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PROSPECTIVE ENVIRONMENTAL SOLUTIONS FOR POULTRY MANURE RECYCLING

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This article analyzes material on the rational use of organic farming waste. The organic waste recycling technologies used for the environmental aspects of the organic waste treatment in Belarus and abroad are described. It lists the most promising directions. The problem of the disposal and utilization of organic waste from chicken farms is confirmed, taking into account the reduction of adverse effects on the environment and the fertility of the soil.

Keywords: organic waste, waste recycling technology, safety, environment, poultry manure, feed recycling

At present, one of the most important problems in poultry production is the environmental pollution by poultry farm manure, which accumulates a large amount of manure. The existing processing methods do not deal with chicken manure efficiently; therefore, a large amount of decomposing material, which is the third category of hazardous waste, accumulates in the adjacent areas.

It is well known that the biomass allocated exceeds the edible product quantitatively, that is, 200–300 eggs per year from one hen, that is, about 15–18 kg of eggs, while poultry manure is allocated about 55–77 kg, with an additional 3 kg of manure per kg of meat. Poultry farms are not prepared to handle and use so much waste, resulting in manure accumulation, loss of value, and serious environmental hazards to the environment.

In fact, modern industrial animal husbandry, without economically viable and ecologically safe disposal of production wastes, has a negative impact on the environment, animal and human health [Донник И. М., Шкуратова И. А., 2011; Неверова О. П., Зуева Г. В., Сарапулова Т. В., 2014].

Poultry manure contains sulfide, acid, benzopyrene, organic sulfur compounds, heavy metals, phenol (especially 2,6-xylene and its derivatives); Benzoquinone, 2,6-di-tert-butylcresol, releases ammonia, (NH₃), hydrogen sulfide (H₂S),

carbon dioxide (CO₂), carbon monoxide (CO), and methane (CH₄) upon decomposition. In addition, avian feces may be a source of pathogenic microorganisms and worm eggs [Zhou J.B., Chen G.Q., 2007; Соловьев А.Б., Биньковская О.В., Зиновьев В.Г. и др., 2011; Amlan K.P., 2012; Abudabos A.M., Alyemni A.H., Dafalla Y.M., 2018].

A lot of manure waste also comes from other animals, which significantly increases the ecological and sanitary epidemiological risks of the region, especially in livestock and poultry farming areas [Сатюкова Л.П., 2017, Rönqvist M., Välttilä V., Ranta J. et al., 2018, Бородай В. П., Фотина Т. И., Сурай П. Ф., 2012].

At the same time, the chemical composition of poultry manure is considered as a source of nutrients and biologically active substances. For dry matter, guano contains 20 to 23% raw protein, 12 to 14% raw fiber, 30 to 37% nitrogen-free extract, 3 to 5% raw fat, 11 to 13% ash, 2.84% calcium, 1.72% phosphorus, and a large number of trace elements [Ахметзянова Ф.К., Ндайкенгурукийе Д., Кашаева А.Р., 2020]. Raw protein is represented by essential amino acid complex (%): methionine 0.469–0.620; lysine 0.764–0.930; threonine 0.775–0.80; arginine 1.420–1.230; proline 0.2–0.3; tyrosine 0.17–0.20; histidine 0.15–0.20, etc. [Bhargava K.K., Во 'Neil J, 1975; Lanyasunya P., Wang H. Rong, Abdulrazak S.A. et al., 2006].

Modern science has provided a wide range of technologies for the treatment and utilization of organic wastes from animal and poultry production. These technologies require a large amount of money, and their production costs can range from half to the full cost of the livestock breeding enterprise itself, depending on the final product of waste disposal. Therefore, the selection of the most economical and efficient organic waste management technology for each farm, ensuring the production of useful products and energy, is of particular importance from the point of view of environmental protection, worker safety, public health and cost-effectiveness of production [Сатликова Д.Ф., Дружакина О.П., 2009]. A wide variety of technologies are being used to treat waste from livestock and chicken farms.

According to the European Council's Environment Committee, more than 80 per cent of air-polluting ammonia and 10 per cent of ozone-depleting methane come from manure, if not put into soil in a timely manner and stored in open repositories. This is a common problem for all mankind. Even conventional compost can't keep the environment safe [Мыскин В.А., Капустин В.П., Родионов Ю.В., Иванова И.В., 2018].

In this regard, it can be concluded that modern poultry manure utilization technology does not conform to the ecosystem approach to rational agricultural production. Based on the ecological knowledge of the interrelationship among the components of the agricultural ecosystem, sustainable and economic methods are sought to deal with poultry manure.

CONTENT

SECTION 1 SOCIO-ECOLOGICAL, ETHICAL AND PEDAGOGICAL PROBLEMS OF OUR TIME

EDIBLE DISHES?	3
<i>V. Dargel, A. Zavora, Z. Kovalevich</i>	
THE ECONOMIC RATIONALITY OF THE USE OF ENVIRONMENTALLY FRIENDLY GOODS AND FOOD BY MODERN CONSUMERS.....	4
<i>V. Luchina, E. Fedulova, V. Sivukha</i>	
THE PSYCHOLOGY OF GENDER AND ITS ACTUALIZATION IN MODERN SOCIETY	6
<i>I. Olenskaya, E. Fedulova</i>	
THE PLACE OF THE ENVIRONMENTAL COMPONENT IN THE CONCEPT OF SUSTAINABLE DEVELOPMENT.....	7
<i>M. Kadomtseva</i>	
THE TEACHINGS OF A.L. CHIZHEVSKY IN THE CONTEXT OF CONTEMPORARY ENVIRONMENTAL PROBLEMS	8
<i>M. Konopazkaya, N.Lepskaya</i>	
DISCRIMINATION AGAINST PEOPLE WITH ALBINISM IN MODERN SOCIETY	9
<i>A. Kozorez</i>	
IMPACT OF POLYPHASE SLEEP ON THE HUMAN BODY UNDER CONDITIONS OF SELF-ISOLATION AND FREE MOVEMENT.....	10
<i>V. Kritskaya, I. Olevskaya</i>	
ENZYMATIC ANALYSIS OF BLOOD SERUM OF PATIENTS WITH ALCOHOLIC LIVER INTOXICATION	11
<i>E. Kuchinskaya, T. Apanasenko</i>	
IMPORTANCE OF COUNTRY SPORTS COMPLEXES FOR ACHIEVING PROFESSIONAL RESULTS OF THE BASKETBALL NATIONAL REPUBLIC OF BELARUS.....	12
<i>M. O. Lashchevskaya, O. V. Lozinskaya</i>	
TRAINING IN BELARUSIAN-CHINESE TRANSLATION OF ENVIRONMENTAL TEXTS	13
<i>Liu Yiwen</i>	
ACHIEVING SUSTAINABLE DEVELOPMENT GOALS IN THE FRAMEWORK OF ENVIRONMENTAL EDUCATION OF STUDENTS.....	14
<i>V. Luchina, V. Sivukha, E. Pytliak</i>	
DIVERSITY OF INVASIVE ANIMAL SPECIES IN BELARUS	15
<i>E. Makarevich, I. Khandohiy</i>	
THE RELEVANCE OF CREATIVE FORMS OF ENVIRONMENTAL EDUCATION WORK IN CONNECTION WITH THE PROBLEMS OF PLASTIC POLLUTION	16
<i>V. Malyshava, A. Fralou</i>	
PSYCHOLOGY OF THE INFLUENCE OF AUTOSUGGESTION ON HUMAN HEALTH	17
<i>M. Markovskaya, I. Olevskaya</i>	
ENVIRONMENTAL PROBLEMS AS A FACTOR IN THE MANIFESTATION OF HUMAN PSYCHOSOMATIC DISEASES.....	18
<i>P. Nechaeva, N. Lepskaya</i>	
THE BIRTH OF THE ENVIRONMENTAL MOVEMENT IN RUSSIA	18
<i>P. Nechaeva, V. Gavrilov</i>	
STUDENTS' COMPETENCES IN ISSUES OF GARBAGE POLLUTION OF CITIES.....	19
<i>I. Reikh, E. Zhuk</i>	
FAIRY TALE AS A MEANS OF FORMING ENVIRONMENTAL COMPETENCES OF PRESCHOOL CHILDREN	20
<i>Y. Sabynich, E. Zhuk</i>	

THE INFLUENCE OF MASS MEDIA ON YOUNG PEOPLE	21
<i>D. Savich, I. Olevskaya</i>	
SOCIO-ENVIRONMENTAL IMPACT OF ALTERNATIVE ENERGY SOURCES	22
<i>I. Sergey, A. Skamarokha, V. Sherikova, N. Lepskaya</i>	
ENVIRONMENTAL TOPICS IN THE SYSTEM OF TRAINING BELARUSIAN SPECIALISTS IN THE CHINESE LANGUAGE	23
<i>Shahab Cassandra</i>	
ENVIRONMENTAL AND PSYCHOLOGICAL PROBLEMS OF OUR TIME	24
<i>A. Shevchik, I. Olevskaya</i>	
PEDAGOGY AND PSYCHOLOGY. PREVENTION OF SUICIDAL BEHAVIOR IN ADOLESCENTS BASED ON VICTOR FRANKL'S LOGOTHERAPY	25
<i>S. Shinkarenko, I. Olevskaya</i>	
ECOLOGICAL CULTURE.....	26
<i>V. Timchenko, M. Yakauleva</i>	
REFLECTION OF THE SUSTAINABLE DEVELOPMENT GOALS IN THE FRAMEWORK OF THE ACADEMIC SUBJECT "MAN AND THE WORLD"	27
<i>S. Vergeichik, E. Zhuk</i>	
PEDAGOGY AND PSYCHOLOGY. TYPES OF TEMPERAMENTS. CONSIDERATION OF THE STUDENT'S TEMPERAMENT IN THE ORGANIZATION OF THE EDUCATIONAL PROCESS	28
<i>N. Vorontsov, I. Olevskaya</i>	

SECTION 2 MEDICAL ECOLOGY

BIOELEMENTAL STATUS OF YOUNG PEOPLE OF THE REPUBLIC OF UZBEKISTAN (TASHKENT REGION EXAMPLE)	29
<i>K.B. Alayeva, Yu.V. Zhylytsova</i>	
ANALYSIS OF HIV INCIDENCE IN THE REPUBLIC OF BELARUS	30
<i>A. Ariskina, L. Zdanovich</i>	
NON-ESTERIFIED FATTY ACID LEVELS IN SALIVA OF PRE-SCHOOL CHILDREN.....	31
<i>O. Basyakova, M. Yurkevich</i>	
RETROSPECTIVE ANALYSIS OF TUBERCULOSIS INCIDENCE IN THE REPUBLIC OF BELARUS (2007-2019).....	32
<i>V. Belous, T. Opanasenko</i>	
NATURAL ANTIOXIDANTS AND THEIR EFFECT ON PROCESSES IN LIVING ORGANISMS	32
<i>N. Bogdanovich, L. Podobed</i>	
POSSIBILITIES OF NEW PHARMACEUTICAL COMPOSITIONS IN ANTIMICROBIAL THERAPY	33
<i>Y. Bogush, N. Ikonnikova</i>	
ANALYSIS OF CHANGES IN FUNCTIONS OF RESPIRATORY SYSTEM WITH EARLY SIGNS OF METABOLIC SYNDROME IN ADOLESCENCE	34
<i>Budkova, E. Fedulova</i>	
CLINICAL AND EPIDEMIOLOGICAL CHARACTERISTICS OF INVASIVE PNEUMOCOCCAL DISEASE IN HOSPITALIZED CHILDREN DURING COVID-19 PANDEMIC	35
<i>V. Bulando, M. Sokolova</i>	
ANTAGONISTIC ACTIVITY OF PROBIOTIC LACTIC ACID BACTERIA IN RELATION TO SOME REPRESENTATIVES OF BACTERIA OF GENUS <i>BACILLUS</i>	36
<i>A. Burak, S. Maltseva, O. Kaskevich, E. Gritskevich</i>	
RADIATION-INDUCED CHANGES IN MECHANICAL PROPERTIES OF SURFACE OF RAT BLOOD CELLS....	37
<i>I.A. Chelnokova, N.M. Shklyarava, M.N. Starodubtseva</i>	

EFFICIENCY OF LABORATORY TESTS FOR THE DIAGNOSIS OF TUBERCULOSIS ON THE BASIS OF HEALTH CARE INSTITUTIONS OF THE REPUBLIC OF BELARUS	38
<i>E. Chernyuk, AL_Ukaily Hussein Ali Mohammed, N. Ikonnikova</i>	
DETERMINATION OF FREE AMINO NITROGEN IN BREWING PRODUCTS	39
<i>A. Derachits, T. Pitsko</i>	
PROCESSING OF MUNICIPAL SOLID WASTE	40
<i>D. Dvorakovsky, L. Kuzina</i>	
PHARMACEUTICAL POTENTIAL OF INVASIVE PLANT SPECIES (ON THE EXAMPLE OF SOLIDAGO SP.) ..	41
<i>N.V. Emelianenko, I.A. Rovenskaya</i>	
EFFECT OF MICROPLASTIC PARTICLES ON ORGANISMS	42
<i>I. Ergasheva, O. Ergasheva</i>	
EMIDEMIOLOGICAL ANALYSIS OF DRUG ADDICTION DISTRIBUTION IN THE REPUBLIC OF BELARUS (2005-2019)	43
<i>Y. Frolova</i>	
MEDICAL WASTE DISPOSAL	44
<i>A. Galakh, L. Kuzina</i>	
CHARACTERISTICS OF IMMUNOLOGICAL PARAMETERS IN PATIENTS AFTER HEART TRANSPLANTATION	45
<i>E.P. Horlinskaya, M.M. Zafranskaya</i>	
NEW ASPECTS OF THE ETIOLOGY OF HIV INFECTION	46
<i>A. Kadeikina</i>	
ASSESSMENT OF OCCURENCE OF AUXOTROPHIC COLIMORPHIC BACTERIA IN THE WATER SUPPLY SYSTEM OF MINSK.....	47
<i>O. Kaskevich, S. Maltseva, A. Burak, E. Gritskevich</i>	
MOLECULAR DOCKING ANALYSIS BETWEEN TRIAZOLE SUGAR CONJUGATE AND TYROSINE KINASE (2QBP).....	48
<i>M. Khancheusk, G. Sivets</i>	
SYNTHESIS AND ANTIPROLIFERATIVE ACTIVITY OF CONJUGATES N-GLYCOSYLAMIDE WITH 1,2,3-TRIAZOLES.....	49
<i>M. Khancheusk, G. Sivets, E. Kvasyuk</i>	
ASSESSMENT OF CELLULAR REACTIVITY OF HOMEOSTASIS IN PATIENTS WITH ARTERIAL HYPERTENSION DURING COMBINATION THERAPY	50
<i>V. Khobotova, K. Shpadaruk</i>	
BIOLOGICAL POTENTIAL OF MELANIN PIGMENTS OF FUNGAL ORIGIN.....	51
<i>V. Kisel, V. Maksueva</i>	
DISORDERS OF SYNOVIAL LIPID METABOLISM IN PATIENTS WITH OSTEOARTHRITIS WITH AND WITHOUT METABOLIC SYNDROME	52
<i>I. Koktysh¹, P. Zhurko, V. Koktysh</i>	
THE CIRCULATING MICRORNA-140 IN SYNOVIAL FLUID AS A MARKER OF OSTEOARTHRITIS AND CELL AGING	53
<i>I. Koktysh, V. Miralau</i>	
ANALYSIS OF THE INCIDENCE OF LEUKEMIA IN THE REPUBLIC OF BELARUS IN 1991-2019	54
<i>Kolyadko A.</i>	
ANALYSIS OF MORBIDITY AND MORTALITY OF THE POPULATION OF THE REPUBLIC OF BELARUS FROM MALIGNANT NEOPLASMS.....	55
<i>O. Kovtunova, I. Puhteeva</i>	
VERTICAL LANDSCAPING OF MUNICIPAL TERRITORIES AND PROBLEMS OF URBAN IMPROVEMENT ..	56
<i>A. Kozorez</i>	
IMPROVING ATHLETIC PERFORMANCE IN STUDENTS WITH WEAKENED HEALTH.....	57
<i>A. Kozorez</i>	

RETROSPECTIVE ANALYSIS OF THE INCIDENCE OF HIV INFECTION IN BELARUS IN 2000-2020	58
<i>Krasilnikov I.</i>	
SYNTHESIS OF 4-N-HYDROXYCYTIDINE TRIACETATE	59
<i>V. Kritskaya, M. Khanchevskiy, E. Kvasyuk</i>	
SYNTHESIS OF 4-N-HYDROXYCYTIDINE	60
<i>V. Kritskaya, M. Khanchevskiy, E. Kvasyuk</i>	
OBTAINING FOOD PRODUCTS BASED ON BEE HONEY THAT ARE USEFUL FOR HUMAN HEALTH.....	60
<i>A.O. Kunitskaya, A.N. Batyan, V.A. Kravchenko.</i>	
ANALYSIS OF THE MORBIDITY REQUIRING URGENT MEDICAL CARE OF THE POPULATION OF GOMEL	61
<i>Liakhavets U., Porada N.</i>	
BIRTH DEFECTS OF THE CENTRAL NERVOUS SYSTEM.....	62
<i>M.V. Litvin, N.V. Kokorina, A.A. Ershova-Pavlova</i>	
ANALYSIS OF THE STATE OF HEALTH OF ADULTS OF GANTSEVICH DISTRICT IN 2013-2020	63
ANTIBIOTIC SENSITIVITY ANALYSIS OF BACTERIA CAUSING SKIN DISEASES	64
<i>O. Lokutova, E. Gritskevich</i>	
IMPACT OF THE ENVIRONMENTAL SITUATION ON RESPIRATORY DISEASES OF MINSK POPULATION..	65
<i>E.D. Lomako, N.V. Kokorina</i>	
AGE CHANGES IN THE PHOSPHOLIPID COMPOSITION OF THE CARDIOMYOCYTE SARCOLEMMAL ON THE EXAMPLE OF RATS.....	66
<i>V. V. Maksueva, S. I. Pekarskaya</i>	
THE EFFECT OF MEDICINAL MUSHROOM SUBSTANCES EXTRACTED BY VARIOUS METHODS ON THE PROLIFERATIVE POTENTIAL OF IMMUNOCOMPETENT CELLS.....	67
<i>V. Malakhov, M. Lobai, N. Ikonnikova</i>	
THE USING OF AVIDIN - STREPTAVIDIN METHOD FOR THE DETECTION OF BIOLOGICALLY ACTIVE SUBSTANCES IN IMMUNOFLUORESCENCE ASSAY	68
<i>K. Malakhova, I. Koktysh</i>	
PROBLEMS OF FORESTRY	69
<i>M. Maltsev, L. Kuzina</i>	
ANALYSIS OF BIOCHEMICAL PROPERTIES PROBIOTICALLY VALUABLE SPORE-FORMING BACTERIA ..	70
<i>U. Martynenko, E. Gritskevitch</i>	
RETROSPECTIVE ANALYSIS OF MORBIDITY IN THE POPULATION OF DROGICHIN, BREST REGION (2015-2019).....	71
<i>T. Matsuka, M. Dubina</i>	
PROBLEM OF NONSPECIFIC ADSORPTION OF ANTIBODIES ON THE PLASMA SURFACE WHEN CREATING IMMUNOFLUORESCENCE TEST SYSTEMS	71
<i>O. A. Matusevich, I. V. Koktysh, Ya. I. Melnikova, O.S. Kulakovich, S. A. Maskevich</i>	
DIAGNOSIS OF TOXOPLASMA INFECTION AS A PART OF THE TORCH-COMPLEX BY THE ELISA METHOD	72
<i>A.N. Mendel, E.E. Tarasova</i>	
SYNTHESIS OF 8-HYDROXYNELARABINE	73
<i>D. Mozheiko, M. Khancheuski, E. Franklin, E. Kvasyuk</i>	
ANALYSIS OF THE MORBIDITY OF THE POPULATION OF THE MINSK REGION WITH DISEASES OF THE CIRCULATORY SYSTEM.....	74
<i>Mikalai Nikalayeu</i>	
ASSESSMENT OF REACTIVITY OF CELLULAR HOMEOSTASIS DURING TREATMENT IN PATIENTS WITH DIABETES MELLITUS.....	75
<i>A.A. Nikolaeva, E.M. Shpadaruk</i>	
DETERMINATION OF OPRT EXPRESSION LEVEL IN PATIENTS WITH COLORECTAL CANCER	76
<i>M. Oev, K. Shpadaruk, R. Smolyakova</i>	

SYNTHESIS OF 8-HYDROXYFLUDARABINE.....	77
<i>E. Osipova, E. Kvasyuk, M. Khancheuski</i>	
ANTIBACTERIAL ACTIVITY OF 8-BROMOXANTHITRIOLE (8-bromo-trihydroxy-seco-xanthosine) WITH RESPECT TO THE <i>BACILLUS CEREUS</i> CULTURE	79
<i>V. Pashkovich</i>	
COMPARATIVE CHARACTERISTICS OF BIOACTIVITY OF ANTIHYPERTENSIVE DRUGS	80
<i>T. Piliushyna, A. Bakunovich</i>	
DYNAMICS OF PREVALENCE OF NONCOMMUNICABLE DISEASE RISK FACTORS IN BELARUS	81
<i>V. M. Pisaryk</i>	
ANALYSIS OF THE MORBIDITY OF THE ADULT POPULATION OF KOBRIN, BREST REGION, IN 2014-2021	81
<i>Plavinski V., Porada N.</i>	
ANALYSIS OF THE CIRCULATION SYSTEM DISEASES INCIDENCE OF THE POPULATION OF THE SOLIGORSK REGION	82
<i>A. Pytkova, A. Zhyvitskaya</i>	
NEONATAL SCREENING FOR CONGENITAL HYPOTHYROIDISM IN CHILDREN IN THE REPUBLIC OF BELARUS	83
<i>Y. N. Reznik, N. V. Kokorina, E. N. Alferovich</i>	
THE PROBLEM OF PHARMACEUTICAL WASTE DISPOSAL	84
<i>A. Romanov, Z. Kovalevich</i>	
ANALYSIS OF MORBIDITY OF THE POPULATION OF THE REPUBLIC OF BELARUS WITH MALIGNANT NEOPLASMS OF THE THYROID GLAND FOR THE PERIOD 2010-2019	85
<i>M. A. Rubinskaya, V. A. Kravchenko</i>	
MODIFICATION OF THE METHODOLOGY FOR STUDYING THE ADHESIVE PROPERTIES OF BACTERIA IN VITRO	86
<i>A. Rudak, T. Romanovskaya</i>	
INFLUENCE OF FOLATE DEFICIENCY ON THE FORMATION OF NEURAL TUBE MALFORMATIONS	87
<i>M.V. Samoylenko, A.A. Ershova-Pavlova, N.V. Kokorina</i>	
THE COMPARATIVE STUDY OF THE NANOMECHANICAL PROPERTIES OF THE SURFACE OF BT-20 BREAST CANCER CELLS USING PEAKFORCE QNM AND FORCE VOLUME AFM MODES.....	88
<i>Shklyarova A.N., Chelnokova I.A., Nadyrov E.A., Krylov A.Yu., Starodubtseva M.N.</i>	
ANALYSIS OF THE RELATIONSHIP BETWEEN THE IODINE SUPPLY OF THE BODY AND THE MORBIDITY OF THE THYROID SYSTEM OF THE POPULATION OF THE REPUBLIC OF BELARUS	89
<i>A. Sidorovich, S. Petrenko, I. Puhteeva</i>	
IMPACT OF COVID-19 ON EMBRYOGENESIS	90
<i>D. Sikita, E. Alferovich</i>	
ANTIBACTERIAL ACTIVITY OF 4-HYDROXYBEZALDEHYDE AND ITS OXIME IN RELATION TO THE CULTURE OF <i>ESCHERICHIA COLI</i> CELLS	91
<i>L. Skidan, A. Trifonova, M. Khancheuski², E. Kvasyuk</i>	
RESEARCH ON THE STATUS QUO OF ECOLOGICAL ENVIRONMENT QUALITY MONITORING IN QINGDAO'S COASTAL WATERS	92
<i>Jin Yang Song, Viktor Lemiasheuski</i>	
STUDYING OF THE PHYLLOSHERE OF DOMINANT PLANT SPECIES IN SMALL RECREATIONAL ZONES AS A PRIMARY STRUCTURE INFECTED BY MYCOLOGICAL DISEASES ON THE EXAMPLE OF ALEKSANDROVSKY, MIKHAILOVSKY AND TROITSKAYA GORA SQUARES	93
<i>Y. Sorgovitskaya, A. Chernetskaya</i>	
ASSESSMENT OF THE CONDITION OF TREE PLANTATIONS AND THE MAIN POLLUTANTS OF ATMOSPHERIC AIR OF CHELYUSKINTSEV PARK OF CULTURE AND RECREATION IN MINSK	94
<i>A.N. Sukhan, D.A., Yatskevich, Yu.V. Zhiltsova</i>	
THE INFLUENCE OF HEAVY METALS (Zn) ON THE VITAL ACTIVITY OF LIVING ORGANISMS	95
<i>A.N. Sukhan, L.F. Podobed</i>	

EVALUATION OF THE ANTI-CANCER ACTIVITY OF MODIFIED NUCLEOTIDES AND 3-HYDROXYPYRIDINE DERIVATIVES	96
<i>Sun Peiming, A. Sysa</i>	
ANTIOXIDANT ACTIVITY OF HEXAHYDROQUINOLINES AND ACRIDINDIONES	97
<i>E.I. Tarun, V. A. Nelyubina, A.N. Pyrko</i>	
ANALYSIS OF FACTORS CONTRIBUTING TO THE SPREAD OF MICROMYCELIAL FUNGI IN VARIOUS CONDITIONS	98
<i>O. Tereshchenko, N. Ikonnikova</i>	
ANTIBACTERIAL ACTIVITY OF VANILLIN AND OXIM VANILLIN FOR <i>SARCINA LUTEA</i> CELL CULTURE..	99
<i>A. Trifonova, L. Skidan, M. Khancheuski, E. Kvasyuk</i>	
INTERLEUKIN-17 PRODUCTION IN $\gamma\delta$ T-LYMPHOCYTES FROM PATIENTS WITH INFLAMMATORY BOWEL DISEASES	100
<i>D. Tsekhanovich, A. Starastsin, A. Dybau, D. Nizheharodava</i>	
THE EXPRESSION OF PROGRAMMED CELL DEATH PROTEIN 1 ON T-LYMPHOCYTES IN PATIENTS WITH BENIGN AND MALIGNANT SINONASAL TUMORS	101
<i>D. Tsekhanovich, N. Marozava, A. Tsarik, D. Nizheharodava</i>	
IMMUNOPHENOTYPICAL CHARACTERISTICS OF HIGHLY DIFFERENTIAL PANCREATIC ADENOCARCINOMA	102
<i>D.R. Tsurika, K.M. Shpadaruk, R.M. Smolyakova</i>	
INFLUENCE OF SMOKING ON THE ELEMENTAL STATUS OF YOUNG PEOPLE.....	103
<i>B.E. Turgunova, Yu.V. Zhyltsova</i>	
EFFECT OF ANTIMICROBIAL THERAPY ON THE MICROBIOTA OF THE ORAL CAVITY.....	104
<i>A. Vabishchevich, N. Ikonnikova</i>	
EFFECT OF GENERAL CRYOTHERAPY ON PROTEIN-LIPID INTERACTIONS IN PLASMA MEMBRANES OF BLOOD CELLS.....	105
<i>A.V. Vakanova, N.V. Gerasimovich, I.V. Puhteva</i>	
STUDY OF THE CLONOGENIC ABILITY OF HEPATOCELLULAR CANCER CELLS	106
<i>N. Velko, V. Syakhovich</i>	
CONSTRUCTION OF BACTERIAL STRAIN FORMING INCLUSION BODIES EXHIBITING DIADENYLATE CYCLASE ACTIVITY.....	107
<i>M. Vinter, I. Kazlouski, A. Zinchenko</i>	
ANALYSIS OF THE POLLUTION CAUSES AND PROTECTION COUNTERMEASURES OF CHAOHU LAKE WATER QUALITY.....	107
<i>Wentao Hu, Anastasiya Bukata</i>	
THE ROLE OF MYELOID-DERIVED SUPPRESSOR CELLS IN ONCOPATHOLOGY	108
<i>M. Yakauleva, D. Nizheharodava, M. Zafranskaya</i>	
DESTRUCTION OF THE OZONE LAYER AS ONE OF THE FACTORS OF THE OCCURRENCE OF MALIGNANT NEOPLASMS OF THE SKIN.....	109
<i>M. Yakauleva, V. Timchenko</i>	
PROSPECTIVE ENVIROMENTAL SOLUTIONS FOR POULTRY MANURE RECYCLING.....	110
<i>Yan Li, Viktor Lemiasheuski</i>	
ANALYSIS OF THE LABORATORY MARKERS IN PATIENTS WITH SEVERE COVID-19 PNEUMONIA IN CHINA.....	111
<i>J. Luo, I. Koktysh</i>	
INVESTIGATION OF FELINE HERPESVIRUS BY POLYMERASE CHAIN REACTION IN CHINA.....	112
<i>Y. Sun, I. Koktysh</i>	
THE PHENOTYPE OF THE EXOSOMAL FRACTION FROM MULTIPOTENT MESENCHYMAL STROMAL CELLS CULTIVATED UNDER NORMOXIA AND HYPOXIA CONDITIONS	113
<i>E. Zhartun, N. Manajeva, D. Nizheharodava</i>	

CONTRIBUTION OF GLUTATHIONE-S-TRANSFERASE GENE POLYMORPHISM TO CARCINOGENESIS (FOR EXAMPLE, KIDNEY CANCER).....	114
<i>A. Karmanova</i>	
PRELIMINARY ASSESSMENT OF TRANSPORT LOADS ON THE URBAN ECOSYSTEMS: CASE-STUDY OF THE RUDN UNIVERSITY CAMPUS.....	115
<i>M.M. Redina, A.P. Khaustov</i>	
RETROSPECTIVE ANALYSIS OF RADIATION TREATMENT OF PROSTATE CANCER STAGE I-III	116
<i>A.N. Batyan, K. V. Hancharova, T. A. Damashnikava, M. V. Kren</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)

DYNAMICS OF PROLIFERATIVE ACTIVITY AND LEVEL OF MICRONUCLEI IN MICE BONE MARROW CELLS IN THE ACUTE RADIATION PERIOD.....	118
<i>O. Aksenenko, A. Suslenkova, E. Shchurova</i>	
THE USING OF FREE SKYHELIOS SOFTWARE IN URBAN MICROCLIMATIC RESEARCH.....	119
<i>M. Alieva, T. Schlender</i>	
THE STUDY OF phytotoxicity DETERMINATION OF soils under various types of anthropogenic load.....	120
<i>D. Apanasevich</i>	
BIOFUELS AS A RENEWABLE ENERGY SOURCE	121
<i>D. Rudz, L. Kuzina</i>	
THE TROPHIC ROLE OF PLANTS IN THE DIET OF WILD WATERBIRDS OF THE MINSK REGION	122
<i>Yu.G. Lyakh, A.V. Apanovich, M.Yu. Lezhdey</i>	
ANALYSIS OF THE ACTIVITY OF THE BREWING INDUSTRY IN THE FIELD OF ATMOSPHERIC AIR PROTECTION	123
<i>E. Baeva, V. Misiuchenka</i>	
OPTIMIZATION OF THIN-LAYER X-RAY COMPUTED TOMOGRAPHY IN DIFFERENTIAL DIAGNOSIS OF FOCAL LUNG CHANGES	124
<i>A. Boika</i>	
ASSESSMENT OF THE WORLD EXPERIENCE IN IMPLEMENTING THE GREEN ECONOMY BASED ON THE BASIC INDICATORS OF THE GLOBAL GREEN ECONOMY INDEX.....	125
<i>J. Butkevich, K.Mukina</i>	
CREATION OF PROKARYOTIC AND EUKARYOTIC STRAINS – PRODUCERS OF RECOMBINANT KERATINASE	126
<i>M. Chindareva, I. Kazlouski, A. Zinchenko</i>	
QUALITY CONTROL OF EXTERNAL BEAM THERAPY USING MATRIX DETECTORS	127
<i>I. Chirkova, T. Chikova</i>	
RADIATION CONTROL OF LINEAR ACCELERATOR ELEMENTS WITH RESIDUAL INDUCED ACTIVITY DURING FACILITY OUT OF OPERATION.....	128
<i>I. Chirkova, T. Chikova</i>	
ASSESSMENT OF LEVELS OF FINE PARTICULATE MATTER IN THE ATMOSPHERIC AIR ON THE TERRITORY OF MOGILEV CITY.....	129
<i>E. Drugakou, T. Krukouskaya</i>	
IMPACT OF THE MILK INDUSTRY ON THE ENVIRONMENTAL STATE OF THE REPUBLIC OF BELARUS.	130
<i>V. D. Duzinchuk, S. E. Golovatyi</i>	
ANALYSIS OF THE CONTENT OF POLLUTANTS IN GROUNDWATER IN THE AREA OF PUBLIC WASTE LANDFILLS OF THE MINSK REGION	132
<i>P. Dzelianko, V. Misiuchenka</i>	

FEATURES OF USING PET IMAGING FOR RADIOTHERAPY PLANNING.....	133
<i>E. Emelyanenko, M. Petkevich, T. Chikova, V. Plokhodko</i>	
ECOLOGICAL AND ECONOMIC JUSTIFICATION OF THE EFFECTIVENESS OF "GREEN" ROOFS WITHIN THE SETTLEMENT.....	134
<i>A. Gil, V.N. Kapitsa</i>	
Venerability OF AGRICULTURAL PRODUCTION to climate change IN THE REPUBLIC OF BELARUS.....	135
<i>A.D. Goman, I.P. Narkevich</i>	
THE PLACE OF THE DAW AND MAGRY IN THE STRUCTURE OF THE POPULATION OF SYNANTHROPIC COVIDS IN THE LARGE URBANLANDSCAPS OF BELARUS	136
<i>A. Khandohiy, A. Charniauski, A. Piatkevich, A. Neverko, A. Zezyulkina</i>	
THE SPECIFICITY OF THE COLOR POLYMORPHISM OF THE GROVEL DOVE IN THE ADMINISTRATIVE REGIONS OF THE CITY OF MINSK	137
<i>I. Khandohiy</i>	
ASSESSMENT OF THE ANTROPOGENIC LOAD ON SOILS OF MINSK VICTORY PARK WITH THE HELP OF INDICATOR PLANTS.....	138
<i>A. Holub, A. Lukashonok, Yu. Zhyltsova</i>	
DEGREE OF URBANIZATION AND NUMBER OF IKSODID IN THE PARKS OF MINSK	139
<i>L.I. Isachenko, Yu.G. Lyakh</i>	
SPECTROSCOPIC STUDY OF TEMOPORFIN (mTHPC) COMPLEXATION WITH POLYMERIC CYCLODEXTRIN.....	140
<i>I. Kablov, V. Kaskeh, I. Kravchenko, V. Zorin</i>	
INFLUENCE OF BIOLOGICALLY ACTIVE SUBSTANCES ON ORNAMENTAL TRAITS OF TULIPS	141
<i>T. Kaleanchuk</i>	
THE RELEVANCE OF CREATING MODELS OF LINEAR ACCELERATORS BEAMS OF VARIOUS MANUFACTURERS IN THE ECLIPSE PLANNING SYSTEMS	142
<i>E. Kemesh, S. Semkovsky</i>	
COLOR POLYMORPHISM OF THE SYNANTROPIC GROVEL DOVE IN DIFFERENT SETTLEMENTS OF BELARUS	143
<i>I. Khandohiy, A. Holub, N. Leschinskaya</i>	
STUDY OF THE DEGREE OF DECOMPOSITION AND THE BOTANICAL COMPOSITION OF PEAT-BOG SOIL FOR IDENTIFICATION OF THE TERRAIN	144
<i>A. Khokh</i>	
POSSIBILITIES OF USING NIR SPECTROSCOPY FOR ESTABLISHING THE GENETIC TYPE OF SOILS	145
<i>A. Khokh</i>	
ANALYSIS OF MAPINFO AND QGIS CAPABILITIES FOR CREATING A DIGITAL TERRAIN MODEL IN ENVIRONMENTAL MAPPING	146
<i>K. Kozhevnikov</i>	
ENVIRONMENTAL MATERIALS IN PRINTING.....	147
<i>V. Krasovskiy, K. Leontieva, D. Koltovich</i>	
ENVIRONMENTAL PAYMENTS AS A TOOL FOR IMPROVING THE EFFECTIVENESS OF REGIONAL POLICY	148
<i>A. Kuzemko, T. Germanovich</i>	
LEMNA MINOR L. IN CONDITIONS OF WATER POLLUTION WITH PETROLEUM PRODUCTS.....	148
<i>D.O. Lebedeva, Yu.V. Zhyltsova</i>	
FORECASTING THE SPREAD OF INFECTIOUS DISEASES USING TIME SERIES ANALYSIS.....	149
<i>I. Lefanova, T. Smirnova</i>	
THE ROLE OF CROP LOSS FOR BIRDS WINTERING IN BELARUS	151
<i>M.Yu. Lezhdey, Yu.G. Lyakh, A.V. Apanovich</i>	
ENVIRONMENTAL METHOD FOR NON-POWER DATA EQUIPMENT OPERATION	152
<i>L. Lipnitski, M. Artemchuk</i>	

INFLUENCE OF MOTOR TRANSPORT ON ATMOSPHERIC AIR POLLUTION IN THE REPUBLIC OF BELARUS	152
<i>A. Y. Karchmit, E.S. Len</i>	
SENSITIVITY ANALYSIS TO BROAD-SPECTRUM ANTIBIOTICS DRUGS OF REPRESENTATIVES OF GENUS BACILLUS WHICH WERE UNDER PROLONGED EXPOSURE TO IONIZING RADIATION.....	154
<i>S. Maltsava, A. Yakubovich, E. Gritskevitch, I. Buchenkov, A. Sysa</i>	
PROBLEMS OF FORESTRY	155
<i>M. Maltsev, L. Kuzina</i>	
STUDYING THE REASONS FOR THE DISTRIBUTION OF SARCOCYSTOSIS AMONG HUNTED WATERBIRDS IN BELARUS.....	156
<i>Yu.G. Lyakh, J.Kh. Miruktamov</i>	
STUDY OF ACIDITY AND MICROBIOLOGICAL COMPOSITION OF FERROUS MILK PRODUCTS.....	157
<i>M. Mukhtorjonova</i>	
INTEGRATED SYSTEM FOR CONTROL WITH CANADIAN GOLDENBERRY (<i>SOLIDAGO CANADENSIS L.</i>) IN MINSK REGION	157
<i>Yu. G. Lyakh, T. R. Omar</i>	
LEGAL ISSUES OF IMPROVING LAND LEGISLATION IN THE CONTEXT OF ENVIRONMENTAL PROTECTION IN KAZAKHSTAN.....	158
<i>Omyrzakov Y., Dosumov Zh.</i>	
COMPARATIVE ASSESSMENT OF METHANE FLOWS IN NATURAL AQUATIC ECOSYSTEMS	159
<i>A.M. Pauliuchenka</i>	
INVESTIGATION OF THE DEGREE OF BACTERIAL CONTAMINATION OF MILK.....	160
<i>A. Peshko, T. Pitsko</i>	
STUDY OF LACTIC ACID CONTENT IN MILK	161
<i>S. Petrenko, T. Pitsko</i>	
APPLICATION OF BIOCHIP PROTOTYPE FOR EXPRESS DIAGNOSTICS OF CARDIOVASCULAR DISEASES.....	162
<i>E. Pishchukhina, A. Miadzvetski, L. Lipnitski</i>	
MEASUREMENTS OF OUTPUT FACTORS FOR SMALL PHOTON FIELDS	162
<i>V. S. Piskunov, T. S. Chikova, A.N. Semashko, S.V. Semenov</i>	
ASSESSMENT OF THE ANTHROPOGENIC IMPACT ON THE SOILS OF THE 50 TH ANNIVERSARY OF THE GREAT OCTOBER PARK IN MINSK BY THE BIOINDICATION METHOD BASED ON THE SOIL ACIDITY ...	163
<i>A. Plavsyuk, D. Lyashuk, Yu. Zhyltsova</i>	
MODELING OF BATTERY CHARGE AND DISCHARGE IN THE CONTEXT OF IMPROVING THE DRIVING PROPERTIES OF ELECTRIC VEHICLES.....	164
<i>V. V. Pleskaney, E. V. Yablonskiy, D. S. Mishlakov, P. K. Shalkevich</i>	
SPECIES COMPOSITION OF INDIVIDUAL FAMILIES OF ORTHOPTERA IN THE GOMEL REGION	165
<i>U. V. Putsko, O. V. Lozinskaya, T.P. Sergeeva</i>	
FEATURES OF PET IMAGING FOR RADIOTHERAPY PLANNING	166
<i>E. Pytlyak, E. Emelianenko, M. Petkevich</i>	
APPROACH TO RADIATION SAFETY DURING STEREOTAXIC RADIOSURGERY	167
<i>E. Pytlyak, M. Petkevich</i>	
CORRELATION BETWEEN ¹³⁷ Cs AND ¹³³ Cs CONCENTRATIONS IN LICHENS, MOSSES AND THEIR SUBSTRATE	168
<i>V. Seglin, N. Shamal, R. Korol, R. Kurilenko, A. Nikitin, Yu. Simonchik</i>	
ASSESSMENT OF THE CONDITION OF THE AIR BASIN OF MOGILEV (2010-2020)	169
<i>V. Semkina, M. Dubina</i>	
ECOLOGICAL AND HYGIENIC CHARACTERISTICS OF ATMOSPHERIC AIR POLLUTION IN INDUSTRIAL CITIES OF THE REPUBLIC OF BELARUS.....	170
<i>V. Semkina, M. Dubina</i>	

ENVIRONMENTAL CRISIS OF THE ARAL	171
<i>N.S. Sheralieva, O.V.Nilova</i>	
DIGITAL TERRAIN MODELING BASED ON DATA OBTAINED USING SATELLITE NAVIGATION SYSTEMS.....	172
<i>O. Shirobokov</i>	
THE EFFECT OF AN ELECTRIC FIELD ON THE BIOLOGICAL PROCESSES OF THE SEED	173
<i>V. Sivukha</i>	
ADENYLATE CYCLASE SYSTEM OF CARDIOMYOCYTES UNDER IRRADIATION.....	174
<i>O. Susha, R. Prokopovich</i>	
BIOINDICATION OF WATER POLLUTION IN THE UDMURT REPUBLIC OF THE RUSSIAN FEDERATION..	174
<i>A. Tyurin</i>	
THE FIRST RECORD OF THE INVASIVE NORTH AMERICAN CRAYFISH <i>FAXONIUS LIMOSUS</i> WITHIN THE WATER BODIES OF MINSK (BELARUS)	175
<i>K. A. Ulashchyk, Yu. G. Giginjak</i>	
USAGE OF INNOVATIVE SOFTWARE TOOLS AND GIS TECHNOLOGIES TO SUPPORT THE ONLINE MONITORING SYSTEM OF THE STATE OF ENVIRONMENTAL COMPONENTS ON THE EXAMPLE OF THE CITY OF ORSHA.....	176
<i>N. Urbanovich</i>	
IMPACT OF IONIZING RADIATION ON AVIATION INDUSTRY EMPLOYEES.....	177
<i>A. Veyalkin, V. Polevich</i>	
ASSESSMENT OF ENVIRONMENTAL DUST POLLUTION (ON THE EXAMPLE OF LOSHITSKY PARK, MINSK)	178
<i>V.V. Yuryeva, T.V. Spevatskaya, L.I. Beliuha, Yu.V. Zhyltsova</i>	
ASSESSMENT OF THE CONDITION OF TREE PLANTATIONS IN PAVLOV PARK.....	179
<i>D. Zhytkevich, E. Zhuk</i>	

SECTION 4

BIOINFORMATICS. MODERN APPROACHES AND METHODS TO THE STUDY OF BIOMOLECULES

STUDY OF CHEMICAL AND BIOLOGICAL ACTIVITY OF SULFONAMIDE DERIVATIVES.....	180
<i>Baranovsky R, Garbuzov D, Voitekhovich K.</i>	
QUANTUM CHEMICAL MODELING AND PHYSICO-CHEMICAL PROPERTIES OF RIBAVIRIN.....	181
<i>D. Burlo, S. Shahab</i>	
EFFECT OF TEMPERATURE ON LUMO-HOMO GAP OF OF THE N-(3,5-DI-TERT-BUTYL-2-HYDROXYPHENYL) METHANESULFONAMIDE.....	182
<i>O. Folts, N. Statsi, D. Garbuzov, S. Shahab</i>	
BIOAVAILABILITY OF LYSERGOL.....	183
<i>O. Folts, N. Statsi, S. Shahab</i>	
COMPARISON OF PARAMETERS AFFECTING THE CHEMICAL AND FUNCTIONAL ACTIVITY OF SULFANILAMIDE DERIVATIVES.....	184
<i>D. Garbuzov, R. Baranovsky, O. Foltz</i>	
SOFTWARE FOR COMPUTER MODELING IN BIOLOGICAL SCIENCES	185
<i>D. Yu. Garbuzov, B. A. Tonkonogov</i>	
QUANTUM CHEMICAL MODELING AND PHYSICO-CHEMICAL PROPERTIES OF ALPRAZOLAM.....	186
<i>M. Gorbatenko, S. Shahab</i>	
QUANTUM CHRMICAL MODELING OF THE ETHYL(2-ETHYL-6-METHYLPYRIDINE-3-YL) SUCCINATE AND 2-ETHYL-6-METHYLPYRIDINE-3-YL PENTYL SUCCINATE	186
<i>A.Gritsenko, V. Linnik, M. Oev, S. Shahab</i>	

QUANTUM-CHEMICAL SIMULATION OF THE INTERACTION BETWEEN GUANOSINE AND TRIHYDROXY-SEKO-GUANOSINE	187
<i>R. Kazakov, M. Khancheuski, E. Kvasyuk, S. Shahab</i>	
PREPARATION AND CHARACTERISTICS OF A HYDROGEL BASED ON TRIHYDROXY-SEKO-GUANOSINE	188
<i>R. Kazakov, M. Khancheuski, E. Kvasyuk, S. Shahab</i>	
OPTIMISATION OF CAMF AND AP ₄ A MOLECULES BY DFT METHOD WITH B3LYP/6-31G(d,p) FUNCTIONAL.....	189
<i>D. Kozlovich, Y. Liu, N. Bogdanova</i>	
BIOLOGICAL CHARACTERISTICS OF CAPSAICIN AND MENTHOL.....	190
<i>V. Linnik, A. Gritsenko, S. Shahab</i>	
INFLUENCE OF THE PREPARATION "NANOPLANT - 8 ELEMENTS" ON GRAM-POSITIVE AND GRAM-NEGATIVE BACTERIAL CULTURES	191
<i>S. I. Pekarskaya, E. E. Tarasova</i>	
THE EFFECT OF PREPARATIONS BASED ON NANOSCALE PARTICLES ON MICROORGANISMS	192
<i>S. I. Pekarskaya, E. E. Tarasova</i>	
BIOACCESSIBILITY OF FURANEOL.....	193
<i>M. Statsi, S. Shahab, O. Folts, D. Garbuzau</i>	
ESTABLISHING OF BIOLOGICAL ACTIVITY OF SULFONAMIDE DERIVATIVE	194
<i>M. Statsi, O. Folts, D. Garbuzau, S. Shahab</i>	
COMPARATIVE CHARACTERISTICS OF THE BEST ANTIOXIDANTS	195
<i>O. Susha, V. Zayats</i>	
ANTIOXIDANT ACTIVITY OF FATTY ACID ETHANOLAMIDES	196
<i>V. Timchenko, M. Yakauleva</i>	
BIOLOGICAL ACTIVITY OF THE 24-EPIBRASSINOLIDE BIOMOLECULE	197
<i>Trifonova, O. Panibrat, V. Zhabinsky</i>	
BIOLOGICAL ACTIVITY OF THE 24-EPICASTESTERONE BIOMOLECULE	198
<i>Trifonova, O. Panibrat, V. Zhabinsky</i>	
COMPARATIVE CHARACTERISTICS OF THE ANTIOXIDANT PROPERTIES OF VITAMIN C, VITAMIN A AND TOCOPHEROL	199
<i>M. Yakauleva, V. Timchenko</i>	
COMPARISON OF ASTAXANTHIN AND ZEAXANTHIN ANTIOXIDANT PROPERTIES BASED ON QUANTUM MECHANICAL MODELING.....	200
<i>V. Zayats, O. Susha, I. Naletov</i>	
FENOFIBRIC ACID AS A POTENTIAL THERAPEUTIC AGENT FOR SARS-COV-2 INFECTION	201
<i>Zhang Zhibo, A. Bakunovich</i>	

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