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# BIOACTIVE PROPERTIES OF LUPINE (*Lupinus albus L.*) SEEDS AND ITS IMPORTANCE IN HUMAN NUTRITION

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As well as being used in human and animal nutrition for many years, lupen also plays a role in disease prevention and treatment due to its bioactive components. In addition to its high protein content, lupine flour is an important additive for grain products due to its high water and oil retention capacity and a good emulsifying agent. It is used in products such as lupine, bread, biscuit, cake, pasta, confectionery, soy sauce, in the production of high-quality vegetable oil with high antioxidant content, as gluten-free flour, emulsifier, alternative products to milk and cookies. Lupen is particularly useful for human health against conditions known as metabolic syndrome, which includes a number of factors such as obesity, high blood pressure, insulin resistance, high cholesterol in the blood.

*Keywords:* Lupine, bioactive properties, antioxidant activity, polyphenols, use in foods, nutrition.

Lupine (*Lupinus albus L.*) is an annual herbaceous plant that contains about 300 species of the Legumineceae family, including the *Lupinus* species. The lupine seeds contain about 36-52 % protein, 2-20 % fat and 30-40 % fiber. The fatty acid composition of the lupin oil consists mainly of oleic and linoleic acid. The mineral contents of

the lupine seeds and in addition to this rich content, it is in a position that can compete with soy (about 40 %) with its high protein content and it has been found that it has the potential to meet a significant portion of the mineral substances that should be taken daily. Dietary fiber makes up 40 % of the grain weight of the sweet lupine and is at a higher level than other legumes. The antioxidant activity of the lupine varieties does not depend on the color or polyphenol content of the seeds. Lupine flour is an ideal food component because it has a high content of protein, dietary fiber and bioactive compound and low lipid and starch content.

In this study, the bioactive properties of lupines and their importance in human nutrition will be explained. In addition to its high protein content, lupine flour is an important additive for grain products due to its high water and oil retention capacity and a good emulsifying agent. It has become an alternative raw material for gluten-free products because it does not contain gluten and gluten-like proteins and has a high nutritional value for the diets of celiac patients. Lupine can be used as a supplement in existing products or as a source of protein or fiber in new products. Protein extracts obtained from lupine are used as food additives in the USA in the range of 1-10 % in many food products, especially bakery products, dairy products, frozen milk desserts, jams, puddings and meat products. Lupine is especially beneficial for human health in cases known as metabolic syndrome, which includes a number of factors such as obesity, high blood pressure, insulin resistance, high cholesterol in the blood. It gives fullness (appetite suppression) and provides energy balance. It affects glycemic control. It regulates blood lipids, hypertension, intestinal health.

A minor component of the lupine lipid fraction lupeol is a triterpene alcohol that promotes differentiation as well as promoting dilution of epidermal cells and inhibits the growth of melanoma cells. Lupine usually contains 36-52 % protein, 5-20 % fat and 30-40 % fiber. The composition varies depending on genetic and environmental conditions. Sodium and calcium are low compared to lupine other legumes. Carotenoids and zeaxanthin are high and give bright yellow color. While other legumes contain as much as 50 % starch, the rate of starch in lupine is low (2.3 %). The lupine protein contains high levels of lysine amino acid and low levels of methionine and cystine amino acid. Lupine is a potential source of bioactive plant components with antioxidant activity due to the chemical composition of its seeds. Seeds of low alkaloid lupine varieties are a valuable source of protein. As a valuable component of functional food, interest in lupine is growing. Lupine cotyledon is the source of antioxidant components. As in other oil plants, alpha-tocopherol (85.5 %) and gamma-tocopherol (86.1 %) are dominant in lupine species. The lupine's vitamin E content is similar to soy, but its rate is lower than that of sunflower or rapeseed oil. The tannin content of lupine flour is several times higher than the tannin content in seeds. The antioxidant activity of the lupine varieties does not depend on the color or polyphenol content of the seeds. A lupine flour protected by irradiation can be considered a functional food additive to prevent negative oxidative changes during storage. The antioxidant effect of tocopherol depends on the temperature and the amount of tocopherols lost in competitive reactions with phenolics. Vitamin E prevents oxidation of cholesterol and cholesterol carrier proteins and prevents damage to the vessel wall, which leads to the development of atherosclerosis in the future.

**Conclusion.** It is able to compete with soy with its mineral content and high protein content in addition to this rich content, and it has been shown that it has the potential to meet a significant portion of the mineral substances that should be taken daily. This case demonstrates the importance of the work for recovering the development and dissemination of planting and breeding in the region via Turkey. Lupine seeds can be a potential source of nutritious cellulose for dietary food production. Since it contains minimal starch, its glycemic index is very low. It is extremely nutritious and easy to digest. The lupine's essential amino acids are high, cholesterol-free, contain trypsin inhibitors in an insignificant amount, saponins and lectins known as stomach irritants are very low, no chemical or heat treatment is required before consumption.

# CONTENT

## SECTION 1 SOCIO-ECOLOGICAL, ETHICAL AND PEDAGOGICAL PROBLEMS

ACADEMIC INTEGRITY AS ONE OF THE IMPORTANT FACTORS OF PROFESSIONAL BEHAVIOR OF TEACHERS AND MEDICAL STUDENTS IN A PANDEMIC.....	3
<i>H. Kravets, L. Shevchik</i>	
ANALYSIS OF MEDICAL AND DEMOGRAPHIC INDICATORS IN RUSSIA AND IN THE REPUBLIC OF TATARTAN.....	4
<i>A. Shakirova</i>	
ASSESSMENT THE LEVEL OF COMPETENCIES OF STUDENTS-ECOLOGISTS.....	5
<i>M. Gudova, E. Zhuk, T. Kapustina</i>	
ASSESSMENT OF THE IMPACT OF WIND POWER PLANTS ON HUMAN HEALTH DURING ENERGY PRODUCTION.....	6
<i>A. Khamitsevich, I. Kirukhin, N. Lepskaya</i>	
BELARUSIAN FOLK TRADITIONS OF RECUPERATION AS THE BASIS FOR IMPLEMENTING INNOVATIVE FORMS OF HEALTH TOURISM.....	7
<i>D. Parhimovich, K. Peretrakhina</i>	
COMBINED APPLICATION OF METOTREXATE AND CLADRIBIN IN THE TREATMENT OF RHEUMATOID ARTHRITIS.....	8
<i>M. Kuznechik, I. Puhteeva</i>	
CONCEPT OF AN «ECOLOGICAL HOUR» AS A FACTOR OF THE DEVELOPMENT OF PERSONAL ENVIRONMENTAL CONSCIOUSNESS.....	9
<i>A. Dolhaya, A. Rodzkin</i>	
CONTRIBUTION OF NEOFUNCTIONALISTS TO THE FORMATION OF ENVIROMENTAL ANTHROPOLOGY.....	10
<i>A. Kadeikina, I. Olevskaya</i>	
DEPENDENCE OF FOOD LOSSES IN THE FOOD SUPPLY CHAIN ON CONSUMER BEHAVIOR.....	11
<i>I. Khutornaia</i>	
ENVIROMENTAL AWARENESS OF STUDENTS IN THE MANAGEMENT OF MSW .....	12
<i>A. Vabishchevich, L. Kysina</i>	
ENVIRONMENTAL VOLUNTEER GROUPS AT SCHOOL.....	13
<i>E. Komashilova, A. Kudimova, A. Mironova</i>	
EPIGENETIC TRAITS OF SKULL IN PALEOANTHROPOLOGY.....	13
<i>V. Vinnikava</i>	
EXPORT OF MEDICAL SERVICES IN BELARUS: PROBLEMS AND PROSPECTS OF DEVELOPMENT.....	15
<i>I. Krychko L. Kuzina</i>	
FEATURES OF ADP-INDUCED PLATE AGGREGATION IN PREGNANT WOMEN WITH PREECLAMPSY.....	16
<i>A. Morozova, A. Bakunovich</i>	
FROM PRINTED LIST TO DATA CELL: THE EVOLUTION OF TEXTBOOK .....	17
<i>Y. Yepikhau, A. Antonov</i>	
GREENWASHING FROM THE PERSPECTIVE OF ENVIRONMENTAL MEDICINE.....	18
<i>L. Hauryliuk, N. Kozelko</i>	
GREENWASHING: DUVIOUS ENVIRONMENTAL PRESERVATION.....	19
<i>L. Gavrilyuk, L. Kulyaeva, I. Olevskaya</i>	
HUMANITARIAN IMPORTANCE OF PHYSICAL CULTURE.....	20
<i>O. Hadasevic</i>	

INFLUENCE OF SOCIAL ISOLATION DURING THE PANDEMIC OF THE CORONAVIRUS ON THE PSYCHOLOGICAL STATE OF HUMAN BEING.....	21
<i>K. Kot</i>	
INTERHEMISPHERIC BRAIN ASYMMETRY RESEARCH IN STUDENTS.....	22
<i>K. Ostrenko, V. Almakaeva</i>	
IS ENVIRONMENTAL SITUATION A RESPONSIBILITY OF AN INDIVIDUAL OR SOCIETY?.....	23
<i>M. Bogachova, I. Olevskaya</i>	
PHYSICAL CULTURE - PART OF GENERAL HUMAN CULTURE.....	24
<i>O. Hadasevic</i>	
PHYSICAL EDUCATION IN THE STRUCTURE OF PROFESSIONAL EDUCATION.....	25
<i>V. Skuratovich, O. Hadasevic</i>	
PROBLEMS OF COLLECTION, DISPOSAL AND USE OF MSW.....	26
<i>A. Akhatova, L. Kuzina</i>	
PROBLEMS OF ECOLOGICAL HEALTH.....	27
<i>O. Sokolovich, I. Olevskaya</i>	
PROBLEMS OF IMPLEMENTATION OF THE CIRCULAR ECONOMY IN THE REPUBLIC OF BELARUS.....	28
<i>D. Zhukovskaya, L. Kuzina</i>	
PSYCHOLOGY AND GLOBALIZATION.....	29
<i>M. Kokhnyuk, I. Olevskaya</i>	
SOCIAL (NON)TRUST AS THE BASIS OF THE ENVIRONMENTAL CRISIS IN MODERN RUSSIA.....	30
<i>V. Korunova</i>	
TENOFOVIR AS A POTENTIAL INHIBITOR FOR 2019-nCoV CORONAVIRUS MPTOTEAASE.....	31
<i>A. Trifonova, M. Khancheuski, S. Shahab, M. Sheikhi</i>	
THE IMPACT OF THE GLOBAL WARMING ON THE PSYCHO-EMOTIONAL STATE OF A PERSON.....	32
<i>M. Yakauleva, I. Olevskaya</i>	
THE INFLUENCE OF GEOPHYSICAL FIELDS ON HUMAN MENTAL AND NERVOUS ACTIVITY.....	33
<i>N. Darashevich, I. Olevskaya</i>	
THE POSITION OF THE CONCEPT OF NEOEVOLUTIONISM IN CONTEMPORARY ECOLOGICAL ANTHROPOLOGY.....	34
<i>A. Kadeikina, I. Olevskaya</i>	
THE PROBLEM OF GLOBALIZATION IN PROCESSUAL ENVIRONMENTAL ANTHROPOLOGY.....	35
<i>A. Kadeikina, I. Olevskaya</i>	
THE PROBLEM OF HYPERCONSUMPTION IN MODERN SOCIETY .....	36
<i>V. Gamenyuk, I. Olevskaya</i>	
THE PSYCHOLOGY OF CONSUMPTION .....	37
<i>V. Polyanskaya, I. Olevskaya</i>	

## SECTION 2 MEDICAL ECOLOGY

ADSORPTION TYRPHOSTIN AG528 ANTICANCER DRUG UPON THE CNT(6,6-6) NANOTUBE.....	38
<i>K. Sirotsina, S. Shahab, A. Yurlevich, D. Novik, E. Kvasyuk</i>	
AGE AND GENDER DISTINCTIONS IN THE PSYCHOLOGICAL STATE WHILE WORKING ON THE COMPUTER ACCORDING TO SUBJECTIVE SCORING.....	38
<i>A. Fedotov</i>	
ANALYSIS AND INTERPRETATION OF ONCOMARKERS PRESENCE IN BLOOD SERUM.....	39
<i>D. Yanchenko, T. Romanovskaya</i>	
ANALYSIS OF ACCESSED APLASTIC ANEMIA INCIDENCE AMONG CHILDREN IN THE REPUBLIC OF BELARUS (2000 – 2018).....	40
<i>V. Tyshkevich, I. Puhteva, T. Kugeiko</i>	

ANALYSIS OF BIOCHEMICAL INDICES OF PERIPHERAL BLOOD OF PATIENTS WITH METABOLIC SYNDROME IN COGNITIVE DYSFUNCTION.....	41
<i>Y. Pekarskaya, E. Shpadaruk, R. Smolyakova</i>	
ANALYSIS OF CARDIOLOGICAL PATIENTS INCIDENCE ON THE ULTRASOUND «GANTSEVICH CRH» IN THE BREST REGION.....	43
<i>I. Varvashevich</i>	
ANALYSIS OF MORTALITY OF THE POPULATION OF VITEBSK REGION FROM CARDIOVASCULAR DISEASES FOR THE PERIOD 2008-2019.....	44
<i>O. Proshchenko</i>	
ANALYSIS OF SENSITIVITY OF <i>PROTEUS MIRABILIS</i> TO ANTIBACTERIAL DRUGS <i>IN VITRO</i> .....	45
<i>A. Yakubovich, E. Gritskevitch</i>	
ANALYSIS OF THE INCIDENCE OF RESPIRATORY SYSTEM PATHOLOGY OF THE POPULATION OF MINSK AND THE MINSK REGION.....	46
<i>O. Susha</i>	
ANALYSIS OF THE MECHANISMS OF INTRACELLULAR CALCIUM HOMEOSTASIS IN LYMPHOCYTES.....	46
<i>A. Kaurova, N. Gerasimovich</i>	
ANALYSIS OF THE PREVALENCE OF BONE-MUSCULAR SYSTEM AND CONNECTIVE TISSUE DISEASES AMONG THE POPULATION OF GOMEL REGION IN 2013-2018.....	47
<i>D. Shaforenko, I. Puhteeva</i>	
ANALYSIS OF THE QUALITY OF TREATMENT OF CERVICAL CANCER BY COMBINED RADIOTHERAPY.....	48
<i>I. Shturo, T. Chikova</i>	
ANALYSIS OF TOOTH MORBIDITY IN THE POPULATION OF GOMEL AND GOMEL REGION.....	49
<i>A. Mashukova</i>	
ANTAGONISTIC ACTIVITY OF <i>BACILLUS THURINGIENSIS</i> BACTERIA IN RELATION TO SOME SANITARY-INDICATIVE MICROORGANISMS.....	50
<i>Y. Nemkevich, E. Gritskevitch</i>	
ANTIBIOTIC RESISTANCE STUDY OF THE MAIN REPRESENTATIVES OF THE ENTEROBACTERIACEAE FAMILY.....	51
<i>D. Oleinikova, N. Ikonnikova</i>	
ANTI-CHLAMYDIA ANTIBODIES: DIAGNOSTIC AND PATHOGENETIC SIGNIFICANCE OF CLASS AFFILIATION.....	52
<i>Y. Karostik</i>	
ANTIOXIDANT ACTIVITY OF MILFOIL FLOWERS AND LEAVES EXTRACTS ( <i>ACHILLEA</i> ).....	53
<i>A. Kuxta, A. Nebokatkina, E. Tarun, V. Kurchenko</i>	
APPLICATION OF ELISA IN DIAGNOSTICS OF INFECTIOUS DISEASES.....	54
<i>N. Kurnushko, T. Romanovskaya</i>	
ASSESSMENT OF BREAST CANCER AGGRESSIVE POTENTIAL BY HER-2 / NEU AND KI-67 EXPRESSION LEVELS.....	55
<i>A. Prokopuk, E. Shpadaruk, I. Andreeva</i>	
ASSESSMENT OF HODGKIN'S LYMPHOMA INCIDENCE AMONG THE POPULATION OF THE CITY OF MINSK.....	56
<i>A. Krupitskaya, A. Zhuk, N. Zhardzetskaya</i>	
ASSESSMENT OF THE BODY'S REACTIVITY BY CELLULAR INDICATORS OF PERIPHERAL BLOOD IN PATIENTS SUFFERING FROM TUBERCULOSIS DURING THERAPY.....	57
<i>A. Mazurova, K. Shadaruk</i>	
ASSESSMENT OF THE PSYCHOLOGICAL STATE OF SCHOOL CHILDREN OF DIFFERENT AGE GROUPS.....	58
<i>E. L. Serenkova</i>	
BIOACTIVE PROPERTIES OF LUPINE ( <i>Lupinus albus L.</i> ) SEEDS AND ITS IMPORTANCE IN HUMAN NUTRITION.....	59
<i>Duygu İpek Çoban, V. Lemiasheuski, Mehmet Musa Özcan</i>	



BIOCHEMICAL DISORDERS OF HOMEOSTASIS IN DEVELOPMENT OF A SYSTEMIC INFLAMMATORY PROCESS CAUSED BY CORONAVIRUS INFECTION.....	60
<i>V. Slabko, R. Smolyakova</i>	
BIOELECTRICAL IMPEDANCE DETERMINING BODY COMPOSITION AND HARDWARE-SOFTWARE RECORDING OF HEART RATE VARIABILITY DURING AN OBJECTIVE STRUCTURED CLINICAL EXAMINATION AS A DIAGNOSTIC TOOL.....	61
<i>G. Nevoit</i>	
BORON NEUTRON THERAPY – BORON-10 DELIVERY TO THE TUMOR TISSUES.....	63
<i>M. Mikulich, M. Statsi, I. Puhteva, T. Apanasenka, N. Gerasimovich</i>	
CALCIUM EXCHANGE MODIFICATIONS IN RAT PLATELETS DURING THE POST-RADIATION PERIOD.....	64
<i>A. Goman, O. Parhimovich, K. Bulanova, A. Zinchenko</i>	
CALCULATION OF THE ANNUAL EFFECTIVE DOSE OF THE INTERNAL IRRADIATION OF THE POPULATION DUE TO CONSUMING HONEY PRODUCED ON THE TERRITORY OF THE POLESSKY STATE RADIOECOLOGICAL RESERVE.....	65
<i>V. Kravchenko, V. Kravchenko</i>	
CHANGES IN THE HEALTH OF RUSSIANS IN THE CONTEXT OF ENVIRONMENTAL THREATS.....	66
<i>V. Korunova</i>	
COMPUTER MODELING OF OLIGOPEPTIDES THAT BIND S1 SARS-COV-2 PROTEIN.....	67
<i>S. Bruyakin, D. Makarevich, T. Ryabtseva</i>	
CONGENITAL DISEASES PREVENTION.....	68
<i>A. Yatskov, N. Kokorina</i>	
CONTENTS OF SEPARATE RADIONUCLIDES IN VARIOUS TYPES OF FISH OF RESERVOIRS OF THE PINA REGION OF THE BREST REGION.....	69
<i>A. Garbatsevich</i>	
CREATION OF BACTERIAL STRAIN-PRODUCER OF XANTHOSINE PHOSPHORYLASE.....	70
<i>A. Daineko, A. Bulatovski, A. Zinchenko</i>	
CYTOTOXIC EFFECT OF MUSHROOM <i>PHALLUS IMPUDICUS</i> ETHANOL EXTRACTS ON TUMOR CELLS LINE.....	71
<i>V. Malakhov, K. Plishch, M. Labai</i>	
DEVELOPMENT OF OSTEOPENIA IN PATIENTS WITH PRIMARY OSTEOARTHRITIS IN COMORBIDITY WITH EXOCRINE INSUFFICIENCY OF THE PANCREAS.....	72
<i>I. Halabitska</i>	
ECOLOGICAL FACTORS IN THE DEVELOPMENT OF DISEASES OF THE CARDIOVASCULAR SYSTEM.....	73
<i>A. Pochevko</i>	
ECOLOGICAL IMMUNOLOGY: A SCIENTOMETRIC STUDY BASED ON THE PUBMED DATABASE.....	74
<i>N. Rybko, M. Yurkevich</i>	
ECOLOGICAL SYNTHESIS OF SILVER NANOPARTICLES USING BACTERIA.....	75
<i>Yu. Laziuka, O. Skrotska, Y. Kharchenko</i>	
EFFECT OF CRYOTHERAPY ON THE PROPERTIES OF BLOOD CELL MEMBRANES IN RHEUMATOID ARTHRITIS.....	76
<i>E. Pristavka, T. Opanasenko, N. Gerasimovich</i>	
EFFECT OF HIGH CONCENTRATION GLUCOSE ON MULTIPOTENT MESENCHYMAL STROMAL BONE MARROW CELLS <i>IN VITRO</i> .....	77
<i>M. Kokhnyuk, M. Labai</i>	
EFFECTS OF MORINGA ( <i>Moringa oleifera</i> L.) PLANT ON BIOACTIVE PROPERTIES AND HUMAN HEALTH.....	78
<i>R. Babacan, V. Lemiasheuski, M. Musa Özcan</i>	
EFFICIENCY OF THE NAVIGATION SYSTEM «DeclipseSPECT» IN TREATMENT OF BREAST CANCER.....	79
<i>D. Shpak, T. Chikova</i>	
ENVIRONMENTAL ANALYSIS OF THE SVETLOGORSK REGION.....	81
<i>D. Shaforenko, I. Letyago, I. Puhteva</i>	



EPIDEMIOLOGICAL ASSESSMENT OF INCIDENCE INDICATORS OF DIFFERENT FORMS OF THYROID CANCER IN THE POPULATION OF THE REPUBLIC OF BELARUS.....	82
<i>I. Lukhanina</i>	
ESTIMATION OF THE CYTOTOXICITY OF CITARABIN AND CYCLOCYTIDINE•HCl IN COMBINATION WITH EMOXIPIN BY EXPRESSION CD107a.....	83
<i>M. Khancheuski, A. Trifonova, V. Miralau</i>	
EVALUATION OF QUALITY OF LIFE INDICATORS OF PATIENTS WITH ISCHEMIC STROKE.....	84
<i>E. Khlamchuk</i>	
EXPRESSION OF microRNA let7 AND miR-140 IN SYNOVIAL LIQUID IN DEFORMING JOINT DISEASES UNDER HIGH ANTHROPOGENIC LOAD.....	85
<i>I. Koktysh, P. Zhurko, V. Koktysh</i>	
EXPRESSIONAL ANALYSIS OF CIRCULATING microRNA FOR DIAGNOSTICS AND PREDICTION OF CELLULAR AGING AND DEVELOPMENT OF OSTEOARTHRITIS PREDICTION OF CELLULAR AGING AND DEVELOPMENT OF OSTEOARTHRITIS.....	86
<i>P. Zhurko, I. Koktysh</i>	
EXTRACORPORAL THERAPY AND ANTI-COAGULATION METHODS.....	87
<i>V. Tyshkevich, I. Puhteeva</i>	
FEATURES OF SENSITIZATION IN INCREASING EFFICACY OF RADIO-THERAPY.....	88
<i>K. Ostrenko, V. Lemiasheuski</i>	
FEATURES OF THE POPULATION COMPOSITION OF LYMPHOCYTES IN INDIVIDUALS WITH EBV-INFECTION.....	89
<i>N. Zverko</i>	
FEATURES OF THROMBIN-INDUCED PLATELET ACTIVATION IN PREGNANT WOMEN WITH PREECLAMPSIA.....	90
<i>A. Sinyak, A. Bakunovich</i>	
FREQUENCIES OF FCGR3A AND NKG2C GENE POLYMORPHISMS IN DONORS FOR ALLOGENEIC HEMATOPOETIC STEM CELL TRANSPLANTATION OF PATIENTS WITH LEUKEMIA.....	91
<i>E. Gorbach, A. Migas, A. Meleshko</i>	
IFN $\gamma$ PRODUCTION TO T-LYMPHOCYTES OF PATIENTS WITH NON-SPECIFIC INFLAMMATORY DISEASES OF THE INTESTINAL.....	92
<i>T. Mandrik, A. Adamovich, V. Shadrina</i>	
IMMUNE STATUS OF PERSONS WITH IN-HOSPITAL INFECTION.....	93
<i>L. Mankevich</i>	
INCIDENCE OF CIRCULATORY DISEASES AND ASSESSMENT OF EFFECTIVENESS OF CARDIOLOGICAL ASSISTANCE IN DIFFERENT GENDER AND AGE GROUPS.....	94
<i>V. Steshyn, M. Sinelyova</i>	
INDICATORS OF HUMORAL IMMUNITY IN PATIENTS WITH IGA NEPHROPATHY.....	95
<i>E. Kozhemyako, K. Komissarov, D. Nizhegorodova</i>	
INDICATORS OF NEUTROPHILS PHAGOCYtic ACTIVITY IN PATIENTS WITH INFECTIOUS BOWEL DISEASE.....	95
<i>M. Shtyk</i>	
INFLUENCE OF LOW-MOLECULAR COMPOUNDS ON THE PROCESSES OF PROTEIN MOLECULES AGGREGATION.....	96
<i>D. Kozlovich, N. Bogdanova</i>	
INFLUENCE OF STUDYNG STRESS FACTORS ON THE PSYCHOLOGICAL STATUS AND VEGETATIVE FUNCTIONS OF THE ORGANISM.....	97
<i>A. Tushinskaya, A. Denkin</i>	
INFLUENCE OF SUCCINIC ACID DERIVATIVES ON LIPID COMPONENTS OF LYMPHOCYTE MEMBRANES.....	98
<i>J. Izepchenko, N. Gerasimovich, M. Levin</i>	
INFLUENCE OF THYROID PATHOLOGY ON REPRODUCTIVE HEALTH AND PREGNANCY.....	99
<i>D. Sikita, N. Kokorina</i>	

INTRAEPIHELIAL LYMPHOCYTES PHENOTYPE IN COLON OF CROHN'S DISEASE PATIENT.....	100
<i>A. Mohammad, A. Starastin, D. Nizheharodava</i>	
INVESTIGATION OF THE ROLE OF C677T POLYMORPHIC LOCUS (rs1801133) OF THE MTHFR GENE IN THE DEVELOPMENT OF EXTRAPYRAMIDAL IMPAIRMENTS INDUCED BY NEUROLEPTICS.....	101
<i>K. Tukan, I. Halayenka, V. Obyedkov, O. Gorgun, A. Shimkevich</i>	
ION-EXCHANGE RESIN AS A REAGENT IN THE SYNTHESIS OF SECO-INOSINE.....	103
<i>E. Deusova</i>	
LYCORINE, PHYSICO-CHEMICAL PROPERTIES.....	103
<i>A. Trifonova, M. Atroshko</i>	
MECHANISM OF FORMATION OF AMYLOID FIBRILS ON THE EXAMPLE OF THE INSULIN PROTEIN.....	104
<i>A. Makhnach, N. Bogdanova</i>	
MEDICAL AND BIOLOGICAL ASSESSMENT OF THE INFLUENCE OF NATURAL MINERAL HEALING MUD ON THE HUMAN BODY.....	105
<i>A. Sokolova</i>	
METABIOTICS AS A REMEDY OF RESTORING THE MICROBIAL ECOLOGY OF MACROORGANISM.....	106
<i>S. Starovoitova</i>	
METHODS OF DETERMINING ANTICLEBSIELLOUS ANTIBODIES IN SERUM.....	107
<i>A. Kostyuk, T. Romanovskaya</i>	
MODELING NON-ALCOHOLIC FATTY LIVER DISEASE IN VITRO.....	108
<i>Y. Teplyakova, V. Syakhovich</i>	
MODERN ASSESSMENT OF THE BIOLOGICAL ACTIVITY OF TOP PEAT IN MINSK REGION.....	109
<i>O. Shinkevich, E. Busko</i>	
MODERN DIAGNOSTICS OF VIRAL HEPATITIS C.....	110
<i>T. Mashkovich, S. Marshalkovich, E. Tarasova</i>	
MOLECULAR GENETIC CHARACTERISTICS OF HEMOPHILIA A.....	111
<i>A. Liubushkin, I. Guryanova, R. Smolyakova</i>	
OBTAINING AND IMMUNOCHEMICAL CHARACTERIZATION OF PALLADIUM-COPROPORPHYRIN CONJUGATES OF MONOCLONAL ANTIBODIES.....	112
<i>Y. Melnikova, Y. Laikov</i>	
PCR IN DIAGNOSTICS OF CATS VIRAL DISEASES.....	113
<i>M. Statsi, Y. Melnikova</i>	
PHARMACOLOGICAL CORRECTION OF ACUTE HYPERCAPNIC HYPOXIA WITH EPOFEN.....	114
<i>A. Ovcharova, K. Ostrenko, O. Egorova, N. Bukata</i>	
PREDICTIVE VALUE OF THE LEVELS OF HEMOSTASIOLOGICAL INDICATORS IN THE DEVELOPMENT OF THROMBOTIC COMPLICATIONS IN PATIENTS UNDER THE BACKGROUND OF CORONAVIRAL INFECTION.....	115
<i>C. Levchik, R. Smolyakova</i>	
PROBLEMS OF ECOLOGICAL HEALTH.....	116
<i>O. Sokolovich, I. Olevskaya</i>	
PRODUCTION OF HUMAN ANNEXIN A5 FUSED WITH BACTERIAL ADENOSINE CATABOLIC ENZYMES.....	117
<i>A. Bulatovski, A. Zinchenko</i>	
PYRIMIDINE DERIVATIVE PHYSICO-CHEMICAL PROPERTIES.....	118
<i>A. Strogova, M. Atroshko, S. Shahab</i>	
QUANTITATIVE ANALYSIS OF THE CHILD POPULATION MORBIDITY IN THE CITY OF BARANOVICHI, BREST REGION IN 2014-2018.....	119
<i>D. Krivetskaya, N. Porada</i>	
QUANTUM-CHEMICAL MODELING AND PHYSICO-CHEMICAL PROPERTIES OF ADENOSINE MONOPHOSPHATE.....	120
<i>D. Novik, S. Shahab, A. Yurlevich, K. Sirotsina</i>	

QUANTUM-CHEMICAL MODELING AND PHYSICO-CHEMICAL PROPERTIES OF FLUDARABINE.....	121
<i>A. Yurlevich, D. Novik, K. Sirotnina, E. Kvasnyuk, S. Shahab</i>	
RAT HEPATOCYTE SPHEROID MODEL IN VITRO.....	122
<i>P. Alchovik, M. Labai, M. Yurkevich</i>	
RETROSPECTIVE ANALYSIS OF GENERAL MORBIDITY OF POPULATION OF BREST REGION (2007-2017).....	123
<i>E. Ustimchuk, A. Sysa</i>	
RETROSPECTIVE ANALYSIS OF INCIDENCE IN THE ADULT POPULATION OF IVANOVSKY DISTRICT BY DISEASES OF THE BLOOD CIRCULATION SYSTEM (2013 - 2019).....	124
<i>D. Ustimchuk, M. Dubina</i>	
RETROSPECTIVE ANALYSIS OF MORBIDITY OF THE POPULATION OF THE REPUBLIC OF BELARUS DUE TO INJURIES, POISONING AND OTHER CONSEQUENCES OF EXTERNAL CAUSES.....	125
<i>I. Tsalkova, E. Zhivitskaya</i>	
RETROSPECTIVE ANALYSIS OF PRIMARY CHILDHOOD DISEASE IN THE REPUBLIC OF BELARUS (REGIONAL ASPECT).....	126
<i>A. Augustinovich, E. Vlasenko</i>	
RETROSPECTIVE ANALYSIS OF THE INCIDENCE OF RESPIRATORY DISEASES IN THE CITY OF LUBAN (2015 – 2019).....	127
<i>I. Remenchik, M. Dubina</i>	
RETROSPECTIVE ANALYSIS OF THE PRIMARY INCIDENCE OF DIGESTIVE DISEASES IN THE REPUBLIC OF BELARUS (2007-2017).....	128
<i>D. Meleshevich, M. Dubina</i>	
ROLE OF STRESS-INDUCED TRANSPOSITION OF MOBILE GENOME ELEMENTS IN TYPE 2 DIABETES.....	129
<i>R. Baranovsky, N. Bogdanova</i>	
ROLE OF TRACE ELEMENTS IODINE AND SELENIUM IN THYROID PATHOLOGY.....	130
<i>A. Soropyatova, S. Petrenko</i>	
STATISTICS OF ONCOLOGICAL DISEASES IN THE REPUBLIC OF BELARUS IN THE PERIOD FROM 1990 TO 2014.....	131
<i>A. Matalygo</i>	
STUDYING OF IMMUNOTROPIC ACTIVITY OF THE EXTRACT OF MYCOTHALLUS <i>G. LUCIDUM</i> IN THE MODEL OF AN IMMUNE RESPONSE IN BALB/C MICE.....	132
<i>A. Lyamtseva, T. Romanovskaya</i>	
SYNTHESIS AND PROPERTIES OF WATER-SOLUBLE DECAHYDROACRIDINE ACID-BASE TITRATION INDICATOR.....	133
<i>V. Andritso, A. Pyrko</i>	
SYNTHESIS OF 8-BROMOFLUDARABINE.....	134
<i>E. Osipova, E. Deusova</i>	
SYNTHESIS OF 8-BROMONELARABINE.....	135
<i>M. Khancheuski, E. Deusova</i>	
THE CONTENT OF INDIVIDUAL RADIONUCLIDES IN DIFFERENT TYPES OF FISH IN PINSK DISTRICT OF BREST REGION.....	136
<i>A. Huzarevich</i>	
THE EVIDENCE OF IMMUNITROPIC ACTIVITY OF PLANT EXTRACTS IN TERMS OF PHAGOCYTOSIS OF PERITONEAL MACROPHAGES OF A MOUSE.....	137
<i>E. Gavrilenko</i>	
THE IMPACT OF NICOTINE ADDICTION ON WOMEN’S REPRODUCTIVE HEALTH.....	138
<i>M. Samoylenko, N. Kokorina</i>	
THE RELEVANCE OF INFECTION CAUSED BY EPSTEIN–BARR VIRUS (EBV) AT THE PRESENT STAGE.....	139
<i>L. Romanyuk, O. Zazulyak, D. Ilinska</i>	
THE ROLE OF CHAPERONES IN DIABETES MELLITUS TYPE 2.....	140
<i>V. Abakumets, V. Sagan, N. Bogdanova</i>	

THE ROLE OF THE SOCIAL PROTECTION SYSTEM IN SOLVING ENVIRONMENTAL PROBLEMS: INTERNATIONAL EXPERIENCE.....	141
<i>A. Shakirova</i>	
THE VIABILITY AND MORPHOLOGY OF MULTIPOTENT MESENCHYMAL STROMAL CELL CULTURES IN THE PRESENCE OF VITAMIN D3.....	142
<i>A. Tsarik, M. Yurkevich</i>	
TRACE ELEMENT COMPOSITION IN PERIPHERAL BLOOD AND SYNOVIAL FLUID IN OSTEOARTHRITIS.....	143
<i>N. Bashura, I. Koktysh, V. Koktysh</i>	
USE OF MODIFIED NUCLEOTIDES AND NUKLEOSIDES AS CHEMOTHERAPEUTHIC AGENTS.....	144
<i>M. Serpitovskaya, T. Zhukovets</i>	
$\gamma\delta$ T-LYMPHOCYTES SUBSETS IN PATIENTS WITH IgA-NEPHROPATHY.....	145
<i>A. Svirskaya, K. Komissarov, N. Manaeva, D. Nizheharodava</i>	

### SECTION 3

#### **PROBLEMS OF MODERN ENVIRONMENTAL SAFETY (BIOMONITORING, BIOINDICATION, BIOREMEDIATION, RADIOECOLOGY AND RADIATION SAFETY, ENVIRONMENTAL MONITORING, MANAGEMENT AND AUDIT. INFORMATION SYSTEMS AND TECHNOLOGIES IN ECOLOGY)**

ADAPTIVE ABILITIES OF THE PIG BODY UNDER THE INFLUENCE OF DIHYDROQUERCETIN.....	147
<i>Yu. Alyaudinov</i>	
ANALYSIS OF MORBIDITY AND SURVIVAL OF PATIENTS WITH BRAIN GLIOBLASTOMA IN BELARUS AT THE POPULATION LEVEL (2010-2019).....	148
<i>V. Sinkevich E. Vlasenko</i>	
ANALYSIS OF POSSIBLE TECHNOLOGIES FOR PROCESSING TOBACCO WASTES IN THE REPUBLIC OF BELARUS.....	149
<i>A. Kuharewa, V. Misiuchenka</i>	
ANALYSIS OF POSSIBLE TECHNOLOGIES FOR RECYCLING CONFECTIONERY WASTE IN THE REPUBLIC OF BELARUS.....	150
<i>A. Nikitich, V. Misyuchenko</i>	
ANALYSIS OF POSSIBLE TECHNOLOGIES OF RECYCLING OF DIRTY WOOD CONTAMINATED WITH CHEMICALS.....	151
<i>V. Lesik, V. Misyuchenko</i>	
ANALYSIS OF THE MORBIDITY OF DIABETES IN THE POPULATION OF THE REPUBLIC OF BELARUS FOR 2015-2019.....	152
<i>V. Trosko, I. Pukhteva</i>	
APPLICATION OF ANAMMOX PROCESS FOR WASTEWATER TREATMENT AT FOOD INDUSTRY ENTERPRISES OF UKRAINE.....	153
<i>M. Madani, A. Tkachenko</i>	
APPLICATION OF ARTIFICIAL NEURAL NETWORK METHODS IN THE ANALYSIS OF ECOLOGICAL PROBLEMS.....	154
<i>A. Shakirova</i>	
APPLICATION OF BIOGAS TECHNOLOGIES FOR ORGANIC WASTE PRO-CESSING.....	155
<i>A. Gubernatorova</i>	
APPLICATION OF CHITOSANS IN THE FIELD OF PLANT PROTECTION.....	156
<i>T. Maksym</i>	
APPLICATION OF CYTOGENETIC METHODS IN BIOINDICATION.....	157
<i>A. Maximovich, E. Maslyukov, Y. Malinovskaya</i>	
ASSESSMENT OF CONTENT OF MERCURY COMPOUNDS IN FISH PRODUCTS IN THE REPUBLIC OF BELARUS.....	158
<i>N. Stanishevskaya, E. Busko</i>	

ASSESSMENT OF <i>IMPATIENS GLANDULIFERA</i> ROYLE EXPANSION IN BELARUS.....	159
<i>M. Yasaite, L. Chumakov</i>	
ASSESSMENT OF SALT CONTAMINATION OF THE SOIL BY THE STATE OF LEAF BLADES OF HEART-SHAPED LINDEN.....	160
<i>M. Gorsky, T. Kapustina, E. Zhuk</i>	
ASSESSMENT OF THE RADIOACTIVE IMPACT ON INDIVIDUAL COMPONENTS OF THE BIOTA BY THE LEVEL OF RADIONUCLIDE CONTAMINATION OF LAKES OF VARIOUS TYPES IN THE GOMEL REGION.....	161
<i>E. Sologub</i>	
BIOENERGY AS A WAY TO «GREENING» THE ECONOMY OF THE YAMALO-NENETS AUTONOMOUS OKRUG.....	162
<i>Ia. Shelkov</i>	
BIOFILMS DESTRUCTION UNDER THE ACTION OF A MIXTURE OF <i>NOCARDIA VACCINII</i> IMV B-7405 SURFACTANTS AND ESSENTIAL OILS.....	164
<i>I. Klyuchka, L. Klyuchka, T. Pirog</i>	
BIOREMEDIATION OF SOILS CONTAMINATED WITH HEAVY METALS USING DIGESTATES OF ANAEROBIC DIGESTED WASTE .....	165
<i>V. Chubur</i>	
BUILDING A PROTOTYPE AUTOMATED WIRELESS SYSTEM FOR MONITORING AIR DUST AT PRODUCTION SITES.....	166
<i>U. Voznesenskaya, D. Moiseev</i>	
CLONING AND EXPRESSION OF <i>BACILLUS LICHENIFORMIS</i> KERATINASE GENE IN <i>ESCHERICHIA COLI</i> .....	167
<i>J. Mironova, M. Chindareva, A. Zinchenko</i>	
DEFINING SCOTS PINE HABITAT BY FOURIER-TRANSFORM INFRARED SPECTROSCOPY METHOD.....	168
<i>A. Khokh</i>	
DETERMINATION OF BACTERIOPHAGE TITER <i>BACILLUS SUBTILIS</i> IN URBAN SOIL.....	169
<i>T. Kaluhina</i>	
DEVELOPMENT OF A CALIBRATION METHOD OF AN ELECTRONIC PORTAL IMAGE DETECTOR FOR PERFORMING DOSIMETRIC MEASUREMENTS AT A NON-STANDARD SOURCE-DETECTOR DISTANCE.....	170
<i>Y. Holdman, E. Titovich</i>	
DEVELOPMENT OF A QUALITY ASSURANCE PROGRAMME FOR THE EXTERNAL BEAM RADIOTHERAPY: CLINICAL AND PHYSICAL ASPECTS.....	171
<i>Y. Zhdanovich, S. Siamkouski, D. Aliakhnovich</i>	
DEVELOPMENT OF UTILIZATION FOR SPENT CATALYSTS OF HYDROTREATING DIESEL FUEL.....	173
<i>A. Chepikov</i>	
DIFFERENT CRITERIA FOR ASSESSING THE ECOLOGICAL STATE OF LAND.....	174
<i>P. Khilimonchyk, S. Golovaty</i>	
ECOBIOELECTROCHEMICAL TECHNOLOGY OF OBTAINING HYDROGEN FROM ORGANIC WASTE.....	175
<i>A. Lyalina</i>	
ECOLOGICAL MAPPING OF WATER USE IN THE CENTRAL FEDERAL DISTRICT OF THE RUSSIAN FEDERATION.....	176
<i>V. Zorina</i>	
ECOLOGICAL VARIATION OF SCOTS PINE WOOD ELEMENTAL COMPOSITION.....	178
<i>A. Khokh</i>	
EFFECT OF HEAT TREATMENT APPLIED AT DIFFERENT TIMES ON THE PHYSICOCHEMICAL PROPERTIES OF THE SUNFLOWER OIL.....	179
<i>M. M. Özcan, N. Uslu</i>	
EFFECT OF WIND DIRECTION ON METHANOL CONTENT IN ATMOSPHERIC AIR.....	180
<i>E. Kulakova, A. Safarov</i>	

ENVIRONMENTAL FRIENDLINESS OF USING ELECTOCARS.....	182
<i>N. Sirisko, A. Bykova, V. Sivukha, L. Lipnitski</i>	
ENVIRONMENTAL POTENTIAL: SCIENTIFIC KNOWLEDGE AND UNDERSTANDING OF SUSTAINABILITY.....	183
<i>L. Gudyayeva</i>	
ESTIMATION OF ECONOMIC EFFICIENCY OF SORPTION FILTER IMPLEMENTATION FOR WASTEWATER TREATMENT AT THE PERFUME AND COSMETICS MANUFACTURE.....	184
<i>A. Holevo, V. Misuchenko</i>	
ESTIMATION OF THE EXPOSURE DOSES FOR PEOPLE WHO CONTACT WITH THE PATIENTS WHO HAVE PASSED A COURSE OF RADIONUCLIDE THERAPY.....	185
<i>Y. Zhdanovich, N. Siniak</i>	
FEATURES OF BIOFILM FORMATION ON THE SURFACE OF A POLYMER MATERIAL BASED ON LACTIC ACID.....	186
<i>A. Melnikova, V. Orekhova, L. Komarova</i>	
HARMFUL WORKING CONDITIONS OF MEDICAL INSTITUTIONS.....	187
<i>L. Lipnitski, T. Roslik, A. Shymanovich</i>	
HIV PATIENTS EPIDEMIOLOGICAL EVALUATION IN THE GOMEL REGION.....	188
<i>A. Lazben</i>	
HYDROPHOBIC SORBENT BASED ON CHITIN AND POLYURETHANE FOAM TO CLEANING WATER FROM THE OIL POLLUTION.....	189
<i>Y. D. T. Tran, L. Zenitova</i>	
IMPROVING THE TECHNOLOGY OF SOIL TREATMENT, CONTAMINATED BY HEAVY METALS USING SOIL AMENDMENTS .....	190
<i>E. Zaitseva, A. Garkovich</i>	
INFLUENCE OF BRASSINOSTEROIDS ON THE GROWTH OF FLOWER-DECORATIVE CULTURE OF PETUNIA AND SURFINIA.....	191
<i>T. Yunkevich</i>	
INFLUENCE OF GROWTH IN THE NUMBER OF BIRDS ON THE NUMBER OF HUMAN DISEASES.....	192
<i>E. Pinchuk, I. Khandohiy</i>	
INSTITUTE OF «GREEN» CERTIFICATES.....	193
<i>A. Khamitsevich, Yu. Shulya</i>	
MEDICAL AND BIOLOGICAL ASPECTS, CAUSES AND MECHANISMS OF DEVELOPMENT OF THE REPLACEMENT PROCESS ON THE EXAMPLE OF PNEUMANIA.....	194
<i>S. Marshalkovich, T. Mashkovich, E. Tarasova</i>	
MONITORING OF THE FODDER BASE OF WILD WATER BIRDS INHABITING IN WATER BODIES OF BELARUS DURING THE PRE-MIGRATION PERIOD.....	196
<i>Yu. Lyakh, A. Kornakova, T. Snorko, A. Bormotov</i>	
NEW OPPORTUNITIES FOR EXPERTS AND RESIDENTS OF THE COUNTRY IN THE FRAMEWORK OF IMPLEMENTATION OF THE NATIONAL PROJECT «ECOLOGY» IN THE RUSSIAN FEDERATION.....	197
<i>M. Prygunova</i>	
OPIGNO LMS AS MULTIFUNCTIONAL SOFTWARE FOR ENVIRONMENTAL EDUCATION .....	198
<i>P. Shalkevich, L. Lipnitski</i>	
PHYTOREMEDIATION AS AN ALTERNATIVE METHOD FOR REMOVING POLLUTANTS FROM THE SOIL.....	199
<i>E. Shavald</i>	
POLYMER MATERIALS BASED ON BIODEGRADABLE FILLERS .....	200
<i>A. Melnikova, V. Orekhova, L. N. Komarova</i>	
PRINCIPLES OF FORMATION OF ARTIFICIAL POPULATIONS OF RARE SPECIES OF MEDICINAL PLANTS.....	201
<i>A. Chernetskaya, T. Yunkevich</i>	



PROBLEMS OF WATER SUPPLY FOR THE FOOTLAND REGION OF THE STAVROPOL REGION OF THE RUSSIAN FEDERATION.....	202
<i>Y. Repetin</i>	
PROCESSING OF THE MIXTURE OF FRIED SUNFLOWER OIL AND ACETATE INTO THE MICROBIAL EXOPOLYSACCHARIDE ETHAPOLAN.....	203
<i>A. Voronenko, M. Yarosh, T. Pirog</i>	
QUANTITATIVE ESTIMATION OF CHEMICAL REACTIONS EFFICIENCY AND SAFETY BY GREEN CHEMISTRY METRICS.....	205
<i>A. Liavontsyeu, T. Savitskaya</i>	
QUANTITATIVE LUMINESCENT DETERMINATION OF IMPURITIES OF FAT DECOMPOSITION PRODUCTS IN NATURAL OBJECTS USING PYRONIN G.....	206
<i>N.v. Nekhan, V.u. Zhylko</i>	
RADIATION MONITORING IMPLEMENTATION METHODS IN THE RADIATION THERAPY DEPARTMENT OF THE N.N ALEXANDROV NATIONAL CANCER CENTRE OF BELARUS.....	207
<i>E. Kemes, M. Petkevich, E. Preobrazhenskaya</i>	
RETROSPECTIVE ANALYSIS OF THE GENERAL MORBIDITY OF GASTROINTESTINAL DISEASES IN THE KOBRIN DISTRICT (2015-2019).....	208
<i>N.Telyakov, M. Dubina</i>	
SCOTS PINE VARIATION WITH ANTHROPOGENIC IMPACT.....	209
<i>A. Khokh</i>	
«SMART» TECHNOLOGIES IN ENSURING ENVIRONMENTAL SAFETY IN RUSSIA: ANALYSIS OF TRENDS AND DEVELOPMENT PROSPECTS.....	210
<i>V. Korunova</i>	
SOLAR PANELS RECYCLING.....	211
<i>L. Lipnitsky, A. Khamitsevich, I. Kirukhin, P. Shalkevich</i>	
SPECIALLY PROTECTED NATURAL AREAS OF PRIPYAT POLESIE.....	212
<i>A. Paliukhovich</i>	
SPECIES DIVERSITY OF INVERTEBRATES ON THE TERRITORY OF NATIONAL PARK «CHEREMOSKYI».....	213
<i>D. Yuzyk</i>	
STEP INTO THE FUTURE WITH RUSSIAN ANTINEUTRINO DETECTORS .....	214
<i>T. Artsemyeva, O. Boyarkin</i>	
SYNERGISTIC EFFECT ON MICROORGANISMS OF MICROBIAL SURFACTANTS, ESSENTIAL OILS AND THERE MIXTURES .....	214
<i>L. Kliuchka I. Kliuchka, T. Pirog</i>	
SYNTHESIS OF AUXINS BY STRAINS <i>ACINETOBACTER CALCOACETICUS</i> IMV B-7241, <i>NOCARDIA VACCINII</i> IMV B-7405 AND <i>RHODOCOCCUS ERYTHROPOLIS</i> IMV AC-5017 IN THE PRESENCE OF TRYPTOPHAN IN THE CULTURE MEDIUM.....	215
<i>V. Zhdaniuk, D. Piatetska, N. Klymenko, T. Pirog</i>	
THE AGE STRUCTURE OF POPULATIONS OF <i>HEDYSARUM GRANDIFLORUM</i> PALL. (FABACEAE).....	217
<i>V. Ilyina</i>	
THE ENVIRONMENTAL VALUE OF SPRINGS (ON THE EXAMPLE OF THE BRYANSK REGION).....	218
<i>O. Soboleva</i>	
THE MAIN PATHOGENS OF DENDROFLORA OF THE SQUARE «TRINITY MOUNTAIN» ON THE EXAMPLE OF SMALL-LEAVED LINDEN.....	219
<i>Y. Sorgovitskaya, A. Chernetskaya</i>	
THE SCALE OF CLIMATE WARMING IN PRIPYAT POLESIE.....	220
<i>A. Paliukhovich</i>	
THE SPECIALLY PROTECTED NATURAL AREAS SYSTEM OF THE SAMARA REGION (RUSSIA).....	221
<i>S. Rogov, V. Ilyina</i>	
THE USE OF WIND GENERATORS FOR ECOLOGICAL HOUSES.....	222
<i>S. Artemchuk, I. Kirukhin, A. Khamitsevich</i>	



TOXICITY ASSESSMENT OF SOIL CONTAMINATED WITH DIFFERENT ANTIBIOTIC GROUPS.....	223
<i>A. Kosmacheva</i>	
TRANSFORMATION OF EARTHQUAKE ENERGY INTO ELECTICITY.....	224
<i>E. Cherevan, I. Lenhinovich</i>	
WHY A BIKE DOESN'T FALL.....	224
<i>A. Vikhrova, V. Krasovskiy</i>	

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