenue of studying intercellular and interfabric relationship is the identification of interaction between fabrics facing impact of toxic substances. In the human body, this is especially relevant as the relationship between fabrics and their cellular elements helps to reveal morphofunctional features of cells. Toxic substances acting on an organism triggers morphofunctional processes that lead to destructive changes in organisms. Chronic poisoning with cadmium and lead, for instance, destroys	Functional-morphological features of enterosorbent in animal cells Zura, Y., Nurzhanyat, A., Perizat, T., Bakytzhan, K., Arailym, Y.

			<p>animal cells, leading to the dysfunction of internal organs. An excess of cadmium interferes with the metabolism of metals, especially iron and calcium, distorts the effect of zinc and other metalenzymes, blocks sulfhydryl groups of enzymes and interrupts DNA synthesis. Lead interferes with biosynthesis, and is considered the strongest neurotoxin, causing aggressive reactions where it is present. In this experiment, morphological changes in the internal organs of white, not purebred, rats that are given 1.5 mg/kg of cadmium and 25 mg/kg of lead in an enterosorbent are investigated using 1 g/kg Ingo2 within 30 days of its use. Two groups of rats show strong destructive changes in their internal organs i.e. necrosis, puffiness, gidropic dystrophy, reduced pathological processes and increased compensatory reaction. Two other groups of rats show the effects of damage due to poisoning, but these effects are reduced after use of enterosorbent Ingo2. The results of this research demonstrate that the enterosorbent Ingo2 promotes efficiency in occluding cations of lead and cadmium.</p>	
83.	<p>CONFERENCE PAPER THE EFFECT OF CRUDE OIL ON THE BIOCHEMICAL PARAMETERS OF THE BLOOD OF WHITE RATS</p>	<p>DOI: 10.1051/e3sconf/202125409003</p>	<p>ABSTRACT: In this article authors were identified the effect of crude oil on the biochemical parameters of white rat blood. The experiments were conducted in two groups. In the first group, biochemical blood parameters of the control group were determined. In the second group, the</p>	<p>Ydyrys, A., Ablaihanova, N., Amanbay, B., Seiykadyr, K., Demeuova, D. E3S Web of Conferences, 2021, 254, 09003</p>

			<p>biochemical parameters of the blood of white rats after poisoning with crude oil were determined: during the experiment, white rats were treated for chronic crude oil poisoning. Crude oil products from the Zhanaozen oil field were the main food for white rats. Feeding of white rats was carried out according to commonly used methods. The oil concentration in the feed is about 1%. There was also a weak concentration of oil in the water of 0.001%. Thus, rats were fed a daily dose of 5.85 g of oil per day. Results: The results of the study show a decrease in the mechanical properties of oil-poisoned organisms in stem cells and the intensity of protein synthesis. Leads to metabolic processes and physiological changes in the body. Biochemical parameters of the blood of white rats after poisoning with crude oil indicate impaired liver and kidney function. Based on the results of the study, it can be concluded that crude oil has a high negative impact on the biochemical parameters of the blood and causes various diseases. Therefore, the results of the study can be used to organize measures to protect the environment and animal and human health in oil-producing areas.</p>	
84.	<p>DETERMINATION OF THE CONTENT OF BIOLOGICALLY ACTIVE SUBSTANCES IN SOME AQUATIC HIGHER PLANTS</p>	<p>DOI: 10.30848/PJB2021-5(23)</p>	<p>ABSTRACT: The article identifies the following biologically active substances in the surface and the underground parts of <i>Eichhornia crassipes</i>, <i>Pistia Stratiotes</i>, and <i>Lemna minor</i> aquatic plants (roots, stems,</p>	<p>Ramazanova, A.A., Yernazarova, G.I., Turasheva, S.K., Ablaihanova, N.T. Pakistan Journal of Botany, 2021, 53(5), стр. 1893–1899</p>

			<p>leaves): alkaloids, anthraquinones, proteins, tannins, flavonoids, phenolic compounds, polysaccharides, anthraquinones, and coumarins. A brief overview of scientific works has been given for certain types of biologically active substances and their biological activity, importance, biosynthesis, and genetic transfer. The results of this research show that high amount of biologically active substances (BAS) was found in Eichhornia crassipes aquatic plant in terms of tannins, which in the roots amounted to 7.476%, and in the above-ground part — to 6.73%. The content of polysaccharides was 5.907%, and in the roots — 2.642%. By the amount of BAS detected in the composition of Pistia stratiotes aquatic plant, polysaccharides content in the aerial part was 3.073%, and in the roots — 4.881%, the content of flavonoids in the aerial part was 4.833%, and in the roots — 3.716%. Among BAS in Lemna minor water plant, the content of flavonoids was 5.463%.</p>	
85.	<p>STUDYING PHYTOCHEMICAL FEATURES OF THREE ASTERACEAE HERBS GROWING WILD IN KAZAKHSTAN</p>	<p>DOI: https://doi.org/10.1590/2179-8087-FLORAM-2021-0060</p>	<p>ABSTRACT: This study aimed to evaluate the phytochemical features of medicinal species of the <i>Asteraceae</i> family, their mineral elements, antioxidants, vitamins, and amino acids. The species studied included common yarrow (<i>Achillea millefolium</i> L.), common chicory (<i>Cichorium intybus</i> L.), and German chamomile (<i>Chamomilla recutita</i> (L.)</p>	<p>Zhadyra B. Ashirova Zhenis Z. Kuzhantaeva Zhanna T. Abdrassulova Gulsana Z. Shaimerdenova Gulshat K. Atanbaeva Studying Phytochemical Features of Three Asteraceae Herbs Growing Wild in Kazakhstan ORIGINAL ARTICLE, Conservation of Nature, Floresta Ambient. 28 (4) • 2021</p>

			<p>Rauschert) collected in the Ile Alatau Mountain (Trans-Ili Alatau), Kazakhstan. The plants were harvested in July 2019-July 2020 during their flowering. The article's scientific novelty lies in the conceptual research of phytochemical and morphological features of medicinal species with a maximum content of biologically active substances and high antioxidant activity, which can be a basis for creating innovative functional food products enriched with natural antioxidants. The article describes a new idea to display a very high concentration and diversity of vitamins (8 types), mineral elements (8 types), antioxidants, and amino acids (13 types) in the flowers of <i>C. intybus L.</i>, <i>Ch. recutita L.</i>, <i>A. millefolium L.</i></p>	
86.	<p>CONDITION OF ADRENERGIC INNERVATION APPARATUS OF THE THYROID GLAND, BLOOD AND LYMPH VESSELS, AND LYMPH NODES DURING CORRECTION OF HYPOTHYROSIS</p>	<p>DOI: 10.1007/s10517-021-05212-5</p>	<p>ABSTRACT: We used specific histochemical fluorescence-microscopic method of visualization of catecholamines to study adrenergic innervation of the thyroid gland tissue, blood vessels of the thyroid gland, cervical lymphatic vessel and lymph nodes in rats during correction of hypothyroidism with a bioactive formulation (Vozrozhdenie Plus balm with <i>Potentilla alba L.</i>). In experimental hypothyroidism, adrenergic innervation of the thyroid gland and the wall of the cervical lymph node, concentrated mainly along the arterial vessels and the cervical lymphatic vessel, retained its structural formations (plexuses</p>	<p><u>S N Abdreshov, G A Demchenko, A T Mamataeva, G K Atanbaeva, S A Mankibaeva, N A Akhmetbaeva, U N Kozhaniyazova, U B Nauryzbai</u>\\ Condition of Adrenergic Innervation Apparatus of the Thyroid Gland, Blood and Lymph Vessels, and Lymph Nodes during Correction of Hypothyrosis, Bull Exp Biol Med. 2021 May;171(2):281-285.</p>

			and varicosities), but diffusion of catecholamines outside these formations was observed. Correction with the bioactive formulation restored of the contours of the nerve plexuses and varicosities and their brighter fluorescence in the thyroid gland and cervical lymphatic vessel and node. During correction of hypothyroidism with the bioactive formulation, reorganization of regional lymphatic vessels and nodes was more pronounced than reorganization of the thyroid gland.	
87.	CHRONOBIOLOGIC ANALYSES OF WEEKLONG AROUND-THE-CLOCK RECORDS OF SIMULTANEOUSLY MONITORED BLOOD PRESSURE AND ACTIVITY	ISBN 978-802109715-5 Indexed in Scopus	ABSTRACT: Among the many different factors that influence blood pressure, activity was once thought to be the major determinant of the circadian variation in blood pressure. Whereas the endogenous nature of the circadian rhythm in blood pressure is no longer disputed, there is great interest in monitoring activity concomitantly with blood pressure. Herein, we reanalyze a dataset on weeklong ABPM records obtained concomitantly with actigraphy from 20 clinically healthy young adults. The purpose of this investigation is to review different approaches available for the characterization of the circadian variation in physiological variables such as blood pressure, heart rate, and activity. Topics covered include rhythm detection, the estimation of rhythm parameters, and the visualization of their waveform. Methods to examine how circadian	Cornelissen G., Farah Z., Gubin D., Gumarova L., Sackett-Lundeen L., Kazlauskas T., Otsuka K., Siegelova J., Beaty L. Chronobiologic analyses of weeklong around-the-clock records of simultaneously monitored blood pressure and activity // Noninvasive methods in cardiology – Brno, 2020, pp.19-26

			rhythms of different variables may relate to each other are also discussed.	
88.	GEOMAGNETIC, CARDIOVASCULAR AND GEO-CARDIOVASCULAR CONGRUENCES OF CYCLES: PUTATIVE CO-PERIODISMS	DOI 10.26577/ijbch.2020.v13.i2.06 Indexed in Web of Science	ABSTRACT: A sense for magnetism in humans and more broadly for nonphotic solar effects is not consciously perceived, even though the cosmos may have broad biospheric consequences. Associations are already documented for the human circulation and for mental and cellular functions with geo- and interplanetary magnetism. We compare interval estimates of periods in view of the ever-present uncertainties, congruence assess corresponding periods by the presence or absence of overlap between the CIs (95% confidence intervals) of the paired periods, found by the nonlinearly extended cosinors in time series of geomagnetic indices, Kp, quasi-logarithmic local index of the 3-hourly range, its derivatives Cp and C9, on the one hand and on the other hand in separate data sets of systolic (S) and diastolic (D) blood pressure (BP) and heart rate (HR) of 360 patients, each monitored ambulatorily (ABPM) for 24 hrs. Some circasemiseptan periods are shared by SBP, DBP and HR in female patients and further by C9 and Cp. Kp reveals a period of 4.31 days, with an even longer period found for SBP in men in the spectral region examined, the periods being picked because of their statistical significance in that spectral region. The gender differences in HR and SBP have their precedents in other regions	Gumarova L., Hillman D., Mansharipova A., Sadyrbayeva G., Tauassarova M. Geomagnetic, cardiovascular and geocardiocvascular congruences of cycles: putative co-periodisms // International Journal of Biology and Chemistry. – 2020, Vol.13, № 2, 46, pp 46-52

			of the circasemiseptan spectrum of these variables. The circaseptan coperiodisms between geomagnetic indices, Kp, Cp, C9 and cardiovascular system (SBP, DBP) in periodicity is clear for women patients only. The coperiodisms of HR with 10.7 C in 21 days period, and the circaseptan coperiodism again only of Kp with the BP were found.	
89.	COMPARATIVE ANALYSIS OF CIRCADIAN RHYTHMS OF HEMODYNAMICS AND PHYSICAL ACTIVITY	DOI 10.1080/09291016.2021.1922827 Indexed in Scopus, Web of Science	ABSTRACT: In determining the time structure (circadian rhythm) of blood pressure (BP), heart rate (HR), and physical activity (actigraphy indicators ZCM, HPIM) in everyday life and how they are related, 20 clinically healthy participants, 26.7 ± 2.3 years of age, were examined. Phase-weighted averages obtained by the population-mean cosinor detected statistically significant 24- and 12-h components (P < 0.001). The cross-correlation function between physical activity and BP shows a strong common circadian variation. The similarity of the circadian waveform of cardiovascular variables and activity, gauged by the ratio of the amplitudes of the 12-h and 24-h components, is statistically confirmed by their positive correlation. The best correspondence between fluctuations in hemodynamics and actigraphy data is shown for systolic BP and ZCM. Our results indicate the synchronicity of the circadian rhythms of BP, HR rate and physical activity, supporting the statement	Lyazzat Gumarova, Zainab Farah, Alima Tyutenova, Zhanna Gumarova, Linda Sackett-Lundeen, Thomas Kazlauskis, Germaine Cornelissen Guillaume. Comparative analysis of circadian rhythms of hemodynamics and physical activity. // Biological Rhythm Research: 2021.

			that the circadian rhythm of BP is not a sole direct response to the circadian rhythm of physical activity. At the same time, physical activity has a positive effect on the circadian system of the whole organism, through the central pacemaker, and thus indirectly affects the cardiovascular circadian rhythms.	
90.	THE STUDY OF SODIUM AND POTASSIUM CHANNEL GENE SINGLE-NUCLEOTIDE VARIATION SIGNIFICANCE IN NON-MECHANICAL FORMS OF EPILEPSY	DOI: https://doi.org/10.1186/s43042-020-00123-y	ABSTRACT: Epilepsy is one of the most common and heterogeneous neurological diseases. The main clinical signs of the disease are repeated symptomatic or idiopathic epileptic seizures of both convulsive and non-convulsive nature that develop against a background of lost or preserved consciousness. The genetic component plays a large role in the etiology of idiopathic forms of epilepsy. The study of the molecular genetic basis of neurological disorders has led to a rapidly growing number of gene mutations known to be involved in hereditary ion channel dysfunction. The aim of this research was to evaluate the involvement of single-nucleotide variants that modify the function of genes (SCN1A, KCNT1, KCNTC1, and KCNQ2) encoding sodium and potassium ion channel polypeptides in the development of epilepsy. Results: De novo mutations in the sodium channel gene SCN1A c.5347G>A (p. Ala1783Thr) were detected in two patients with Dravet syndrome, with a deletion in exon 26 found in one. Three de novo mutations in the	Khamdiyeva, O., Tileules, Z., Baratzhanova, G. et al. The study of sodium and potassium channel gene single-nucleotide variation significance in non-mechanical forms of epilepsy. Egypt J Med Hum Genet 22, 5 (2021).

			<p>potassium channel gene KCNT1 c.2800G>A (p. Ala934Thr), were observed in two patients with temporal lobe epilepsy (TLE) and one patient with residual encephalopathy. Moreover, a control cohort matched to the case cohort did not reveal any SNVs among conditionally healthy individuals, supporting the pathogenic significance of the studied SNVs. Conclusion: Our results are supported by literature data showing that the sodium ion channel gene SCN1A c.5347G>A mutation may be involved in the pathogenesis of Dravet syndrome. We also note that the c.2800G>A mutation in the potassium channel gene KCNT1 can cause not only autosomal dominant nocturnal frontal lobe epilepsy (ADNFLE) but also other forms of epilepsy. To treat pathogenetic mutations that accelerate the function of sodium and potassium ion channels, we recommend ion channel blockade drug therapy</p>	
91.	<p>ANCIENT GENOMIC TIME TRANSECT FROM THE CENTRAL ASIAN STEPPE UNRAVELS THE HISTORY OF THE SCYTHIANS</p>	<p>DOI: 10.1126/sciadv.abe4414</p>	<p>ABSTRACT: The Scythians were a multitude of horse-warrior nomad cultures dwelling in the Eurasian steppe during the first millennium BCE. Because of the lack of first-hand written records, little is known about the origins and relations among the different cultures. To address these questions, we produced genome-wide data for 111 ancient individuals retrieved from 39 archaeological sites from the first millennia BCE and CE across the Central</p>	<p>Gnecchi-Ruscione G.A.a, b, Khussainova E.c, Kahbatkyzy N.c, d, Musralina L.a, c, d, Spyrou M.A.a, Bianco R.A.a, Radzeviciute R.a, Gomes Martins N.F.a, Freund C.a, Iksan O.c, d, Garshin A.c, Zhaniyazov Z.c Bekmanov B.c, d, Kitov E.d, e, f, Samashev Z.g, h, Beisenov A.f, Berezina N.i, Berezin Y.i, Bíró A.Z.j, Évinger S.j, Bissembaev A.h, k, Akhatov G.f, Mamedov A.l, Onggaruly A.m, Voyakin D.f, n, Chotbayev</p>

			<p>Asian Steppe. We uncovered major admixture events in the Late Bronze Age forming the genetic substratum for two main Iron Age gene-pools emerging around the Altai and the Urals respectively. Their demise was mirrored by new genetic turnovers, linked to the spread of the eastern nomad empires in the first centuries CE. Compared to the high genetic heterogeneity of the past, the homogenization of the present-day Kazakhs gene pool is notable, likely a result of 400 years of strict exogamous social rules.</p>	<p>A.f,Kariyev Y.o,Buzhilova A.i,Djansugurova L.cSend mail to Djansugurova L.,Jeong C.a, pSend mail to Jeong C.,Krause J. Science AdvancesOpen AccessVolume 7, Issue 13, 2021 Article number eabe4414.</p>
92.	<p>TEN MILLENNIA OF HEPATITIS B VIRUS EVOLUTION</p>	<p>DOI: 10.1126/science.abi5658</p>	<p>ABSTRACT: Hepatitis B virus (HBV) has been infecting humans for millennia and remains a global health problem, but its past diversity and dispersal routes are largely unknown. We generated HBV genomic data from 137 Eurasians and Native Americans dated between ~10,500 and ~400 years ago. We date the most recent common ancestor of all HBV lineages to between ~20,000 and 12,000 years ago, with the virus present in European and South American hunter-gatherers during the early Holocene. After the European Neolithic transition, Mesolithic HBV strains were replaced by a lineage likely disseminated by early farmers that prevailed throughout western Eurasia for ~4000 years, declining around the end of the 2nd millennium BCE. The only remnant of this prehistoric HBV diversity is the rare genotype G, which</p>	<p>Kocher, A., Papac, L., Barquera, R., ...Krause, J., Musralina L., Djansugurova L. Science, Volume 374, Issue 65648, 2021.</p>

			appears to have reemerged during the HIV pandemic.	
93.	ECOLOGICAL RISK ASSESSMENT AND LONG-TERM ENVIRONMENTAL POLLUTION CAUSED BY OBSOLETE UNDISPOSED ORGANOCHLORINE PESTICIDES	DOI: 10.1080/03601234.2021.1913931	ABSTRACT: Obsolete organochlorine pesticides (OSPs) are currently prohibited as persistent organic pollutants that contaminate the environment. If undisposed, they continue to pollute soil and water, to accumulate in the food chain and to harm plants, animals and the human body. The aim of the study was to assess water and soil pollution around the storehouses of undisposed, banned OSPs and their possible genotoxic effect. The storehouses in four villages near Almaty, Kazakhstan were investigated. Chemical analysis confirmed contamination of water and soil around storehouses with OSPs. The genotoxic effect of water and soil samples was evaluated using model objects: <i>S.typhimurium</i> , <i>D.melanogaster</i> , sheep lymphocytes cultures and human lymphocytes cultures. It was found that water and soil samples caused mutagenic effect in all model systems. They increased the frequency of revertants in <i>Salmonella</i> , the frequency of lethal mutations in <i>Drosophila</i> chromosomes, and the frequency of chromosome aberrations in cultures of human and sheep lymphocytes. Although a genotoxic effect was demonstrated for each of these models, various models showed different sensitivity to the effects of pesticides and they varied degree of response. The	Mit N.a,Cherednichenko O.b,Mussayeva A.c,Khamdiyeva O.d,Amirgalieva A.a,Begmanova M.a,Tolebaeva A.a,Koishekenova G.d,Zaypanova S.d,Pilyugina A.b,Amandykova M.c, e,Tlenshieva A.c. Journal of Environmental Science and Health - Part B Pesticides, Food Contaminants, and Agricultural Wastes Volume 56, Issue 5, Pages 490 – 502, 2021.

			association between the total content of OCPs in soil and the level of mutations for different model systems was discovered.	
94.	HEAVY METAL CONTENTS IN PLANTS OF PHYTOCENOSSES OF THE POINT OF BESQAYNAR, KYZYLKAIKAT AND TAUARATURYK	DOI: 10.30848/PJB2021-2(33)	ABSTRACT: This article presents data on the determination of heavy metals (Pb ⁺² , Zn ⁺² , Cu ⁺² , Fe ⁺² , Ni ⁺² , Co ⁺³ , Mn ⁺² , Cr ⁺² , Cd ⁺²) in plant samples collected from Almaty Region, Talgar District of Kazakhstan. For a number of reasons, plants cannot absorb most of the heavy metals and, unlike animals, are able to accumulate them in large quantities. The following points were selected for sampling: Control point – Taukarutuk, 2 point – Besqaynar and 3 point – Kyzylkairat. Rumex confertus, Artemisia annua, and Trifolium pratense were identified as the most highly accumulating species of heavy metals in all three monitoring groups. It was investigated that, in the studied points, Besqaynar and Kyzylkairat, all presented plant samples have a large adsorption capacity for such elements as Cd ⁺² and Zn ⁺²	Pakistan Journal of Botany, Volume 53, Issue 2, Pages 511–516, 2021. Inelova Z., Nurzhanova A., Yerubayeva G., Aitzhan M., Djansugurova L., Bekmanov B.
95.	COMPREHENSIVE ASSESSMENT OF UNUTILIZED AND OBSOLETE PESTICIDES IMPACT ON GENETIC STATUS AND HEALTH OF POPULATION OF ALMATY REGION	DOI; 10.1016/j.ecoenv.2020.110905	ABSTRACT: The group of persistent organic pollutants (POPs) are particularly dangerous for the environment and by consequence for human health because of the risk to be transmitted in the food chain. Among them, the urgent problem of obsolete and forbidden organochlorinated pesticides (OCPs) needs a rigorous management in	Djanganlina E., Altynova N., Bakhtiyarova S., Kapysheva U., Zhaksymov B., Garshin A., Seisenbayeva A.a, Delannoy M.d, Jurjanz S. Ecotoxicology and Environmental Safety, Volume 2021, Article number 110905.

			<p>many countries, including Kazakhstan. The aim of our study was to evaluate the effect of pesticides content in food products on the genetic status and health of the population living on the contaminated areas near destroyed warehouses for OCPs (4 villages of Talgar district and 1 control site, Almaty region). The food products sampled in Taukaraturyk (control site), and in 4 villages where non-utilized obsolete pesticides were discovered: Beskainar, Kyzylkairat, Amangeldy, and Belbulak. The contents of 24 pesticides in food products from plant (apples, pears, tomatoes, cucumbers, sweet peppers) and animal (beef meat, cow milk, honey) origin, that grown in places of localization of non-utilized OCPs, were determined, sometimes in high and unacceptably high concentrations (before 2500 times over MRL). In pears, the pesticides content (especially DDT, γ-HCH, β-HCH, endosulfan, and aldrin pesticide group), was higher than in other fruits. Among vegetables, the highest levels of all groups of pesticide were found in cucumbers. Beef meat samples demonstrated increased contents of β-HCH, γ-HCH, endrin and dieldrin. In cow milk samples only the high concentration of dieldrin was found. The content of pesticides in meat was 4–5 times higher than in milk. The medical examinations, carried out among the cohorts living around the polluted by pesticides territories and control cohort from ecologically favorable village,</p>	
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			<p>showed that there were more individuals with high and middle levels of somatic health in the control group than in groups exposed to OCPs. The long-term effect of the pesticide contamination of the environment on genetic status of the population was assessed by chromosomal aberration (CA) frequencies. The highest level of chromosomal aberrations was identified for the examined residents of Kyzylkairat (41%) and Belbulak (38%), a high level in Amangeldy (12%), and middle level in Beskainar (6.5%). The association between the CA frequency, health status and the pesticides contents in food were assessed by a Spearman rank correlation. The low indicators of somatic health status were strictly associated with high levels of CA, and good health status indicates that the CA rates did not exceed the spontaneous level of mutagenesis. The strongest correlation was shown between high levels of chromosomal aberrations and the content of different pesticides in pears (Cr = 0.979–0.467), tomatoes (Cr = 0.877–0.476), cucumbers (Cr = 0.975–0.553) and meat (Cr = 0.839–0.368). The obtained results highlight the need to improve health protection by increasing the public awareness to the security of the storage of obsolete OCPs in order to strengthen food safety by efficient control services</p>	
96.	THE EFFECTS OF DNA REPAIR POLYMORPHISMS ON	DOI: 10.1080/09553002.2020.1711460	ABSTRACT:	Djansugurova L.a,Altynova N.a,Cherednichenko O.a,Khussainova

	<p>CHROMOSOME ABERRATIONS IN THE POPULATION OF KAZAKHSTAN</p>		<p>To analyze the effects of DNA repair polymorphism and other factors on the frequency chromosome aberrations in an irradiated cohort of subjects living around the Semipalatinsk nuclear test site and non-exposed group of subjects from ecologically favorable zones of Kazakhstan. Materials and methods: Blood samples were collected in the rural areas of the East Kazakhstan district around the Semipalatinsk nuclear test site and ecologically favorable zones of Almaty region of Kazakhstan. Chromosome aberrations in the fresh and cryopreserved peripheral blood lymphocyte cultures were analyzed by Giemsa staining. Single nucleotide polymorphisms at eight DNA repair genes (XRCC1 rs1799782, XRCC1 rs25487, XRCC3 rs861539, ATM rs1801516, XPD rs1799793, XPD rs13181, APEX1 rs1130409, and hOGG1 rs1052133) were determined by PCR-RFLP method. Results: The age of donors and smoking significantly affected the frequency of chromosome aberrations among the irradiated and control subjects. In the irradiated and control cohorts, the frequency of chromosome aberrations was significantly increased in the heterozygous ATM rs1801516 (1853 Asp/Asn) individuals; for the rest of the loci no significant associations between polymorphism and the frequency of chromosome aberrations were detected. Conclusions: The age of donors, smoking, and the ATM rs1801516 polymorphism</p>	<p>E.a,Dubrova Y.E. International Journal of Radiation Biology Volume 96, Issue 5, Pages 614 – 621, 2020.</p>
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			significantly affect the frequency of chromosome aberrations among individuals inhabiting contaminated area around the Semipalatinsk nuclear weapon test site, as well as among those inhabiting ecologically favorable zones of Kazakhstan.	
97.	NOTCH SIGNALING DEFECTS IN NK CELLS IN PATIENTS WITH CANCER	DOI: 10.1007/s00262-020-02763-w	ABSTRACT: Altered expressions of proto-oncogenes have been reported during normal lymphocytes mitogenesis and in T and B lymphocytes in patients with autoimmune diseases. We have recently demonstrated a significantly decreased expression of c-kit and c-Myc in NK cells isolated from patients with cancer, which might be related to the functional deficiency of NK cells in the tumor environment. Here, focusing on the regulatory mechanisms of this new clinical phenomenon, we determined expression of c-Myc, Notch1, Notch2, p-53, Cdk6, Rb and phosphorylated Rb in NK cells isolated from the healthy donors and cancer patients. The results of our study revealed a significant down-regulation of expression of Notch receptors and up-regulation of Cdk6 expression in NK cells in cancer, while no significant changes in the expression of p53 and Rb proteins were seen. These data revealed novel signaling pathways altered in NK cells in the tumor environment and support further investigation of the origin of deregulated	Zakiryanova G.K., Kustova E., Urazalieva N.T., Baimukhametov E.T., Makarov V.A., Turaly G.M., Shurin G.V., Biyasheva Z.M., Nakisbekov N.N., Shurin M.R. Cancer Immunology, Immunotherapy Volume 70, Issue 4, Pages 981 – 988, 2021

			expression of proto-oncogenes in NK cells patients with different types of cancer.	
98.	PLANT EXTRACT OF LIMONIUM GMELINII ATTENUATES OXIDATIVE RESPONSES IN NEURONS, ASTROCYTES, AND CEREBRAL ENDOTHELIAL CELLS IN VITRO AND IMPROVES MOTOR FUNCTIONS OF RATS AFTER MIDDLE CEREBRAL ARTERY OCCLUSION	DOI: 10.3390/antiox10111814	ABSTRACT: There are numerous publications demonstrating that plant polyphenols can reduce oxidative stress and inflammatory processes in the brain. In the present study we have investigated the neuroprotective effect of plant extract isolated from the roots of <i>L. gmelinii</i> since it contains a rich source of polyphenols and other biologically active compounds. We have applied an oxidative and inflammatory model induced by NMDA, H ₂ O ₂ , and TNF- α in human primary neurons and astrocytes, and mouse cerebral endothelial cell (CECs) line in vitro. The levels of ROS generation, NADPH oxidase activation, P-selectin expression, and activity of ERK1/2 were evaluated by quantitative immunofluorescence analysis, confocal microscopy, and MAPK assay. In vivo, sensorimotor functions in rats with middle cerebral artery occlusion (MCAO) were assessed. In neurons NMDA induced overproduction of ROS, in astrocytes TNF- α initiated ROS generation, NADPH oxidase activation, and phosphorylation of ERK1/2. In CECs, the exposure by TNF- α induced oxidative stress and triggered the accumulation of P-selectin on the surface of the cells. In turn, pre-treatment of the cells with the extract of <i>L. gmelinii</i> suppressed oxidative stress in all cell types and pro-inflammatory responses in	Nurkenov T., Tsoy A., Olzhayev F. Abzhanova E., Turgambayeva A., Zhussupova A., Avula B., Ross S., Aituarova A., Kassymova D., Zhusupova G., Shalakhmetova T. Antioxidants Volume 10, Issue 11, 2021 Article number 1814.

			astrocytes and CECs. In vivo, the treatment with <i>L. gmelinii</i> extract improved motor activity in rats with MCAO.	
99.	CURRENT STATE AND IN VITRO CONSERVATION OF THE ONLY ENDANGERED POPULATION OF CORYLUS AVELLANA IN KAZAKHSTAN	DOI: 10.31830/2348-7542.2020.106	ABSTRACT: European hazelnut (<i>Corylus avellana</i>) is an important temperate nut crop. Wild germplasm is of great importance for breeding programs to develop new varieties with resistance to biotic and abiotic factors. The only native population of <i>C. avellana</i> is registered in Western Kazakhstan; this species listed in the Red Book of the country. Therefore, the present investigation was conducted during 2018-2019 at the Institute of Plant Biology and Biotechnology, Almaty, Kazakhstan with an aim to assess the state of this population and to collect nuts for in vitro preservation. During the expedition, trees, leaves, involucre, nuts, and kernels were characterized for 60 wild <i>C. avellana</i> accessions using 27 qualitative and quantitative standard descriptors following Biodiversity International guidelines. The study revealed an unsatisfactory state of <i>C. avellana</i> population. Of particular concern is the lack of natural seed propagation in the population. Most of the accessions (70.0%) lacked nut bearing, and 30.0% had only sporadic nuts. A high degree of damage by pests and diseases was recorded. The few seeds collected from 18 nut bearing trees were introduced into in vitro culture as excised embryonic axes. In 16.7% of the excised embryonic axes,	Kushnarenko S.V., Romadanova N.V., Aralbayeva M.M. Current state and <i>in vitro</i> conservation of the only endangered population of <i>Corylus avellana</i> in Kazakhstan // Res. on Crops. – 2020. – Vol. 21 (4). – P. 681-686. IF 0.413

			necrosis and darkening of the tissues were observed. In vitro shoots obtained from 83.3% embryonic axes were indexed for endophyte contamination on the 523 detections medium and in vitro collection of aseptic shoot culture was established. These accessions from Kazakhstan have never been cultured before, so this study contributes to the preservation of important Corylus genetic resources.	
100.	CHEMOTHERAPY OF IN VITRO APPLE SHOOTS AS A METHOD OF VIRUSES ERADICATION	DOI: https://doi.org/10.26577/ijbch.2021.v14.i1.04	ABSTRACT: The article presents the results on the viruses eradication from in vitro shoots of varieties and clonal rootstocks of apple (<i>Malus domestica</i> Borkh.) using chemotherapy and obtaining healthy super-elite planting stocks. Ribavirin at concentrations of 75 and 100 mg/L caused severe in vitro shoot necrosis. Three subcultures on Murashige-Skoog medium with 50 mg/L ribavirin was efficient for elimination of Apple chlorotic leaf spot virus (ACLSV), Apple stem pitting virus (ASPV), Apple stem grooving virus (ASGV), and Apple mosaic virus (ApMV) from in vitro shots of <i>Malus</i> varieties and clonal rootstocks. A virus-free in vitro collection (42 accessions) was established, which was used for create a cryobank of shoot tips at -196°C and to obtain virus-free planting stocks. The percentage of in vitro shoots rooting ranged from 50% to 90%. The survival rate of in vitro shoots rooted in the soil substrate is more than 90%.	Romadanova N.V., Tolegen A.B., Koken T.E., Nurmanov M.M., Kushnarenko S.V. Chemotherapy of in vitro apple shoots as a method of viruses eradication // International Journal of Biology and Chemistry. – 2021. – Vol. 14, № 1. – P. 48-55.

101.	HIV-1 TAT ACTIVATES AKT/MTORC1 PATHWAY AND AICDA EXPRESSION BY DOWNREGULATING ITS TRANSCRIPTIONAL INHIBITORS IN B CELLS	DOI: 10.3390/ijms22041588	ABSTRACT: HIV-1 infects T cells, but the most frequent AIDS-related lymphomas are of B-cell origin. Molecular mechanisms of HIV-1-induced oncogenic transformation of B cells remain largely unknown. HIV-1 Tat protein may participate in this process by penetrating and regulating gene expression in B cells. Both immune and cancer cells can reprogram communications between extracellular signals and intracellular signaling pathways via the Akt/mTORC1 pathway, which plays a key role in the cellular response to various stimuli including viral infection. Here, we investigated the role of HIV-1 Tat on the modulation of the Akt/mTORC1 pathway in B cells. We found that HIV-1 Tat activated the Akt/mTORC1 signaling pathway; this leads to aberrant activation of activation-induced cytidine deaminase (AICDA) due to inhibition of the AICDA transcriptional repressors c-Myb and E2F8. These perturbations may ultimately lead to an increased genomic instability and proliferation that might cause B cell malignancies.	Akbay B.a, bSend mail to Akbay B.,Germini D.aSend mail to Germini D.,Bissenbaev A.K.b, cSend mail to Bissenbaev A.K.,Musinova Y.R.d, eSend mail to Musinova Y.R.,Sheval E.V.eSend mail to Sheval E.V.,Vassetzky Y.a, dSend mail to Vassetzky Y.,Dokudovskaya S. International Journal of Molecular SciencesOpen AccessVolume 22, Issue 4, Pages 1 - 12February 2021 Article number 1588
102.	A POLYCLONAL ANTIBODY AGAINST A RECOMBINANTLY EXPRESSED TRITICUM AESTIVUM RHT-D1A PROTEIN	DOI: 10.1186/s43141-020-00072-4	ABSTRACT: Reduced height-1 dwarfing alleles affect DELLA proteins belonging to a family of putative transcriptional regulators that modulate plant growth and development. The Arabidopsis thaliana genome encodes five DELLA proteins, whereas monocot plants, such as rice, barley, and wheat, each	Smekenov I., Alybayev S., Ayupov T., Rakhmatullaeva G., Bissenbaev A. Journal of Genetic Engineering and Biotechnology, Volume 18, Issue 11, 2020 Article number 52

			<p>have a single DELLA protein. In wheat, wild-type Rht-B1a and Rht-D1a genes encode DELLA proteins and have many alleles that contain lesions. Among them, Rht-B1b and Rht-D1b are the most common mutant dwarfing alleles, which have played a key part in the creation of high-yielding wheat varieties. Despite their fundamental roles in plant biology, until now, DELLA proteins in wheat have been mainly researched regarding the phenotypic effect of defective Rht mutants on yield-related traits, without studies on the underlying mechanisms. The RHT-1 protein has yet to be detected in wheat tissues, owing to a lack of appropriate molecular tools for characterization of RHT function and protein interactions in signal transduction. This study is focused on the production of a polyclonal antibody to the wheat RHT-D1A protein. Results: To generate the anti-RHT-D1A antibody, we expressed and purified soluble 6xHis-tagged RHT-D1A. The purified recombinant RHT-D1A was injected into New Zealand white rabbits to generate polyclonal antiserum. The polyclonal anti-RHT-D1A antibody was purified by ammonium sulfate precipitation, followed by affinity chromatography on protein A-agarose beads. The purified polyclonal antibody was demonstrated to be effective in immunoblotting, western blot hybridization, and immunoprecipitation. In wheat seedling extracts, the polyclonal antibody recognized a protein with a</p>	
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			<p>molecular mass close to the predicted molecular weight of the endogenous RHT-D1A protein. We also demonstrated that RHT-D1A disappears in response to exogenous and endogenous gibberellic acid. Conclusion: The purified polyclonal antibody raised against the recombinant RHT-D1A protein is sufficiently specific and sensitive and could be a useful tool for future insights into upstream and downstream components of DELLA-regulatory mechanisms in wheat plants.</p>	
103.	<p>THE ARABIDOPSIS THALIANA POLY(ADP-RIBOSE) POLYMERASES 1 AND 2 MODIFY DNA BY ADP-RIBOSYLATING TERMINAL PHOSPHATE RESIDUES</p>	<p>DOI: 10.3389/fcell.2020.606596</p>	<p>ABSTRACT: Proteins from the poly(ADP-ribose) polymerase (PARP) family, such as PARP1 and PARP2, use NAD⁺ as a substrate to catalyze the synthesis of polymeric chains consisting of ADP-ribose units covalently attached to an acceptor molecule. PARP1 and PARP2 are viewed as DNA damage sensors that, upon binding to strand breaks, poly(ADP-ribosyl)ate themselves and nuclear acceptor proteins. The flowering plant <i>Arabidopsis thaliana</i> contains three genes encoding homologs of mammalian PARPs: atPARP1, atPARP2, and atPARP3. Both atPARP1 and atPARP2 contain poly(ADP-ribosyl)ating activity; however, it is unknown whether they could covalently modify DNA by ADP-ribosylating the strand break termini. Here, we report that similar to their mammalian counterparts, the plant atPARP1 and atPARP2 proteins ADP-ribosylate 5'-terminal phosphate residues</p>	<p>Taipakova S., Kuanbay A., Saint-Pierre C., Gasparutto D., Baiken Y., Groisman R., Ishchenko A.A., Saparbaev M., Bissenbaev A.K. <i>Frontiers in Cell and Developmental Biology</i>, Volume 826, 2020 Article number 606596</p>

			<p>in duplex DNA oligonucleotides and plasmid containing at least two closely spaced DNA strand breaks. AtPARP1 preferentially catalyzes covalent attachment of ADP-ribose units to the ends of recessed DNA duplexes containing 5'-phosphate, whereas atPARP2 preferentially ADP-ribosylates the nicked and gapped DNA duplexes containing the terminal 5'-phosphate. Similar to their mammalian counterparts, the plant PARP-catalyzed DNA ADP-ribosylation is particularly sensitive to the distance that separates two strand breaks in the same DNA molecule, 1.5 and 1 or 2 turns of helix for atPARP1 and atPARP2, respectively. PAR glycohydrolase (PARG) restored native DNA structure by hydrolyzing the PAR-DNA adducts generated by atPARPs. Biochemical and mass spectrometry analyses of the PAR-DNA adducts showed that atPARPs utilize phosphorylated DNA termini as an alternative to protein acceptor residues to catalyze PAR chain synthesis via phosphodiester bond formation between C1' of ADP-ribose and a phosphate residue of the terminal nucleotide in DNA fragment. Taken together, these data establish the presence of a new type of DNA-modifying activity in Arabidopsis PARPs, suggesting a possible role of DNA ADP-ribosylation in DNA damage signaling and repair of terrestrial plants.</p>	
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<p>104.</p>	<p>WHEAT GERMINATION IS DEPENDENT ON PLANT TARGET OF RAPAMYCIN SIGNALING</p>	<p>DOI: 10.3389/fcell.2020.606685</p>	<p>ABSTRACT: Germination is a process of seed sprouting that facilitates embryo growth. The breakdown of reserved starch in the endosperm into simple sugars is essential for seed germination and subsequent seedling growth. At the early stage of germination, gibberellic acid (GA) activates transcription factor GAMYB to promote de novo synthesis of isoforms of α-amylase in the aleurone layer and scutellar epithelium of the embryo. Here, we demonstrate that wheat germination is regulated by plant target of rapamycin (TOR) signaling. TOR is a central component of the essential-nutrient-dependent pathway controlling cell growth in all eukaryotes. It is known that rapamycin, a highly specific allosteric inhibitor of TOR, is effective in yeast and animal cells but ineffective in most of higher plants likely owing to structural differences in ubiquitous rapamycin receptor FKBP12. The action of rapamycin on wheat growth has not been studied. Our data show that rapamycin inhibits germination of wheat seeds and of their isolated embryos in a dose-dependent manner. The involvement of <i>Triticum aestivum</i> TOR (TaTOR) in wheat germination was consistent with the suppression of wheat embryo growth by specific inhibitors of the TOR kinase: pp242 or torin1. Rapamycin or torin1 interfered with GA function in germination because of a potent inhibitory effect on α-</p>	<p>Smailov B., Alybayev S., Smekenov I., Mursalimov A., Saparbaev M., Sarbassov D., Bissenbaev A. <i>Frontiers in Cell and Developmental Biology</i>, Volume 823, 2020 Article number 606685</p>
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			<p>amylase and GAMYB gene expression. The TOR inhibitors selectively targeted the GA-dependent gene expression, whereas expression of the abscisic acid-dependent ABI5 gene was not affected by either rapamycin or torin1. To determine whether the TaTOR kinase activation takes place during wheat germination, we examined phosphorylation of a ribosomal protein, T. aestivum S6 kinase 1 (TaS6K1; a substrate of TOR). The phosphorylation of serine 467 (S467) in a hydrophobic motif on TaS6K1 was induced in a process of germination triggered by GA. Moreover, the germination-induced phosphorylation of TaS6K1 on S467 was dependent on TaTOR and was inhibited by rapamycin or torin1. Besides, a gibberellin biosynthesis inhibitor (paclobutrazol; PBZ) blocked not only α-amylase gene expression but also TaS6K1 phosphorylation in wheat embryos. Thus, a hormonal action of GA turns on the synthesis of α-amylase in wheat germination via activation of the TaTOR–S6K1 signaling pathway.</p>	
105.	<p>HETEROLOGOUS SECRETORY EXPRESSION OF B-GLUCOSIDASE FROM THERMOASCUS AURANTIACUS IN INDUSTRIAL SACCHAROMYCES CEREVISIAE STRAINS</p>	<p>DOI: 10.1007/s42770-019-00192-1</p>	<p>ABSTRACT: The use of plant biomass for biofuel production will require efficient utilization of the sugars in lignocellulose, primarily cellobiose, because it is the major soluble by-product of cellulose and acts as a strong inhibitor, especially for cellobiohydrolase, which plays a key role in cellulose hydrolysis. Commonly used ethanologenic yeast <i>Saccharomyces cerevisiae</i> is unable</p>	<p>Smekenov I., Bakhtambayeva M., Bissenbayev K., Saparbayev M., Taipakova S., Bissenbaev A.K. Brazilian Journal of Microbiology, Volume 51, Issue 1, Pages 107 – 123, 2020</p>

			<p>to utilize cellobiose; accordingly, genetic engineering efforts have been made to transfer β-glucosidase genes enabling cellobiose utilization. Nonetheless, laboratory yeast strains have been employed for most of this research, and such strains may be difficult to use in industrial processes because of their generally weaker resistance to stressors and worse fermenting abilities. The purpose of this study was to engineer industrial yeast strains to ferment cellobiose after stable integration of <i>tabg11</i> gene that encodes a β-glucosidase from <i>Thermoascus aurantiacus</i> (TaBg11). The recombinant <i>S. cerevisiae</i> strains obtained in this study secrete TaBg11, which can hydrolyze cellobiose and produce ethanol. This study clearly indicates that the extent of glycosylation of secreted TaBg11 depends from the yeast strains used and is greatly influenced by carbon sources (cellobiose or glucose). The recombinant yeast strains showed high osmotolerance and resistance to various concentrations of ethanol and furfural and to high temperatures. Therefore, these yeast strains are suitable for ethanol production processes with saccharified lignocellulose.</p>	
106.	<p>THE INFLUENCE OF ABIOTIC STRESS FACTORS ON THE MORPHOPHYSIOLOGICAL AND PHYTOCHEMICAL ASPECTS OF THE ACCLIMATION OF THE PLANT</p>	<p>DOI: 10.3390/plants10061196 (IF=3,935; Q1 in Ecology, Plant Science).</p>	<p>ABSTRACT: Plants of the <i>Crassulaceae</i> family are natural accumulators of many medicinal secondary metabolites (SM). This article describes the study of morphophysiological, anatomic and</p>	<p>Terletskaya N.V., Korbozova N.K., Kudrina N.O., Kobylina T.N., Kurmanbayeva M.S., Meduntseva N.D., Tolstikova T.G. The Influence of Abiotic Stress Factors on the Morphophysiological and Phytochemical</p>

	<p>RHODIOLA SEMENOWII BORISS.</p>		<p>phytochemical responses of immature plants of <i>Rhodiola semenovii</i> under water deficit and (or) cold-stress conditions. Changes in biomass production due to water content in plant tissues such as a decrease in water deficit and an increase in cold stress were revealed. A significant decrease in the efficiency of the photosynthetic apparatus under stress conditions was noted, based on the parameters quantum efficiency of Photosystem II and electron transport rate and energy dissipated in Photosystem II. The greatest decrease in efficiency was pointed out in conditions of water shortage. The anatomical modulations of root and shoot of <i>R. semenovii</i> under stress conditions were found. For the first time, a detailed study of the chemical composition of the ethanol extract of root and shoot of <i>R. semenovii</i> under stress was carried out using gas chromatography–mass spectrometry. The qualitative and quantitative composition of SM associated with acclimation to the effects of abiotic stresses was determined. Both nonspecific and specific phytochemical changes caused by the action of water deficiency and cold treatment were identified. It has been shown that the antioxidant system in plant tissues is complex, multicomponent, depending on a number of natural and climatic factors. Further research should be focused on the use of abiotic stressors for the targeted synthesis of bioactive SMs valuable for pharmaceutical use.</p>	<p>Aspects of the Acclimation of the Plant <i>Rhodiola semenovii</i> Boriss // Plants – 2021. – 10, 1196.</p>
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107.	PHOTOSYNTHETIC ACTIVITY OF TRITICUM DICOCCUM × TRITICUM AESTIVUM ALLOPLASMIC LINES DURING VEGETATION IN CONNECTION WITH PRODUCTIVITY TRAITS UNDER VARYING MOISTER CONDITIONS	DOI: 10.32615/ps.2021.003 (IF=2,562; Q1 in Plant Science).	ABSTRACT: Drought is a key stressor under global climate change conditions around the world. <i>Triticum dicoccum</i> Shuebl is a species with high potential drought tolerance. Photosynthesis is the primary physiological process affected by water deficit. Rapid light curves (RLCs), recorded using PAM-fluorometers, appear suitable for drought tolerance determination in breeding material. Chlorophyll fluorescence parameters at different vegetation stages, morphophysiological traits, and their relationship with the productivity were analyzed in nine alloplasmic lines (allolines) of <i>T. dicoccum</i> Shuebl × <i>T. aestivum</i> L. partially exposed to drought conditions. Quantum yield parameters at the beginning of RLC at the early vegetation stages correlated with the productivity of investigated lines. Parameters related to photosynthetic capacity had a stronger correlation with the productivity at the stages of subflag and flag formation. For drought tolerance screening, quantum yield of nonorganized energy passive dissipation is particularly promising. Chlorophyll fluorescence and productivity data confirm the potential of the presented breeding strategy in allolines D-d-05 and D-d-05b.	Terletskaya N.V., Stupko V.Yu., Altayeva N.A., Kudrna N.O., Blavachinskaya I.V.N.A., Kurmanbayeva, M.S., Erezhetova, U. Photosynthetic activity of triticum dicoccum × triticum aestivum alloplasmic lines during vegetation in connection with productivity traits under varying moister conditions //Photosynthetica, 2021, 59(1), стр. 74–83.
108.	SOME MECHANISMS MODULATING THE ROOT GROWTH OF VARIOUS WHEAT	DOI:	ABSTRACT: The role of the root in water supply and plant viability is especially important if	Terletskaya N.V., Lee T.E., Altayeva N.A. Kudrina N.O., Blavachinskaya I.V., Erezhetova U. Some mechanisms

	SPECIES UNDER OSMOTIC-STRESS CONDITIONS	10.3390/plants9111545 (IF=3,935; Q1 in Ecology, Plant Science).	plants are subjected to stress at the juvenile stage. This article describes the study of morphophysiological and cytological responses, as well as elements of the anatomical structure of primary roots of three wheat species, <i>Triticum monococcum</i> L., <i>Triticum dicoccum</i> Shuebl., and <i>Triticum aestivum</i> L., to osmotic stress. It was shown that the degree of plasticity of root morphology in water deficit affected the growth and development of aboveground organs. It was found that in conditions of osmotic stress, the anatomical root modulations were species-specific. In control conditions the increase in absolute values of root diameter was reduced with the increase in the ploidy of wheat species. Species-specific cytological responses to water deficit of apical meristem cells were also shown. The development of plasmolysis, interpreted as a symptom of reduced viability apical meristem cells, was revealed. A significant increase in enzymatic activity of superoxide dismutase under osmotic stress was found to be one of the mechanisms that could facilitate root elongation in adverse conditions. The tetraploid species <i>T. dicoccum</i> Shuebl. were confirmed as a source of traits of drought tolerant primary root system for crosses with wheat cultivars.	modulating the root growth of various wheat species under osmotic-stress conditions // <i>Plants</i> , 2020, 9(11), crp. 1–14, 1545.
109.	DROUGHT STRESS AND TOLERANCE	DOI:	ABSTRACT:	Terletskaya, N.V., Shcherban, A.B., Nesterov, M.A., Perfil'ev R.N.,

	<p>PHOTOSYNTHETIC ACTIVITY OF ALLOPLASMIC LINES T. DICOCCUM X T. AESTIVUM</p>	<p>10.3390/ijms21093356 (IF=5,923; Q1 in Plant Science).</p>	<p>Tetraploid species <i>T. dicoccum</i> Shuebl is a potential source of drought tolerance for cultivated wheat, including common wheat. This paper describes the genotyping of nine stable allolines isolated in the offspring from crossing of <i>T. dicoccum</i> x <i>T. aestivum</i> L. using 21 microsatellite (simple sequence repeats-SSR) markers and two cytoplasmic mitochondrial markers to orf256, rps19-p genes; evaluation of drought tolerance of allolines at different stages of ontogenesis (growth parameters, relative water content, quantum efficiency of Photosystem II, electron transport rate, energy dissipated in Photosystem II); and the study of drought tolerance regulator gene <i>Dreb-1</i> with allele-specific PCR (AS-MARKER) and partial sequence analysis. Most allolines differ in genomic composition and <i>T. dicoccum</i> introgressions. Four allolines-D-b-05, D-d-05, D-d-05b, and D-41-05-revealed signs of drought tolerance of varying degrees. The more drought tolerant D-41-05 line was also characterized by <i>Dreb-B1</i> allele introgression from <i>T. dicoccum</i>. A number of non-specific patterns and significant differences in allolines in regulation of physiological parameters in drought conditions is identified. Changes in photosynthetic activity in stress-drought are shown to reflect the level of drought tolerance of the forms studied. The contribution of different combinations of nuclear/cytoplasmic genome and alleles</p>	<p>Salina E.A., .Altayeva, N.A., Blavachinskaya, I.V. Drought stress tolerance and photosynthetic activity of alloplasmic lines t. <i>Dicoccum</i> x t. <i>aestivum</i> // International Journal of Molecular Sciences, 2020, 21(9), 3356.</p>
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			of <i>Dreb-1</i> gene in allolines to the formation of stress tolerance and photosynthetic activity is discussed.	
110.	RAPID RUBBER EXTRACTION AND NMR SPECTROSCOPY OF RUBBER EXTRACTED FROM THE ENDEMIC SPECIES SCORZONERA TAU-SAGHYZ.	DOI: 10.18321/ectj931 (CiteScore (2020) – 1.3, P35, SJR 2020 - 0.227, SNIP 2020 - 0.606) (Eurasian Chemico-Technological Journal – CiteScore: 1.3, Percentile: 35) (индекс Хирша 1) https://doi.org/10.18321/ectj931	ABSTRACT: Scorzonera tau-saghyz Lipsch. et G.G. Bosse is an endemic rubber producing plant, growing in mountain regions in South Kazakhstan. The rubber content in plants and the quality of biopolymer has an important impact on industrial rubber production. The results of this study showed that the amount of rubber in <i>S. tau-saghyz</i> roots fluctuates between 7.74% and 38.75%. The amount of synthesized and deposited rubber biopolymer particles depends on various factors such as physiological age of plant, origin, temperature, moisture and environmental conditions. We optimized the extraction method of natural rubber by using n-hexane as a solvent for direct extraction. This method allows extracting the maximum amount of rubber from 3–4-year-old plants. NMR results show structural links of natural isoprene rubber in the root extract sample. There is a clear relationship between methyl, methine and methylene protons which corresponds to isoprene rubber structure. The samples having strongly marked singlets that are inherent for rubber functional groups confirms the stereospecific structure of rubber. Good solubility of the root extract in deuterated chloroform can characterize the low molecular weight of the polymer.	Kenzhe Karim Boguspaev, Svetlana Turasheva, Tulegen Seilkhanov., Dmitriy Faleev , Meirambek Mutalkhanov, Vitaliy Portnoy Rapid rubber extraction and nmr spectroscopy of rubber extracted from the endemic species <i>Scorzonera tau-saghyz</i> . // Euras chem tech journal. – 2020. - №22. – P. 59-68.

			<p>NMR characterization of rubber, extracted from <i>S. tau-saghyz</i> roots, is reported for the first time. Regeneration in vitro provides an important opportunity for endemic preservation by rapidly increasing the number of plants. The best regeneration of adventitious shoots was obtained on MS medium containing 5.5 µM kinetin and 0.5 µM NAA. The plants were successfully acclimatized in a glasshouse with 75% of <i>S. tau-saghyz</i> plantlets, respectively surviving after transfer to ex vitro conditions.</p>	
111.	<p>PROSPECTS FOR THE CREATION OF A WASTE-FREE TECHNOLOGY FOR WASTEWATER TREATMENT AND UTILIZATION OF CARBON DIOXIDE BASED ON CYANOBACTERIA FOR BIODIESEL PRODUCTION</p>	<p>DOI: https://doi.org/10.1016/j.jbiotec.2020.10.010</p>	<p>ABSTRACT: Current fresh water and energy shortage determines the need to study the possibilities of using living objects in bioenergy and environmental purification technologies. The development of waste-free technologies allows waste recycling, which saves raw materials and energy, in turn, reducing waste generation. The effect of different carbon dioxide concentrations and wastewater from households on the growth of cyanobacteria was studied in order to determine their capabilities in the purification processes. It was found that the optimal CO₂ concentration for the cultivation of cyanobacteria <i>Cyanobacterium</i> sp. IPPAS B-1200 and <i>Desertifilum</i> sp. IPPAS B-1220 was 10 %, and for the <i>Cyanobacterium aponinum</i> IPPAS B-1201 – 5%. It was revealed that the cultivation of the cyanobacterium <i>Cyanobacterium</i> sp. IPPASB-1200 on</p>	<p><u>Kenzhegul Bolatkhan, Assem K.Sadvakasova, Bolatkhan K.Zayadan, Ardak B.Kakimova, Fariza K.Sarsekeyeva, Bekzhan D.Kossalbayev, Ayshat M.Bozieva, Saleh Alwasel, Suleyman I.Allakhverdiev.</u> Prospects for the creation of a waste-free technology for wastewater treatment and utilization of carbon dioxide based on cyanobacteria for biodiesel production. <i>Journal of Biotechnology</i>, 2020, 324, стр. 162–170</p>

			<p>wastewater from the water storage reduces the concentration of organic pollutants and, accordingly, improves the physicochemical properties of water. The cleaning percentage for selected pollutants was 68–100 %. It was shown that the most optimal ratio of wastewater to nutrient media for cyanobacteria cultivation were 25:75 and 50:50. The lipid content (%/dry weight) in the biomass of the studied strains of cyanobacteria ranges from 15 to 22% after cultivation in wastewater. It was determined that the strains of Cyanobacterium genus were the most suitable for the production of biodiesel according to their fatty acids composition. It was determined that lipids were composed of only saturated and monounsaturated fatty acids. As a result of the studies, the optimal conditions for the growth of Cyanobacterium sp. IPPAS B-1200 were determined. This microorganism has a good potential to produce biodiesel as a producer of saturated and monounsaturated middle-chain-length fatty acids.</p>	
112.	<p>ASSESSMENT OF THE BIOTECHNOLOGICAL POTENTIAL OF CYANOBACTERIAL AND MICROALGAL STRAINS FROM IPPAS CULTURE COLLECTION</p>	<p>DOI: https://doi.org/10.1134/S0003683820070030</p>	<p>ABSTRACT: A search for strains capable of the simultaneous production of high amounts of several biologically valuable compounds and/or high biomass productivity has been carried out. The growth characteristics and biochemical composition of 12 microalgal and cyanobacterial strains from the IPPAS</p>	<p>Sinetova M.A., Sidorov R.A., Starikov A.Y., Voronkov A.S., Medvedeva A.S., Krivova Z.V., Pakholkova M.S, Bachin D.V., Bedbenov V.S, Gabrielyan D.A., Zayadan B.K, Bolatkhan K <u>Assessment of the Biotechnological Potential of Cyanobacterial and Microalgal Strains from IPPAS Culture Collection.</u></p>

			Collection were studied at the exponential and stationary growth phases. All of the strains had high growth rates (a doubling time of 6–22 h). The strains Cyanobacterium sp. IPPAS B-1200, Chlorella sp. IPPAS C-1210, Nannochloris sp. IPPAS C-1509, Cyanidium caldarium IPPAS P-510, and Vischeria sp. IPPAS H-242 demonstrated the highest biotechnological potential and can be used for the production of various types of biofuel, pigments, and feed and food additives, including those with a high content of eicosapentaenoic acid (20 : 5 Δ 5, 8,11, 14, 17).	<u>Applied Biochemistry and Microbiology</u> , 2020, 56(7), crp. 794–808
113.	BIOPROCESSES OF HYDROGEN PRODUCTION BY CYANOBACTERIA CELLS AND POSSIBLE WAYS TO INCREASE THEIR PRODUCTIVITY	DOI: https://doi.org/10.1016/j.rser.2020.110054	ABSTRACT: Due to the depletion and increasing cost of fossil fuels, the production of cyanobacteria-based hydrogen as eco-friendly and renewable energy for the future seems promising. The paper describes the current state of research in the field of hydrogen yield by cyanobacteria. The use of cyanobacteria as potential producers of hydrogen is particularly relevant and beneficial as they form hydrogen from water as a result of solar energy conversion. However, production is a complex biotechnological process, and the main obstacle is the low ability of cyanobacteria to produce hydrogen. The prospects for the development of cyanobacterium-based hydrogen energy can be improved by a complex approach of increasing hydrogen	<u>Asemgul K.Sadvakasova, Bekzhan D.Kossalbayev, Bolatkhan K.Zayadan, Kenzhegul Bolatkhan, Saleh Alwasel, Mohammad Mahdi Najafpour, Tatsuya Tomo, Suleyman I.Allakhverdiev. Bioprocesses of hydrogen production by cyanobacteria cells and possible ways to increase their productivity. Renewable and Sustainable Energy Reviews</u> , 2020, 133, 110054

			<p>productivity by cyanobacteria cells. First of all, it is the achievement of genetic engineering, the construction of genetic mutants of cyanobacteria with great potential in hydrogen production, followed by a correctly chosen metabolic approach to increase its yield and the development of innovative methods of their cultivation. Thus, the widespread adoption of this technology requires additional R&D with large investments.</p>	
114.	<p>EFFECT OF CADMIUM IONS ON SOME BIOPHYSICAL PARAMETERS AND ULTRASTRUCTURE OF ANKISTRODESMUS SP. B-11 CELLS</p>	<p>DOI: https://doi.org/10.1134/S1021443720040196</p>	<p>ABSTRACT: Effects of low concentrations of cadmium ions on growth, photosynthesis, and cell ultrastructure of microalga <i>Ankistrodesmus</i> sp. B-11 were investigated. The addition of cadmium to growth medium at concentrations of 0.005–0.02 mg/L led to a significant decrease in the number of <i>Ankistrodesmus</i> sp. B-11 cells relatively to that in the untreated culture. The addition of cadmium at concentrations >0.05 mg/L completely stopped cell growth. Cadmium ions induced ultrastructural changes in the arrangement of thylakoids within the stroma, the detachment of thylakoid membranes with the formation of void interthylakoid spaces, and a significant increase in vacuolization of microalgal cells. Simultaneous measurements of fluorescence induction curves and redox transformations of photosystem I components on a microsecond time scale by means of a M-PEA-2 fluorometer</p>	<p><u>B.K. Zayadan, A. K. Sadvakasova, D.N. Matorin, N. R. Akmukhanova, M.Kokocinski, N.P.Timofeev, Kh.Balouch & M. O. Bauenova.</u> <u>Effect of Cadmium Ions on Some Biophysical Parameters and Ultrastructure of <i>Ankistrodesmus</i> sp. B-11 Cells.</u> <u>Russian Journal of Plant Physiology</u> volume 67, pages 845–854 (2020).</p>

			revealed that cadmium ions inhibit electron transport in photosystem II (PSII). The quantum yield of electron transport in PSII (ϕE_o) and the performance index (PIABS) were found to decrease; the photoreduction of P700 pigment was decelerated, while energy dissipation (DI0/RC) and ΔpH -dependent nonphotochemical quenching (qE) increased significantly under the action of cadmium. The performance index (PIABS) was the most sensitive parameter; it can be used for the detection of early toxic effects of cadmium ions on algae.	
115.	DETERMINATION OF THE POTENTIAL OF CYANOBACTERIAL STRAINS FOR HYDROGEN PRODUCTION	DOI: https://doi.org/10.1016/j.ijhydene.2019.11.164	ABSTRACT: Hydrogen (H ₂) is a renewable, abundant, and nonpolluting source of energy. Photosynthetic organisms capture sunlight very efficiently and convert it into organic molecules. Cyanobacteria produce H ₂ by breaking down organic compounds and water. In this study, biological H ₂ was produced from various strains of cyanobacteria. Moreover, H ₂ accumulation by <i>Synechocystis</i> sp. PCC 6803 was as high as 0.037 $\mu\text{mol/mg Chl/h}$ within 120 h in the dark. The wild-type, filamentous, non-heterocystous cyanobacterium <i>Desertifilum</i> sp. IPPAS B-1220 was found to produce a maximum of 0.229 $\mu\text{mol/mg Chl/h}$ in the gas phase within 166 h in the light, which was on par with the maximum yield reported in the literature. DCMU at 10 μM increased H ₂ production by <i>Desertifilum</i> sp. IPPAS B-1220 by 1.5-fold to 0.348 $\mu\text{mol H}_2/\text{mg}$	<u>Bekzhan D.Kossalbayev, Tatsuya Tomo, Bolatkhan K.Zayadan, Asemgul K.Sadvakasova, Kenzhegul Bolatkhan, Saleh Alwasel, Suleyman I.Allakhverdiev.</u> <u>Determination of the potential of cyanobacterial strains for hydrogen production.</u> <u>International Journal of Hydrogen Energy, 2020, 45(4), стр. 2627–2639</u>

			Chl/h. This is the first report on the capability of Desertifilum cyanobacterium to produce H ₂ .	
116.	POTENTIAL OF MICROALGAE PARACHLORELLA KESSLERI BH-2 AS BIOREMEDIATION AGENT OF HEAVY METALS CADMIUM AND CHROMIUM	DOI: https://doi.org/10.1016/j.algal.2021.102463	ABSTRACT: The basis of biological remediation refers to environmentally friendly methods of extracting various xenobiotics, including heavy metals, from the wastewater of various industrial facilities, using the biochemical capabilities of naturally occurring organisms or their metabolites. In this regard, the assessment of the contribution of microalgae to the transformation of heavy metal compounds and the detoxification of the natural environment is very important and necessary. This paper presents an investigation of the effect of different concentrations of cadmium Cd ²⁺ and chromium Cr ^{2O7} ²⁻ ions on the survival and ultrastructure of microalgae cells of Parachlorella kessleri Bh-2 and its ability to accumulate these metals in order to determine its bioremediational potential against these metals. It was determined that the culture of Parachlorella kessleri Bh-2 is resistant to concentrations of cadmium (0.3 mg l ⁻¹) and chromium (30 mg l ⁻¹) ions. It was found that heavy metals in these concentrations are actively transported through the cell membrane and accumulate in the cytoplasm of cells, causing an increase in the number of vacuoles with electron-dense deposits, granulation of the cytoplasm and an increase in the number of	Meruert O.Bauenova, Assemgul K.Sadvakasova, Zhuldyz O.Mustapayeva, Mikołaj Kokociński, Bolatkhan K.Zayadan, Maria Katarzyn, Wojciechowicz, Huma Balouch, Nurziya R.Akmukhanova, Saleh Alwasel, Suleyman I. Allakhverdiev, 2021. Potential of microalgae Parachlorella kessleri Bh-2 as bioremediation agent of heavy metals cadmium and chromium Algal Research, Volume 59, November 2021,102463

			starch grains in the microalgae cells. Analysis of the content of total polysaccharides showed a noticeable increase in the concentration of polysaccharides by of exposure to concentrations of Cd (II) - 0,3 mg l ⁻¹ and Cr (VI) - 30 mg l ⁻¹ .	
117.	POTENTIAL OF CYANOBACTERIA IN THE CONVERSION OF WASTEWATER TO BIOFUELS	DOI: https://doi.org/10.1007/s11274-021-03107-1	ABSTRACT: Environmental and energy security has now become a serious global problem, requiring a lot of research to find and implement its cost-effective and environmentally friendly alternatives. The development and use of renewable energy sources is necessary and important in order to avoid the emergence of a global economic crisis. One of the solution to prevent a future crisis caused by energy shortages is to introduce biofuels into the fuel market. Despite the fact that various forms of renewable energy are currently used, the prospects for the production of biofuels from cyanobacteria are quite high due to their unique properties, such as a high lipid content and a suitable fatty acid (FA) composition for the production of biofuels, their suitability for growing open water and the ability to grow on wastewater. The purpose of this article is to provide a comprehensive overview of the potential of cyanobacteria in the conversion of wastewater into biofuels. The article covers comparative data on the accumulation of lipids and the content of fatty acids in various representatives of	Asemgul K. Sadvakasova, Bekzhan D. Kossalbayev, Bolatkhan K. Zayadan, Dariga K. Kirbayeva, Saleh Alwasel & Suleyman I. Allakhverdiev. Potential of cyanobacteria in the conversion of wastewater to biofuels. World Journal of Microbiology and Biotechnology, 2021, 37(8), 140

			<p>cyanobacteria and their possibilities in the remediation of wastewater. Various approaches to the extraction of lipids from phototrophic microorganisms that are currently available, their advantages and disadvantages, and the results of the monitoring of the main key points of the development of the technology for converting cyanobacterial biomass into biofuels, with an emphasis on the existing barriers, effects and solutions, are also considered. Further research in this field is required for the successful implementation of this technology on an industrial scale.</p>	
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