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Faculty of Social Sciences, Faculty of Engineering, Forest Faculty

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STUDENTS ON THEIR WAY TO SCIENCE

(undergraduate, graduate, post-graduate students)

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POSSIBILITY OF PRODUCTION OF SOLID RECOVERED FUEL FROM MECHANICALLY SORTED MUNICIPAL SOLID WASTE IN LATVIA

Dace Āriņa

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The production of solid recovered fuels (SRF) is one of the ways to reduce the waste amount for landfilling and it provides alternative fuels for industries. The SRFs already are used in cement kilns in the cement plant *Cemex* as a substitute for fossil fuels in Latvia [1]. The *Cemex* is planning to use the following amount of the alternative fuel with two variations of humidity yearly: 72 324 t (<15% of humidity) and 179 687 t (<25%). The high quality recovered fuels (class SRF I) [2] can be produced from commercial, construction, demolition and industrial waste, but the quality class SRF II-III from household and commercial waste after source separation as shown by the long term experience in Finland [3]. According to the national statistics the total amount of disposed municipal waste in 2011 was around 572195 tons and the largest part of it - 89%, consisted of unsorted household refuse and similar waste material.

Automatical sorting by linear star screen and rotating drum screen sorting lines was investigated as the pre-treatment method for municipal solid waste in Latvia [4]. Only the spring fraction of the waste fraction separated as potentially usable for the production of fuel had the corresponding average amount (<25%) of the humidity. The qualitative material for the production of fuel cannot be obtained from the wet unsorted household waste (typical for Latvian circumstances) by only pre-shredding and screening either with the drum or star screen. To decrease the amount of the moisture in the waste and to increase the amount of waste for SRF production it is advisable to introduce the source separation system for bio waste (including kitchen waste).

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DEVELOPMENT OF ENVIRONMENTAL GAINS FROM SMALL MUNICIPALITY WASTE WATER SYSTEM INFRASTRUCTURE IN LATVIA

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The Latvian waste water system infrastructure in small villages was built in the 20th century when the massive soil melioration system building process destroyed traditional individual farmstead schemes. In Soviet times many small collective farms, animal husbandry farms etc. with centralized water supply waste water treatment were built [1,2].

It means that the small Latvian (< 2000 PE) municipal waste water systems are exploited for more than 30 years and the optimal period of use has passed. It is necessary to make long term investments into reconstruction and building of new water management infrastructure to reduce the pollution of environment and threat to the human health.

For municipal water management development the funding from the European Regional Development Fund (ERDF) was attracted in order to equalize the differences within the European Community [3]. During the planning period 2008-2013 in the Ministry of Environmental Protection and Regional Development 533 water management infrastructure development projects were accepted. There will be more accepted projects (about 75) till the end of March. This study was developed to evaluate the environmental gains from the implemented projects. There are load estimates of the reduction of municipal effluents made. The calculation is made considering the number of people whose households are connected to the centralized waste water system and the amount of per capita load figures. The first results show that the amount of the total nitrogen reduction amount is 3,38 t. per annum and total phosphorus – 0,67 t. per annum.

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POLICY OF EURO INTRODUCTION IN POST-SOCIALIST COUNTRIES: SLOVENIA, SLOVAKIA AND ESTONIA

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Latvia is preparing to join the euro zone on January 1, 2014, so the aim of this paper is to analyze the experience of the introduction of the euro in other post-socialist states. So far, three post-socialist countries joined the euro area: Slovenia (since January 1, 2007), Slovakia (since January 1, 2009) and Estonia (since January 1, 2011). To ensure sufficiency of euro banknotes and coins, the banknotes were borrowed from central banks of other euro area countries, but the coins were minted in the Finnish Mint. For more successful implementation of the new currency early the cash was transferred to commercial banks and further – to entrepreneurs, traders and financial institutions. To inform the inhabitants about euro introduction, information campaigns were carried out, which included special websites, free consultation phone lines, explanatory brochures, informative articles in the press, radio and television and currency calculators distributed to households. A compulsory requirement for the introduction of the euro is to display the prices in the national currency and in the euro too for at least three months before and six months after the introduction of the euro. In Slovenia, Slovakia and Estonia this period was longer. The correct calculation and reflection of prices were monitored by consumer protection institutions and by consumers themselves. The government called on the goods and service providers to sign an agreement on a fair price conversion. In all three countries the euro cash changeover was carried out after the "big bang" scenario - the introduction of euro cash on the same day when the euro became the new national currency and short (two weeks) dual currency circulation period. Disadvantages of the introduction of euro were the costs of the implementation, attempts to pay with fake money, increase of inflation and the need to help other euro area countries landed in the difficulties. The euro cash changeover process was evaluated as positive, encouraging integration in Europe, increasing of foreign investor confidence and investments.

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ELECTRIC VERSUS TRADITIONAL BICYCLE

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Electric bicycles are growing in popularity in Latvia, already few hundred bicycles are in use in Latvia, but it cannot be compared to Germany, where already 900 000 are sold in recent years [1]. This research is about clearing some presumptions about electric bicycle technology from the author's experience as a traditional and electric bicycle regular user.

Electric bicycles are expensive; the buying price is about 2-3 times the traditional one. Batteries will last for few years properly maintained. However, they are a lot cheaper than fuel driven vehicles or public transport, for example, one way ticket in Jelgava city bus costs 0.71 EUR, but electricity charge for ACXA bicycle for 20 km - 0.05 EUR [2].

Electric bicycles are heavy, about two times heavier than a traditional one. It can be felt when electric energy ends and there is a need to pedal- there is more resistance, or when storing the bicycle, but sometimes the battery pack (about half of the bicycle weight) is removable, so you can charge batteries in a room, separately from the bicycle.

Electric bicycles are fast. The engine power cannot exceed 250 W to be called a bicycle, larger power ratings put bicycles in the moped category with registration, insurance etc. These bicycles can reach speeds up to 25 km/h without human assistance. It is faster than a traditional bicycle in a city, even too fast on a crowded payment. Because of lack of control on the roads, there are bicycles with up to 1000 W motors that can reach the speed 50 km/h.

Electric bicycles are slightly complicated. Bicycle parts are almost the same, apart from more heavy duty rims and brakes with position switches, every bicycle shop should be able to service it. The electric part needs to have a mechanic with basic electronic skills; brushless motors do not need maintenance. From the author's experience, throttle control is one of the most unreliable parts because of falls.

Electric bicycles are not for everyone; basically they should be perceived as small mopeds, giving a reasonable driving range from a small, cheap and renewable energy source. Humans are always searching how to ease their work, so this kind of transportation gives a greater choice to do it. In the author's opinion, traditional bicycle users will continue to use their feet, but mostly people new to cycling are turning to electric bicycles.

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SELECTION CRITERIA OF FUEL INJECTORS FOR GASOLINE TO E85 FUEL CONVERSION

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Automobiles, which are built to operate with gasoline and equipped with port fuel injection (PFI) spark ignition (SI) engines, can be converted to use ethanol-gasoline blends, such as commercially available E85. Fuel conversion allows using a sustainable source of fuel. Gasoline and E85 have different chemical and physical properties. Use of E85 increases the engine power output and reduces emissions of hydrocarbon and carbon monoxide components in the exhaust gases. The negative aspects of use of E85 are engine cold start difficulties, chemical aggression, increased emission of aldehydes and increased fuel volume consumption. This study focuses on revealing the specific properties of the fuel injectors, which are becoming particularly important when selecting injectors for automobiles within the process of fuel conversion. Electric and acoustic injector diagnostic methods are described. The results of this research can be practically applied when fuel injectors are being evaluated or selected for the fuel conversion purposes.

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BENEFICIAL USE OF SECONDARY OR INDUCED MAGNETIC FIELD TO IMPROVE THE EFFICIENCY OF ELECTRIC GENERATORS

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Nowadays researches in efficient production of electrical energy are becoming increasingly topical.

Even though it is believed that the energy production efficiency, for industrial purposes, in cogeneration stations is approaching the maximum of the theoretically feasible efficiency, new electrical generators that make electrical energy production more efficient and therefore also cheaper are still being made. The author has analysed a wide range of innovative, high-efficiency electric voltage generators. Although the efficiency is very high, its “ceiling” is clear and can be calculated, as determined by prolonged fundamental scientific research all over the world [2]. Therefore, fundamentally the potentially highest generator efficiency has reached its “ceiling” [1].

A detailed analysis of electric generators has led to the development of a new generator model, which was named the “Secondary Magnetic Field Generator” (SMFG). The necessary theoretical calculations were made by means of using the computer simulation program “Finite Element Method Magnetics” or “FEMM”, in which the theoretical computer simulations were made, as well as a prototype was made in order to determine the real “SMFG” operation errors and maximize the efficiency of this model.

The aim of the research was to find out whether the secondary magnetic field can be used to do useful work in order to reduce retaliation against the primary magnetic field.

After the calculations and the experiment, the obtained data allowed concluding that the use of a secondary magnetic field for useful work can result in significant increase in the efficiency of generator operation.

Besides, the “SMFG” operating principle could be used in order to efficiently regulate the operation of wind generators.

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INDUCTION MOTOR FAULTS AND THEIR CAUSES

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Induction motors are commonly used in industry, agriculture, transporting systems and other places. They account for 95% of all movers in industrialized nations and consume 40 to 50% of all generated electric energy [1]. General applications of induction motors are in air conditioners, fans, pumps, compressors, machine tools, lifts, etc. Induction motors are inherently reliable and need minimum maintenance. However, induction motors eventually deteriorate and fail. According to [2] the annual motor failure rate is conservatively estimated at 3-5% per year, and in extreme cases, up to 12%. Therefore, in this paper the conditions of work places where induction motors are used and induction motor failures will be analysed.

In [3] a detailed description is given of conditions under which induction motors are used and their impact on the performance and life time. These conditions are: dust, high humidity and aggressive gases, fast temperature changes, low and high temperatures, bad quality and asymmetrical voltage. Application of induction motors above these condition limits can lead to induction motor intense heating, vibrations, induction motor insulation damage, bearing shortened life time and in the end to complete induction motor stoppage.

The results of induction motor fault surveys [1] show that 40-50% of motor faults are due to bearing faults, 30-40% stator faults, 5-10% rotor bar, 10-15% eccentricity. In [2] the induction motor failures are classified: electrical related failures – 35%, mechanical related failures - 31%, environmental impact and other reason related failures – 34%. It can be seen that the results from both surveys are even. Due to this it can be concluded that induction motor performance monitoring and maintenance are very important to decrease the induction motor failure rate and economical losses that induction motor faults and stoppage can cause.

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VEGETATION DIVERSITY IN BLACK ALDER WOODLAND KEY HABITATS

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Small forest parcels with high biodiversity values are defined as woodland key habitats, which are determined by the stand age and history (Linder and Ostlund, 1998), the stand characteristics (e.g., the content of the forest structural elements) and the occurrence of indicator species (Johansson and Gustafsson, 2001). The woodland key habitat strategy has been established to the regions where forests have been intensively managed (Timonen et al., 2011) and thereby substantially fragmented.

Black alder woodland key habitats are protected under the Habitats Directive 92/43/EEC in Europe. In Latvia, the gap analysis of black alder woodland key habitats shows serious lack of this habitat type in all regions (Liepa and Straupe, 2012). The aim of this study was to estimate the vegetation diversity of black alder swamp woods. The vegetation of black alder woodland key habitats in the central region of Latvia in Zemgale is described. The vegetation survey has been made in the vegetation season of 2012. In total 4, 20×50 m study sites were recorded. The research has been performed in two woodland types: *Dryopterioso caricosa* and *Filipendulosa* on wet peat soils. The Braun – Blanque method has been used to estimate the projective coverage (%) of the moss layer, herb layer, shrub layer and tree layer. A total of 104 species were recorded. In the moss layer – 25, herb layer – 77, shrub layer – 10 and tree layer – 4 species were established. In order to assess the vegetation diversity, average ecological values of vascular plants and mosses were calculated, species richness and composition were analyzed.

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COMPUTER NUMERICAL CONTROL

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Many manufacturing industries require particular parts for their equipment and/or products, hence is why CNC machinery is used. CNC is the acronym for "Computer Numerical Control", a term which describes a type of control system used on a piece of manufacturing equipment. It is difficult to imagine the modern manufacturing industries without these control systems due to their universality.

The most important role in the history of CNC machines was played by John T. Parsons from the "Parsons Corporation" trolled machine, who helped to develop the first numerical cone. It was successfully demonstrated in 1952. From that point the variations of machine types grew with each year to come [1].

The types of CNC machines most commonly used in the manufacturing industry are Machining Centers and Turning Centers, although a large variety of machinery can be used alongside with them, for example, Wire electrical discharge machines, Flame-Cutting and Laser-Cutting Machines [2].

Due to the difference in the construction of each mentioned machine, the components differ as well, but the main parts are identical, such as control units, drive motors etc. The programming language on most CNC machines is the same. It is called "g-code", which comprises mainly of alphanumeric characters [3].

Taking into account high precision and sophisticated construction of these machines led to relatively high prices compared to machines without CNC systems. That is compensated by the high efficiency of the machines and fewer workers that are required to operate the machinery.

Computer Numerically Controlled machines have made a remarkable contribution to the manufacturing industries by means of automation of the machining processes with flexibility to handle small to medium batch quantities in part production.

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INFLUENCE OF PH ON AMOUNT OF TEARS OF HORSES

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There are many different eye problems distributed between horses. One of the most widespread and common is increased eye watering that causes many problems for horse owners and veterinarians and especially for the horses they own. It is important to provide conditions for a horse that makes the animal feel comfortable, but eye problems like increased lacrimation cause a lot of discomfort.

There are many different factors that cause increased lacrimation like dust in the stable and the air quality, different bacterial infections and many other factors [1]. Increased lacrimation may seem to be a problem that can be solved easily, but it demands regular and serious care. If the problem is not solved on time, it may cause a lot of serious and complicated diseases, e.g., conjunctivitis, keratitis, uveitis, blocked tear ducts, etc.

In this research the author explores the pH influence on the amount of tears of horses. The normal amount of pH in horses' tears is not completely explored. The pH of normal human tear is 6,5– 7,6, but there are no common data about horses [2]. Considering that pH is one of the factors that effects tear production, there were made two simple tests for 40 horses. First of all, the Schirmer's test was used to find out the amount of tears per minute. The use of this test is simple and often used for eye health diagnosis [3]. Secondly, pH test strips were used to determinate the pH of tears. Both methods are safe for animals and can be performed quickly and by causing only minimal stress for horses. Summarising the obtained data, a connection was found between the pH of tears and the amount of tears. Finding this connection can help find the most effective treatment for each individual horse and solve the eye watering problems for these animals.

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HISTORICAL EVOLUTION, LIGHT CONDITIONS AND FUTURE DEVELOPMENT OF OAK FOREST (*QUERCUS ROBUR* L.) IN NATURE RESERVE “KAĻĶU GĀRŠA”

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In Latvia natural oak forests have become rare. Development of agriculture and manufacturing has led to important loss of oak forests in Latvia. Nowadays, oak stands often form largely overgrown park-like meadows or wood pastures where the stands regenerate without oaks. It is important to explain the main factors that affect oak regeneration in these stands and determine the main management activities for saving and maintaining these habitats.

Park-like meadows and wood pastures are the result of rare management and historical land-use.

The data suggest that the territory of the nature reserve „Kaļķu gārša” in the 18th century was forested. The nature reserve “Kaļķu gārša” had developed from managed forests but it is possible that in the 19th to 20th centuries there had been a wood pasture; the location of the trees and the age data agree with it.

Competition with vegetation and other species, limited light conditions, water and nutrient resources negatively influence the natural oak regeneration process [1]. Nowadays, oak, lime and ash-tree are the dominant species in the stand. Oak was found only in the largest diameter, age and height classes. Natural regeneration processes will turn the oak forest into spruce and broadleaves mixed-stand.

In broadleaved forests gap-scale disturbances are frequent. Under canopy gaps more light and nutrients are available that increases competition between the understorey species [2].

Spruce is dominant in the sapling and seedling layers. The data analysis about the light conditions in the stand and tree species shows significant correlation with rowan-tree and lime, because broadleaves are light demanding species and successfully can develop under the canopy gaps.

In future oak will be replaced by spruce with mixture of other species like lime and ash, forming mixed-stands. Oak cannot regenerate in the stand because of complicated light conditions and strong competition with spruce.

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REPRESENTATIVENESS OF POLYHYPOMICROELEMENTOSIS OF ANIMALS

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The role of many trace substances is not completely investigated, and interaction between them is a question open. This gets a special status when diagnosing pathology of an element homeostasis. Chemical "relations" of trace elements are very difficult and sometimes unpredictable, that is expressed in them - 105 bilateral and 455 tripartite synergistic and opposing relationship among them.

In Belarus biogeochemical provinces are with low contents of I, Se, Zn, Mn, etc. It is a fundamental factor in development of illnesses of mineral failure of humans and animals. More often from elementosis pathology diselementosis is met, and in particular polyhypomicroelementosis in animals.

Researches have established an interesting tendency in the conditions of a series of experiments in cattle breeding farms of the republic. In the experiments, hair was biosubstrate, in which trace elements were defined.

The data obtained in the experiments on calves showed deep deficiency of Co, Cu, Zn and Mn. Alopecias of different localization, as deep combers and wounds in the field of the facial part of the head of animals were clinically established. Thus, the infectious and invasive beginning was not established.

At first sight, against deficiency of the above-mentioned trace elements in this case, in a larger measure for this symptomocomplex zinc (Parakeratosis calfs) is responsible. Its disadvantage to pathology of an integument and its derivatives is that it is rather a mechanism starting in this chain of events, and accompanying deficiency of copper and manganese promotes a brighter course of a disease.

This assumption can be considered quite thorough if to consider that similar pattern was shown in the experiments which have been carried out by Tairova L.G. and Mukhamedyarova A.R. in biogeochemical conditions of a forest-steppe zone of South Ural, thousands kilometers from Belarus, thus as biosubstrate I integral blood of animals acted. The determined consistent pattern of the shown combined deficiency of elements shows that a parakeratosis as "purely" nosological unit concedes to informational content polyhypomicroelementosis dilating this term. That gives a chance to tap and characterize fully an exact cause of illness and pharmacological correction following it will be the most rational.

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WHAT IT IS MORE IMPORTANT?

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It is important to diagnose correctly! It is not only the availability of the corresponding equipment, but also, of course, fundamental knowledge of the subject. Not less important is the material which has been selected from a live organism, in which specific markers a giving correct “course” for identification of this or that pathology, hidden to a usual eye, are available.

However, accurate diagnosis for diselementosis in animals is difficult. By the last mean temporary or long violation of bioelement structure in animal organism (surplus, deficiency, an imbalance of bioelements) which proceeds latent, with decrease in adaptive reserves, predisposition to infectious, invasive and noncontagious diseases, the birth of weak and impractical posterity, partial and not full realization of the domestic productive capacity occurs causing great economic damage to agriculture.

Our research has established that the use of hair cover of animals, as a very informative material, first of all, displays the dynamics of trace elements. It means that at continuous monitoring within this dynamics there will be a certain quantity of chemical elements for this species of an animal at which control it is possible to characterize fully the condition of an animal, so, at identification of elementosis pathology to carry out rational its pharmaceutical correction, by means of the corresponding preparations or a diet therapy.

It is not necessary to reject the fact that in complex research not only one biological substrate as a hair, but integral blood, blood serum, biopsy samples of the internal organs, saliva, sperms give a full picture of the events. However, for farm animals there is practice to use simple, highly specific in kind, cheap methods for sampling, transportation and storage of samples, followed by their elemental analysis.

For the recent 50-60 years information about the correct selection of biological substrate (hair, blood, etc.) and discussions about the methods of their research have rather increased. When some scientists claim that this is charlatanism, others consider it being an integral part to use hair cover both daily and in the routine of scientific-research purposes.

Probably a specific purpose in a specific place is more important than thousands of options!

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FINANCIAL BENEFITS FOR NEW PARENTS

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Lately one of the popular topics in our country is improvement of the demographical situation. According to the statistical data at the end of 2012, the resident population in Latvia was 2,041,765 which is less by 339,952 or 15 % compared to 2000.

In Latvia new parents have an opportunity to get six State Social Insurance Agency granted benefits: maternity, paternity, maternity allowance, child care allowance, parental allowance and family benefits. Since January 1, 2013 improvements in parents, maternity and in paternity benefits were introduced, each of them now gets LVL 23.02 per day plus 50 % of the amount that exceeds LVL 23.02. It means that the number of people, who can get these benefits at higher rates has increased by about 20 %. Hereafter, the following benefits cap will remain – 8 % parents, 10 % maternity and 17 % paternity, receiving more than LVL 700 per month.

Besides, there are significant changes in child care allowance. If no one of the parents work, this benefit will reach LVL 100 starting from 2013; it could be received for one year after the child's birth, afterwards it will be LVL 30, and it will remain unchanged until the child becomes two years old. However, if the parents work, this benefit in the sum of LVL 100 can be received for one and a half year after the child's birth and plus half a year LVL 30.

The above mentioned amendments and the amount of the benefits in Latvia are different from the other Baltic States. It is hard not to notice significant differences between the minimum of parental allowance. In Lithuania it is two times higher than it is in Latvia (LVL 50), while in Estonia the minimum of benefits reaches about LVL 200, which is two times higher than it is in Lithuania and four times higher than it is in Latvia. Due to this it is possible to conclude that it is necessary to go in the footsteps of the neighbours to do significant improvements.

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CONCEPTUAL FRAMEWORK OF BI-PROFESSIONAL CURRICULUM IN ENGINEERING EDUCATION

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As innovation is the source of competitiveness [1], innovation remains a hot topic for scientific discussions in many research fields. Many researchers agree that innovation is promoted by diversity, synergy and creativity. In higher education, “two degrees for the price of one” provides diversity, synergy and creativity for promotion of students’ intellectual flexibility, a certain amount of adventurousness and plain hard work [2]. By “two degrees for the price of one” two national (for example, German and French Degree in Engineering) degrees are meant. The “two degrees for the price of one” approach the demands on partner universities’ internalization, intensive international cooperation and staff mobility. Against this background, the authors of the present contribution suggest another approach, namely, acquiring two professions (for example, engineer’s and entrepreneur’s professions) within one curriculum. The aim of the research is to analyse theoretically bi-professional curriculum in engineering education underpinning elaboration of a model of bi-professional curriculum in engineering education. Psychological and pedagogical theories and documents are to be analysed. The findings of the research allow drawing the conclusions that bi-professional curriculum is based on the Leontiev’s theory of the psychological system defined as the change in the relationship between functions for the individual development, and not the development of each function [3]. Moreover, bi-professional curriculum has been successfully working in higher education in Latvia.

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BIRCH JUICE

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In order to use different resources of nature economically, representatives of food industry have to know specific information about the product value, its chemical content and utilization.

Birch sap is the sap extracted from a birch tree, such as North American Sweet Birch or Silver Birch. The sap is often a slightly sweet, thin syrupy-watery liquid [1]. This liquid contains sugars, proteins, amino acids, and enzymes [2]. Birch juice cleans kidneys and blood of unnecessary substances. Every year a person should consume not less than 8-10 l of birch sap. [3].

Birch sap must be collected during a specific time of the year, depending on the species and geography, at the break of winter and spring when the sap moves intensively, typically between the first thaws and the start of bud development [4].

Birch sap collection is done by drilling a hole into its trunk and leading the sap to the bottle by a plastic tube. A small birch (trunk diameter about 15 cm) can produce up to 5 liters of sap per day, a larger tree (diameter 30 cm) up to 15 liters per day. Birch sap has to be collected in early spring before any green leaves have appeared, as in late spring it becomes bitter. The collection period is only about a month per year [4].

The price of birch sap is correspondingly high in some countries, e.g., in Japan reaching up to 50 euro per liter. Birch sap may be consumed both, fresh and naturally fermented. From birch sap you can make drinks, such as wine, lemonade, champagne [4].

In Latvia this tonic is used as traditional herbal medicine functioning as antiseptic, anti-parasitic, anti-inflammatory, and anti-itching treatment. Fresh birch sap is highly perishable even if refrigerated; it is stable for only up to 2–5 days.

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PROPOSALS FOR FIELD WORK RIDES AND OPTIMIZATION ACCORDING TO SHAPE OF LAND

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In the research different irregular shapes of land were compared and each of these shapes was evaluated based on the driving direction in the scale distributed by 5° and then the optimal guidance lines were planned. In the case of optimal guidance lines it was found that using opposite turns decreases the percentage of working rides and thus increases the turning of agricultural machinery on the field. These differences in the percentage of the working ride with/without using opposite turns are in the scale from 0.72% to 44.50% depending on the shape and area of the land. Similar results showed values of the driving distance. In the case of using opposite turns the values of the driving distance are higher in the order of hundreds of meters.

Bochtisa et al. (2010) shows that implementing controlled traffic farming instead of uncontrolled traffic farming significantly increases the in-field transport distance travelled by an application unit during slurry applications.

Jílek and Podpěra (2005) refer, that there are numerous interwoven factors which affected the machine efficiency outputs. The field shape, size, terrain, obstructions and size of the equipment have great influence on performing operational steps from the point of view of exploitation, economical and energy criteria.

In conclusion, it was found that even the slightest deviation from the optimal direction line can lead to a significant increase in the proportion of non-working rides and crossings. Also these optimizations may lead to reduction in load of soil and risk factors.

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CONCEPTUAL METAPHOR

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Conceptual metaphor is reflected in all aspects of human life. It not only forms our communication, but also shows how we think and act.

"Metaphor penetrates into everyday life, not only in language but in thought and action. Our everyday conceptual system in a language of which we think and act is essentially metaphorical" [1].

In the book by George Lakoff and Mark Johnson "Metaphors We Live By" we can see that we use a lot of metaphors in our everyday speech, but do not always notice it.

Conceptual metaphors are often used to understand the theories and models. To understand something better conceptual metaphor "takes" one idea and "connects" it to another.

Moreover, the metaphor can be a powerful tool of "reconceptualization" of public consciousness, "that is, to change the system of basic concepts of the people themselves, their country and their role in its development. Therefore, with changes in the system of conceptual metaphors, our citizens will no longer feel like pawns, cogs, soldiers, guinea pigs, actors, passengers of the sinking ship or aircraft which is seized by terrorists. It will be a metaphor of society, confident, growing and at the same time not forgetting about the fundamental national valuables and priorities" [2].

So, we can say that metaphor is a universal tool of thinking and understanding the world.

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DIFFERENT APPROACHES TO NOTION OF “CONCEPT”

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Nowadays the notion “concept” has become widely used and it is difficult to understand its essence. Therefore, it is necessary to present different points of view which exist in science and formulate the basic understanding of the notion ‘concept’.

Concept as a cognitive notion is a unit of “mental resources of our consciousness and an informative structure that reflects knowledge and experience of a person; an operative meaningful memory unit, a unit of mental lexis, conceptual system and the whole world, reflected in human psyche” [1].

According to the “Brief Dictionary of Cognitive Notions”, the notion “concept” corresponds to the representation of those thoughts, which a person operates during the processes of thinking and which reflect the content of experience and knowledge, the content of the results of human activity and processes of cognition of the world in the form of “quantum” of knowledge [2].

Concept exists in consciousness (in the mental world) of a person. That “bunch” of images, notions, knowledge, associations which accompany a word is called concept. Concepts are “coagulates” of cultural environment in humans’ consciousness. Concept is an object from the “ideal” world which has a denotation and reflects certain culturally determined image of the real world. As it is seen from the definitions, concept is studied not only from the point of view of embodied information about this or that object, but at the same time as a cultural unit [3].

Based on the above mentioned information we can make a conclusion that the notion “concept” is the subject of research of many sciences which results in different interpretation of the meaning of the given notion. Because of their cognitive nature concepts are able to store knowledge of the world, be a carrier and a way of transferring of meanings.

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COMPARATIVE ANALYSIS OF THE ENGLISH FOR ACADEMIC PURPOSES COURSES' CONTENT IN LATVIA AND RUSSIA

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Comparative analysis of the content of the English for Academic Purposes course in Doctoral education in Latvia and Russia has attracted little research attention. Such an empirical lacuna has to be filled in as English for Academic Purposes in Doctoral education plays a significant role in the academic development of society and has close inter-relationships with content-based second language instruction [2], integrated content and language instruction as well as content and language integrated learning.

The research question is as follows: What content is used in the English for Academic Purposes course in Doctoral education of Latvia and Russia?

The aim of the research is to compare the content of the English for Academic Purposes course in Doctoral education in Latvia and Russia underpinning elaboration of a hypothesis on the content of the English for Academic Purposes course in Doctoral education.

The theoretical framework of the present research includes the meaning of the key concepts of *content*, *English for Academic Purposes* and *Doctoral education* studied.

The exploratory type of the comparative study has been applied [1]. The empirical study was conducted at the University of Latvia, Riga, Latvia and Immanuel Kant Baltic Federal University, Kaliningrad, Russia. Interpretative research paradigm has been used.

The findings of the research allow drawing the conclusions that the content of the English for Academic Purposes course in Doctoral education in Latvia and Russia have similarities and differences that are relevant to the local contexts of Latvia and Russia in terms of educational policy and their cultural and linguistic experience. Validity and reliability of the research results have been provided by involving other researchers into several stages of the conducted research. External validity has been revealed by international co-operation. The following hypothesis has been formulated: the content of the English for Academic Purposes course in Doctoral education is centred on research. The present research has *limitations*. Empirical studies in other institutions are proposed to be carried out.

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ASSESSMENT OF DISSIPATED POWER OF DBD REACTOR

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Plasma-assisted combustion (PAC) is now a timely topic worldwide, possibly having applications to more efficient fossil-fuel usage, conversion of low-grade fuels into higher grade fuels, and the reduction of pollution through ultra-lean burn combustion.

The application of plasmas to enhance combustion processes is an emerging field of plasma science and technology. It is lately receiving greater interest, driven by the need for more energy-efficient and less polluting combustion techniques, as mentioned above [1].

The aim of the present work is to research in gas heating in plasma reactors. A practical research in a coaxial DBD reactor was performed at the Latvia University of Agriculture. Non-equilibrium cold plasma was created in a dielectric barrier discharge (DBD) reactor and applied to hydrocarbon fuel. A test bench consisted of a function generator, AC amplifier, DBD reactor, IR thermometer, oscilloscope, data logger and computer. There was used lissajous figure [2] obtained from the transferred charge and voltage graph to measure the dissipated power at different voltage waveforms and duty cycles. IR thermometer was used to measure temperatures of the reactor inner electrode and dielectric layer. These values were used to calculate the power of gas undesirable heating.

The results of the practical research showed that the temperature of the dielectric layer was significantly lower than the inner electrode temperature due to surrounding environment cooling. Approximately 7% to 15% of the applied power was dissipated in gas heating, depending on the voltage waveform and duty cycle.

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GREY ALDER *ALNUS INCANA* L. (MOENCH.) STAND BIOMASS QUANTITY

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Issues on renewable resource (including wood) usage in the power sector turn more topical in the world and also in Latvia. Grey alder sylvicultural, ecological and mechanical characteristics are substantiating its usage as biomass resource. Grey alder quick growing demonstrates enormous wood growth in the first ten years. Grey alder does not have many diseases and pests (Lange, Mauriņš, Zvirgzds, 1978) which are very relevant factors for the tree growth. Also, there is no need for extra fertilization unlike other energetic cultivated plants. The grey alder area and growing stock in Latvia extended due to increasing of abounded agricultural land (Miezīte, 2008). According to the State Forest Service data (VMD, 2012) in Latvia there are 202.5 thousand ha of grey alder stands, 63 percent from the total are overgrown and at this moment it compiles the growing stock approximately 22.7 mil m³. These stands can be used as a biomass source. Cogeneration stations in smaller cities and countryside have been built because of the short distance to wood resources. Previously in Latvia and other countries several researches have been made in the methods of estimation of grey alder above-ground biomass that helps calculate it. Miezīte O., and Dreimanis A. (2009) developed equations for grey alder biomass estimation for trees up to 3.0 cm and trees from 3.1 to 26.0 cm diameter in naturally moist and absolutely dry conditions for independent variable using the breast height diameter and the stand basal area. Grey alder is one of the faster growing and profitable fuel wood and biomass obtaining species in Latvia considering various factors and facts; that is why more detailed research for establishing precise existent and the available grey alder wood quantity at this moment is needed.

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BASE STATIONS OPERATING IN LATVIA FOR LONG-RANGE DETECTION

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A very important process of science is to make data storage over a period of time and make the movement of the earth crust research. LatPos system has 23 permanent global positioning system base stations matching one system. The system consists of the management and data processing center and 23 GPS base stations throughout Latvia [2]. At the end of 2005 - 19 stations were installed and during 2010 to 2011 four new stations were installed. The antennas are located on the roofs of buildings in stable places [1]. Coordinate survey using the "LatPos" can take measurements directly on the surveyed site. The users can access the system using wireless technology over the mobile phone network [1]. The user and the instrument receive the data correction live and directly on the field. The base station and the support points of surveying are continuously monitored every second and in the case of some problem, the system is capable of one base station replacing another [2]. As the global positioning measurements are distance measurements to satellites, accordingly there is impact of the sun activity that alters the electron concentration in the ionosphere. According to the NASA research, solar activity is approaching maximum in 2013 - 2014. Also, the daily outbursts may affect the measurements and instrumentation fixation positions [3]. These and other factors should be taken into consideration in implementing any kind of measurements in Latvia. The aim of the research: what is the solar effect on the network system? Ionosphere resulting error can reach 4-7 cm [3]. Therefore, the field receivers cannot achieve a fixed position. Global positioning measurements are still advised to follow and to plan the location of the satellites during the measurements. Also the implications of the tidal process in the corresponding period are analyzed - during the vertical movement of the earth crust. With more research and analyzing the data of the base station, it can be concluded that there are the earth crust plate motions, therefore the magnitude of both horizontal and vertical movement, tide and solar activity influences should be studied.

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INVESTIGATING IMPORTANCE OF AUTOMOBILE DAMPER BY ASSESSING STABILITY OF SUSPENSION

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Theoretical aspects in research literature on technical requirements of the damper, criteria of importance of the suspension and the structure of the road wheel suspension have been analysed and the importance of the damper has been researched in.

Convenience of the passengers is very important in constructing automobiles, especially cars. The most important function of the suspension is to ensure elastic support of the automobile for the convenience of passengers and isolation of road surface inequality. Further, not less important requirement for the system of suspension is that it must stabilize the motoring automobile when it turns, brakes and accelerates. The main factors influencing the convenience of going by car can be characterised by vertical and horizontal tension, damping and friction of movable junctions. When wheels go up and down due to the effect of road surface inequality, springs at once operate as an energy accumulation device and therefore soundly reduce the size of the chock load which is transmitted to the automobile construction through the suspension.

The analysis of research literature introduced technical requirements for automobile dampers and the criteria of the importance of the suspension and wheel suspension structure. The questionnaire method of the investigation enabled to get to know the opinion of the garage employees about the common reasons of damper breakdown, the means of diagnostics and the features of damper durability.

The major requirements for the dampers are presented; the structure of automobile suspension is explained in the article. The investigation identified that the major reasons of damper breakdown are mounting of worn protective rod rubber and dampers irrespective of the producer instructions as well as that use of dampers ensures safe motoring, maintenance and convenience.

Automobile dampers are particularly important for running the system of electronic stability control ensuring automobile wheel stability, qualitative braking and driving. Dampers ensure elimination of undesirable and redundant motions in the chassis and suspension reducing the wear of parts.

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ENVIRONMENTAL SECURITY AND MAN-MADE POLLUTION

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In our country manufacture of mineral fertilizers in the XXI century began to extend considerably. Agriculture is such a branch of economy, in which production is most closely connected to the nature; however, technical development and the translation process of this sphere of human activity on an industrial basis have resulted in many adverse changes in the environment. Greening of the economy of agrarian and industrial complexes first of all should prevent the negative influence of technological processes on the biogeological, physical and chemical condition of the environment. Besides, it is expedient to reconsider the developed technological processes rendering damage to the environment. The basic purposes to which we aspire when greening the economy, is reduction of man-caused loadings, maintenance of natural potential by self-restoration and the mode of natural processes in the nature, reduction of losses, integrated approach of extraction of useful components, use of waste products as secondary resources. A serious problem of ecology for specialists of agricultural production is recycling of waste products [1].

Intensively developing chemicalization in agriculture can be estimated from two inconsistent positions: as economically profitable and as ecologically dangerous to the environment and the humanity [2].

Therefore, now mineral fertilizers became a major factor of productivity growth. The so-called “green revolution” in the advanced countries where chemical fertilizers are applied has led to sharp increase of productivity of crops, but had also negative consequences.

To solve environmental problems, we need an all-uniting idea, which could rally all layers of the society, political parties and public organizations of Russia in the name of its revival and the world community in the name of preservation of the life on the Earth.

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TRIGENERATION STATION

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Every day we use electric and heat energy to please our needs. Electric energy is used at home every time when we like to watch TV, cook something, turn on the light or do something else. We use heat energy to warm up our house and water. Energy which we use costs money; some type of energy can be made from natural sources like wind, sun, biomass etc. There are different ways how to produce energy – solar, biogas, co-generation, trigeneration etc. stations. Each station has its typical advantages and disadvantages, for example, biogas stations produce carbon dioxide (CO₂) emission in the air, which affects ozone, but as an advantage is that fact that this energy can be made from different types of biomass. Some stations have also disadvantages, which normally cannot be prevented, e.g., residual heat, which is normally thrown in the atmosphere [2].

Now engineers are working to prevent these problems, and have made trigeneration stations, which have more advantages than disadvantages. One of the advantages is that three different types of energy (power, heat, coolness) can be produced, and all resources are used to produce energy, even residual heat. Such station has good efficiency in producing energy; it also decreases production of carbon dioxide, as it uses all resources thanks to its construction. Of course, the costs to build such trigeneration stations are not so low; it depends on how massive station is planned to be constructed, and what kind of equipment is going to be used. As nowadays everyone is thinking how to make more green energy and save more energy in producing, then this kind of a station is the best choice, because it will save energy which was normally not used, also it saves money which has been used to pay for polluting the air with carbon dioxide (CO₂). Trigeneration stations are built in Australia, America, because these countries think about the carbon dioxide affect on the atmosphere, it also gives them a chance to save money and extra energy [1].

Thinking about the atmosphere and efficient energy one of the best things is to build trigeneration stations; it will prevent the massive carbon dioxide production and give a different type of energy which can be used for our needs.

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TRADING PLATFORM INTEGRATION WITH SECURITIES SAFEKEEPING AND CURRENCY ACCOUNTING SYSTEM

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The securities safekeeping system provides a full range of securities transactions accounting functionality. There are many other securities systems in other banks which have almost the same functions. The problem is that if the dealer needs to register deals in both systems, he has to do it twice. It is needless work. A solution is to make this registration automatic. If you register a deal in one system, it transfers the data to the other system and registers it automatically.

A data transfer protocol is a standardized format for transmitting data between two devices. The type of protocol used can determine such variables as the error checking method, the data compression method, and end-of-file acknowledgements [1].

Every trading platform uses a specific type of protocols, which are more relevant to their functionality.

A FIX engine is a piece of software that manages network connection, creates and parses outgoing and incoming messages, respectively, and recovers if something goes wrong [2].

All FIX engines are performing the same tasks, but the main difference between them is the data transmission, used technology, supported and offered services.

The Financial Information Exchange (FIX) protocol is an electronic communications protocol for international real-time exchange of information related to the securities transactions and markets [3].

The FIX protocol describes the used benchmarks for data exchange.

Using trading platforms, protocols and the corresponding applications is a convenient process to automate trading systems. The research has shown that the most widely used data exchange protocol for securities is the FIX protocol, because it supports all types of transactions with securities.

The FIX protocol was implemented with the securities safekeeping system as a result. The particular solution allows automatic data transfer between the securities safekeeping system and the Deutsche Bank.

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FLUXES OF MINERAL NITROGEN AND SULPHUR CONTENT IN SOIL IN DIFFERENT AGRO-CLIMATIC ZONES OF LITHUANIA

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Nitrogen is one of the major nutrients limiting the growth and yield of agricultural crops. On the other hand, an intensive N fertilization can cause environmental pollution through runoff, denitrification and leaching, and does not always correspond to the particular plant needs. Another important element is sulphur. Legumes and Brassica plants are exceptionally sensitive to the lack of this element. Quite often the ability of plants to assimilate the available mineral nitrogen depends on the mineral sulphur content in the soil; in the case of an insufficient content of mineral sulphur in the soil a part of the available mineral nitrogen is not consumed by plants and thus leached into the deeper soil layers and subsequently into the ground waters, therefore it is important to determine the content of N_{\min} and S_{\min} in the soil before the crop fertilization and to choose the optimal fertilization rates.

One of the aims of our study was to determine the fluxes of N_{\min} and S_{\min} content in the soil. The soil samples were collected at 0–30, 30–60, 60–90 cm depth from the soils of 20 m² plots (28 plots in total) located in the Eastern, Western and Middle Lithuania. The soil sampling spots were marked on the digital maps using GPS device. N_{\min} content in the soil was determined in 1 M KCl extraction using the flow analysis (FIA) spectrometer; S_{\min} content in the soil was determined using the turbidimetric method.

According to the data obtained, N_{\min} content in the soils of Lithuania (0-60 cm depth) was within the range of 47.85-51.76 kg ha⁻¹, S_{\min} – 12.19-14.82 kg ha⁻¹. The largest amount of N_{\min} content in the soil (56.71 kg ha⁻¹) was determined in the agro-climatic zone of the Middle Lithuania, where the most intense farming activities are taking place. Western Lithuania is more rainy, thus the content of N_{\min} in the Western soils is lower (44.06 kg ha⁻¹). Lower content of N_{\min} in the soils of Eastern Lithuania was caused by two factors: higher precipitation level and light texture of the soils. As for S_{\min} content in the Lithuanian soils, the highest numbers (15.61 kg ha⁻¹) were obtained in the soils of Eastern Lithuania.

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WIND TURBINE MODEL IN MATLAB/SIMULINK

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The lack of renewable energy resources and fast growth of the energy market in recent years require upgrading of the existing technologies and development of new systems for generating energy in nature friendly way. Alternative energy is becoming more and more popular nowadays because of the possibility of decentralization and due to low to none CO₂ emissions in the time of operation. Alternative energy generators do not require any special type of fuel; they generate electricity from power of wind, radiation of sun, heat of earth, flow of water or other available energy source.

During recent years wind turbine technology has undergone major developments. Mainly the developments were possible due to advanced computer simulations becoming widely available. Growth in the size and optimization of wind turbines has enabled wind energy to become increasingly competitive with the conventional energy sources. As a result of extensive research and engineering work today's wind turbines participate in power production in most countries around the world.

The research object is a model of a wind turbine that is located in Liepaja, Latvia. The model includes a wind turbine and its capability of energy generation from wind energy, a water tank for energy storage using hot water as medium and a room that is heated using water heated by a wind turbine.

The research is based on the created model, Internet research, books. The basic principles of operation have been considered and characteristics are given.

The main concern about using wind turbines to heat water with electricity is the fact that there are four energy transformations involved: wind energy to rotational energy to electricity to heat. It is economically more sensible to use electricity for other purposes, but that makes the system a lot more complicated and expensive.

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OSMOTIC ENERGY

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Osmotic energy is one of the newest ways how to produce electrical power. Although it is renewable and very clean energy, it lacks in cost, which is very high if we compare it to more known sources, for example, hydropower or burning fossil fuels.

Osmotic power, the energy created when fresh water meets salt water, appears to be flowing closer to reality [3].

The way how it works is pretty simple. You need a place where fresh water is flowing into sea water (also called salt water) and put each of them in different tanks by pipes. Then mix them through a special membrane, through which only fresh water can get, and it is flowing there because of the osmosis. As it flows, it runs a turbine and that is how the energy is made.

In the osmotic process it is not possible to use an ordinary filter [1].

The filter, which is needed, is called semipermeable membrane. It has many very small holes. Actually, the membrane is one of the main reasons that makes it so expensive, because one membrane life is only about six months. The thing is – the saltier the water, the higher the pressure and it runs the turbine more quickly. To keep that process running at maximal speed, there is a need to change the water in the salt water tank.

Statkraft is the world's leader in the development of osmotic power [2].

Statkraft is the first and the biggest company which is producing energy by osmosis. And it has been said that this energy has a global potential of 1600 to 1700 TWh, which is very impressive. Statkraft has also worked with Nitto Denko, to make even better membranes.

As it is very clean and makes almost no changes in the environment, it should be considered as a good power source. Surely, there will be something to do about the cost and may be one day it will be used as a primary energy source.

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BENEFITS OF STUDY ABROAD: A CASE FROM THE NETHERLANDS

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More and more students are internationally mobile. Some studies suggest that there are benefits attached to having studies (Allen & Velden van der, 2007; Schomburg & Teichler, 2006). However, it is not clear what causes these benefits. Is it because the students learnt something abroad that gives them advantages in the labour market (i.e., the *human capital theory*) (Becker, 1963) or is it the international experience per se that gives them advantages (i.e., the *screening theory*) (Spence, 1973). Firstly, this study measures in a pre-test-intervention-post-test control group (quasi experimental) design the competence levels of internationally mobile students at the Dutch University of Applied Sciences and of students in reference groups. Secondly, this study measures whether a study abroad affects the start of a professional career and whether competence levels can explain possible labour market effects. Therefore, this study compares the competence levels and labour market positions of formerly internationally mobile students with reference groups of non-mobile students, controlling for a number of variables that might impact these variables.

The research group and reference groups included students from Latvia, Poland, Hungary and France. The first study was conducted with students in the academic year 2010-2011 and 2011-2012; the second study was conducted in 2011-2012 with graduates between 2007 and 2009.

The results show a significant difference in competence development between internationally mobile students and non-mobile students. The data analysis of the labour market effects will be presented at the conference.

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DESIGN OF DRIVE OF INTERAXLE MECHANICAL CUTTER USED IN LOW TRELLIS SYSTEMS

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A mechanical pruner (similar to a special sprinkler for chemical pruning) serves to prune new hopvine shoots in spring. The yield depends on right timing and the quality of pruning, which is why pruning is one of the most important agrotechnical operations [1]. A double-disc mechanical pruner used with high trellises cannot be used with the technology of low trellises. Due to the effort to minimize the chemical environmental burden, the special sprinklers for chemical pruning used abroad are considered inappropriate [2]. This was the reason which led to a design for a mechanical pruner operating in low trellises.

In the introduction it is written, what a low trellis system is, what a hop pruner is, for which operation it is needed and why for low trellis systems it is most effective to use a single-disc hop pruner with a flat cutting disc.

In the Methods and materials section the basic requirements for a mechanical pruner, as the depth of cut, maximal height of the pruner, where the drop irrigation system is hung etc., are described. In this part there is also a paragraph about motion and placement of the mechanical pruner on a tractor, and the advantages and disadvantages are described. At the end of this paragraph the basic parameters of the used hydromotor are presented.

In the Results section several main designs of mechanical pruners are dwelled on: the design for the rear transmission with motor and design for the whole set. The design for the whole set shows and describes how the laboratory measurements were conducted. For laboratory testing, a special carrier for the mechanical pruner was created. In this part also the designed hydraulic circuit supplemented by a one-way valve is described.

Conclusions contain a summary of the results and next steps for research in mechanical pruners for low trellis system.

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HOME ENERGY SAVING

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Not a day goes by without using energy. We use energy at home every time we turn on the light, watch television or fry an egg. Energy costs money, and some energy comes from natural sources we could, one day, use up. For these reasons, it is important that every effort is made to save energy in the home. These days our homes are full of appliances that use electricity all the time, even when we are not there. We leave them on standby mode, waiting to be used again. You would think that an appliance on standby would only use a little electricity, but sadly we are mistaken. In some households appliances of standby mode use the equivalent of leaving a 100W light bulb on all year. Some examples of appliances that use power, but can be switched off are - battery and phone charges, computers, TVs, DVD players, decoders, Hi-Fis, game consoles, the list can go on and on [3].

When you buy a new appliance or replace an existing one, choosing an energy-efficient model can save you money on your bills and reduce your environmental impact without making a difference to your lifestyle. Efficiency rating is rated on a scale from A (most efficient) to G (least efficient). A-rated appliances are better for the environment and cost much less to run [1]. To calculate the exact value of energy savings, you need to determine how much energy, for example, the bulb consumes when on. Every bulb has a watt rating printed on it. For example, if the rating is 40 watts, and the bulb is on for one hour, it will consume 0.04 kWh, or if it is off for one hour, you will save 0.04 kWh [2].

Saving electricity will not only save you money, but will also help with the rising power cuts, conserve natural resources, reduce the impact energy consumption has on the environment and slow down global warming.

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CAR BATTERY CHARGING SYSTEM

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As we know, a car battery is the main power source (when the engine is not running) for all electrical devices on the board. But the battery needs to be recharged once it has given out all of its energy.

The charging system in most cars will generally produce the voltage between 13.5 and 14.4 volts. It has to generate more voltage than the battery rated voltage to overcome the internal resistance of the battery. The current needed to recharge the battery would not flow at all if the charging system output voltage is the same as the battery voltage. A greater difference of the potential between the battery voltage and the alternator output voltage will provide a faster charging rate [1].

The modern charging system has not changed much over 40 years. It consists of the alternator, regulator (which is usually mounted inside the alternator) and the interconnecting wiring. The main component in the charging system is the alternator. The alternator is a generator that produces alternating current (AC) by converting mechanical energy into electrical energy. This current is immediately converted to direct current (DC), with diodes.

There is also a system to warn the driver if something is not right with the charging system. This could be a dash mounted voltmeter, an ammeter, or more commonly, a warning lamp. If this warning lamp lights up while the engine is running, it means that there is a problem in the charging system, usually the alternator that has stopped working.

The alternator is driven by a belt that is powered by the rotation of the engine [2].

It is important that the car battery electrolyte density is not lower than 1,21 kg/l.

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SCRAPERS AND LAND LEVELERS

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A scraper [1] is a large piece of equipment used in the mines. The rear part has a vertically moveable hopper (also known as the bowl) with a sharp horizontal front edge. The hopper can be hydraulically lowered and raised. When the hopper is lowered, the front edge cuts into the soil or clay like a plane and fills the hopper. When the hopper is full it is raised, and closed with a vertical blade (known as the apron). The scraper can transport its load to the fill area where the blade is raised, the back panel of the hopper, or the ejector is hydraulically pushed forward and the load tumbles out. Then the empty scraper returns to the cut site and repeats the cycle.

Box scrapers [2] can be used to level an area in preparation for building. The box is dragged behind the tractor, collecting any material that is too big to go under the gap. The material is dragged to the edge and the box lifted so the material is collected in a pile. A box scraper can also be used to grade a gravel or dirt driveway, path or road. The box scraper is set a couple of inches off the ground. It is then filled with the material that will form the path. As the box scraper is pulled along, the material pours out the bottom to form a level path.

In order to design a scraper at the workplace the author researched in several scraper types, ways of movement and specifications.

The research gives the data about the varieties and differences of scrapers. The number of their varieties is quite large. These data were used in the theoretical part of the work to describe different types of scrapers.

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METHODS TO REDUCE SOIL DAMAGE

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Mechanized vehicles were introduced into forestry to meet the needs of higher productivity. Since then, ground damage has become a significant problem. Mechanized harvesting in thinning, clear felling and extraction are damaging the harvesting sites as the operations are conducted under all weather conditions throughout the year which are involving heavy machinery.

Over the past years a general trend has become more important. The attitude of the society is increasingly critical towards environmentally friendly forestry practices and more demanding of standards and laws which regulate the allowed levels of damage done to the soil.

There are several types of ground damage, such as damage to the roots of living trees, which can reduce the growth of the remaining trees. Soil compaction is a kind of damage that increases the soil density. Rutting is affecting both by reforestation and water run-off. The rut depth is increased significantly with the number of machine passages.

There are several methods and equipment that can be used to improve the soil bearing capacity and minimize soil damage. These methods and tools are often expensive and time consuming to equip. In harvesting operations logging debris as branches and tree tops are used to construct strip roads in harvesting sites which increases the soil bearing capacity, reduced rutting and reduced soil compaction. The key element on which to focus is weight distribution of the maximum area possible by using logs to reinforce strip roads and gaining better soil bearing capacity.

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WIND TURBINE CONSTRUCTION

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Wind turbine construction is the process of defining the form and specifications of a wind turbine to extract energy from the wind. In the final process kinetic energy from wind, which is called wind energy, transforms in mechanical energy and then in electrical energy.

Wind turbines are made to exploit the wind energy that exists at a location. Aerodynamic modeling is used to determine the optimum tower height, control systems, number of blades and blade shape.

Wind turbines convert wind energy to electricity for distribution. Conventional horizontal axis turbines can be divided into three components:

The rotor component, which is approximately 20% of the wind turbine cost, includes the blades for converting wind energy to low speed rotational energy.

The generator component, which is approximately 34% of the wind turbine cost, includes the electrical generator, the control electronics, and most likely a gearbox component for converting the low speed incoming rotation to high speed rotation suitable for generating electricity.

The structural support component, which is approximately 15% of the wind turbine cost, includes the tower and rotor yaw mechanism [1].

The rest of percentage of the cost is for land, setting up a project to build a turbine, and co-ordination of the way how it will look.

Nowadays, the main parameters of a wind turbine are: 80 meters in height; the rotor assembly (blades and hub) is 22,000 kg, the weight of the nacelle, which contains the generator component, is 52,000 kg. The concrete base for the tower is constructed using 26,000 kg of reinforced steel; it contains 190 m³ of concrete. The base is 15 m in diameter and 2.4 m thick near the center [2].

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POTATO GUN UPGRADE

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A potato cannon (also known as a spud gun or "spudzooka") is a pipe-based cannon which uses air pressure (pneumatic) or combustion of a gaseous fuel to launch projectiles at high speeds. They are built to fire chunks of potato as a hobby or to fire other sorts of projectiles for practical use. The projectile can be dangerous and result in life-threatening injuries, including cranial fractures if a person is hit [1.]. In this particular article we are discussing a combustion operated potato canon and its upgrades for better performance and safety.

In accordance with the site www.oocities.org instructions [2], it is mentioned that all plastic parts are glued together. It is not the safest way, because at firing these glued parts may dismount. If it happens, some of these parts are flaying towards the shooter and could make harm to him.

For safety reasons, the author suggests glued and mechanically fixed parts together. The best way is using wood bolts and screw plastic pipes together.

The most common problem for combustion potato canons is their lack in firing. The main reason is improper air/gas mixture, the second – the igniter fails to ignite flammable mixture. If the first problem is possible to be removed with skills, then the second problem is mostly technical. Lighter igniters are not reliable in this project; high voltages igniters would be better, for instance, stun guns [2], camera flashes, xenon lamp igniters, etc.

Especially for this project, the author uses car xenon lamp igniters which give the best performance in usage. Also for safety reasons, in the circuit there is an on/off switch that prevents from unwanted shots.

Most upgrades are made for safety reasons and better performance in using. Also there is always a need to be cautious about any kind of firearms, because improper usage may cause serious injures. All work on this kind of projects should be done with greater responsibility.

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**OCCURRENCE OF WOOD DAMAGE IN YOUNG FOREST STAND
ECOSYSTEMS OF NORWAY SPRUCE
(*PICEA ABIES* (L.) KARST.)**

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Wood is a natural material which has been used by mankind since the ancient times. Synthetic materials can be used instead of it, but a natural product is preferred in many industries. The wood quality is significant; hence tree defects should be reduced during the forest stand growing period. It is possible to improve the properties of the remaining trees after removal of the defective ones at the first thinning. To improve notably the quality of Norway spruce wood, the initial tree distance should be more as 1.5 m on fertile soils, according to the Swedish export grading rules [1].

Wood damages like spike knots, crookedness and double stems are commonly found in Latvian forests. Spike knots are the result of acutely angled branches and it is considered to be quite a dangerous damage, because the harvested wood is suitable only for few roundwood assortments. The second of the most common damages is crookedness, which is considered as damage if it is over than one percent [2]. The occurrence of crooked trees in deciduous forests is higher than in coniferous forests and in pine forests - higher than in Norway spruce forests. Double stems are another serious defect, when the tree has developed double co-dominant stems, and it can lead to structural weaknesses.

The climate change can also cause tree defects, especially for the roots and the crowns [3]. These parts are the most exposed to temperature or excessive humidity when the tree develops all the above mentioned wood damages. The research was established to determine the wood damages in 40-year-old Norway spruce (*Picea abies* (L.) Karst.) stands. The empirical trials were carried out during the time period from 2011 to 2012 in 34 stands in all Latvian regions, including 14 single species stands and 20 mixed ones. Wood damages were found in 19 of the stands, while in 2012 - 41 stands were inspected, 15 of them – single species stands and 26 mixed ones, where damages were detected – in 18 stands. Spike knots, crookedness and double stems were mostly found, the occurrence of each value did not exceed one percent.

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USE OF COMPOST IN AGRICULTURE: FEASIBILITY STUDY

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According to the information provided by the Ministry of Environment *biodegradable* municipal waste will be processed into compost, aiming to reduce the amount of *biodegradable* municipal waste going to landfills [1].

However, the compost quality and compost application issues are interrelated with a whole range of agrochemical and environmental problems, because compost is a complex of a large number of different substances. The type of compost is determined by the composting material: green waste compost, sewage sludge compost, manure compost, compost of mixed biodegradable municipal waste, biowaste compost, vermicompost, digestate (dry residues produced by anaerobic digestion of organic substances) [2].

One of the objectives of our study was to investigate heavy metal contamination in different composts. The highest levels of heavy metals (Cd, Zn, Cu, Cr, Pb) were found in the composts of mixed biodegradable municipal waste and sewage sludge composts. These composts should not be used for fertilization of agricultural crops destined for either human food. The lowest levels of heavy metals were found in the green waste compost, yet these composts contained lower levels of the main plant nutrients (N, P, K).

In 2012 the pot experiments were conducted to compare the effect of different composts on spring barley (*Carbona*) and leaf lettuce (*Grand Rapids*). The yield of spring barley treated with digestate was substantially higher than that of the plants treated with the other types of composts.

The yield of leaf lettuce treated with digestate was about 33 % higher than that of the plants not treated with any kind of compost, and about 26% higher than that of the plants treated with the other types of composts. Application of the compost of mixed biodegradable municipal waste resulted in an increased yield, yet the heavy metal concentrations in the plants were increased as well.

We expect that our study results will help in assessing the effects of different composts on the crop productivity and the yield quality and the level of heavy metal concentrations in soil and in food products.

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MICROALGAE CULTIVATION IN RACEWAY PONDS

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Microalgae like all other green plants on the earth are photosynthetic, that means for living they need sunlight, CO₂ and nutrients. In the result of consuming these products the average oil/lipid content varies between 1 and 70% of dry microalgae biomass weight [1]. Microalgae can be grown in open pond systems and photo – bioreactors. Harvesting can be set up continuously or by harvesting a batch at a time. Opened pond systems are much cheaper, but there is water evaporation, invasion threats and the local species of algae often overgrow the oily microalgae. Also temperature cannot be controlled if only for few degrees by the pond depth, but it may result in poor sunlight radiation in the deepest places even with pond mixing. The raceway pond system consists of a raceway type pond, a mixer which usually is paddle wheeled and from the feeding and filtration system. Mixing with the paddle wheel ensures flow in the pond to avoid microalgae sedimentation and provides equal sun radiation for all cells if the pond depth is set at level (not to exceed 1 m) [2]. Increasing the depth decreases the obtainable microalgae concentration. For fast growth rates microalgae needs food – nutrients. Feeding usually is provided before the paddle wheel for better nutrient dissolving in the growth media, but after the harvesting system. Raceway pond plants can be created at any place in the world where feral oily microalgae already lives in those climatic conditions. During the experimental microalgae cultivation a raceway pond was built. The perimeter and dividing wall were made from land embankment. The paddle wheel was introduced for mixing. The mixing speed was ensured so to prevent microalgae from sedimentation and dissolve enough CO₂ for intensive growth rates. During the experiment it was concluded that there is a need for deeper research in the materials for covering the pond ground to prevent microalgae devotion to it, as it happened on the plastic film during the night without mixing. Wastewater and flue gases from power plants and factories can be treated with microalgae ponds, to reduce the influence on environment and produce biomass for biofuel.

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EURO ADOPTION ADVANTAGES AND DISADVANTAGES

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The present paper is an attempt to analyze the advantages and disadvantages of euro adoption. Joining the eurozone is a complicated process which is possible to implement only if the five Maastricht criteria are fulfilled. It was planned that Latvia would join the eurozone in 2008, but we could accomplish only one of the five Maastricht criteria and it was – keeping a stable level of inflation. Now Latvia is planning to join the eurozone on January 1, 2014. The Bank of Latvia strongly argues that the contribution of Latvia would be only 199 million euros. It is known that the European Stability Mechanism (ESM) envisages irrevocable and unconditional order to satisfy any capital requirements. It means that if any eurozone country is incapable of paying such money, other countries must pay instead. The main advantages offered by the euro include faster economic development, residents' confidence in the safety of their savings, and smaller, or no spending on currency exchange and interest rates. The president of the Bank of Latvia reminded that joining the euro zone, Latvia will save up to 70 million lats per year on the external debt service expense. He pointed out that the money will flow into the economy of the country. Contrary to popular belief that prices will increase steeply in Latvia after the introduction of the euro, none of the five EU member states that last switched to the euro saw price increase by more than 0.2 to 0.3 percentage points, and the switch to the euro has had a favorable effect on both, households and business in these countries.

It is clear that big companies with a turnover of over one million lats will benefit from the introduction of the euro, because it will facilitate their daily lives. Especially the companies engaged in export will gain benefits. Euro adoption could bring some damage, but it is clear that the benefits can be determined in long-term. However, the whole Latvian success will depend on the economic policies of Latvia.

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STABILITY OF HORIZONTAL AND VERTICAL BASE STATIONS IN LATVIA

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There are networks of GNSS base stations available in Latvia for several years. Network accuracy of the horizontal and vertical coordinate values varies between of 2-5 cm. The periodical changes of coordinates of base stations are influenced by various phenomena. The most relevant of them are the Earth tides which cause horizontal and vertical movement of the Earth crust. The other phenomenon is space weather conditions, especially solar activity. There are two GNSS networks available in Latvia: LATPOS and EUPOS-Riga. The LATPOS system is a combination of GPS base stations made of the centre of control and data processing and 23 GPS base stations. Data are processed and stored in the system of base stations. Users get the processed data on the Internet which ensures them to be available everywhere [1]. The EUPOS-Riga network is formed by five base stations in the city. The placement of the base stations ensures even overlay in the territory of Riga.

In recent years the Trimble network has started to establish its network in the territory of Latvia. Trimble has offered its services for several years in Eastern and Central Europe. There have been established already five Trimble VRS Now TEC base stations in Latvia. Earth tides and tide deformations are the Earth crust vertical movements with the maximum amplitude of about 30 cm. The Earth periodic fluctuations occur, mainly, as a result of gravitation forces between the Earth, the Moon and the Sun and centrifugal forces of the rotation system [3]. Space weather conditions influence importantly the GNSS and its users. Every 11th year the solar activity rises. The next period of solar activity is awaited in May, 2013. In this period, ultra violet light of the solar spectrum increases. Reaching ionosphere it makes it denser and thicker [2]. By analysis of the Trimble VRS Now TEC base station data for the period from 1.01.2012 till 01.01.2013 it can be concluded that the Earth tides cause the Earth crust vertical and horizontal movements that influence the precision of the measurement results. The influence of the solar activity will be studied on Trimble VRS Now TEC base stations in the territory of Latvia to state that in good space weather conditions better results can be reached.

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LESS DEPENDENCE ON OIL

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Electric vehicles are improved every year due to the influence of a high rate of rise in oil prices. On October 19, 2010 an electric car homemade by Lithuanian Mindaugas Milašauskas was registered. As the prices for these cars are high, so he redesigned his Honda HR-V in the electric car. By a loaded battery it can drive approximately 70 miles.

An electric vehicle is composed of: an electric motor, battery unit, the electric control unit, control mechanisms, the strengthening of the brake pump, steering pump, high-voltage converter, transmission, battery charging connection and air-conditioning systems. Electric car speed is regulated gradually by a potentiometer, depending on the load, it requires more electric power consumption of the controller, the electronic control system regulates the electric car electronic engine power, the operation of the battery and battery charging. The electric motor with a gearbox and clutch transmits torque. The car battery is fully charged within 6-8 hours and can travel about 160 kilometers. Today, electric vehicles are not yet popular for their price and battery capacity. The emphasis is placed on the development of a new generation of batteries. Lead-acid battery has been replaced by a magnetic lithium battery; it provides an opportunity to quickly charge the battery. There are different projections, by 2020 electric vehicles in the world will be one tenth and by 2030 50 % of all vehicles.

The findings. Currently, most car manufacturers are investing in the development of electric cars. Electric cars do not pollute the environment, are silent and there is no dependence on petroleum products. There are also some negative aspects: high cost of electricity, battery runs down quickly.

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ENVIRONMENT AS A FACTOR OF PERSONALITY DEVELOPMENT

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Today, more and more attention of educators is paid to the environmental approach to the development and education of the individual. That is why we turned to the analysis of the historical and pedagogical aspects of the problem.

One of the first researchers of the concept of "environmental approach" was a famous French philosopher Jean-Jacques Rousseau. In his pedagogical views environment is regarded as a condition of optimal self-development. For effective upbringing he offers to create special environment that would provide a balance between the real possibilities and natural needs of the individual [3].

Nowadays, U. Manuilov understands the phenomenon of environment as an important addition to the components of the educational system and as a way of organizing the environment, the optimization of its effect on the student's personality [2].

The main structural components of the educational space are: the physical environment, the human factor and the training program [1].

Thus, the approach to the child from the environment, i.e., the environmental approach is required as a condition of realization and an important addition to the existing educational systems and tools as a way of organization and optimization of their effect on personality. Popularity of study of the environment in the last decade and the growth of scientific publications in Ukraine and abroad with their educative potential highlight the importance of the environmental approach.

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LAND CONSOLIDATION AND ITS IMPACT ON REAL PROPERTY VALUES

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Land consolidation is a set of measurements which is implemented into the public interest and proposed by legal individuals, the state, or the local government in order to optimise the use of the land [4].

One of the most important objectives of land consolidation is to form an optimal size of the farmland plots in a property. Additionally, to abolish the land fragmentation which has a major impact on the operating conditions and other rural development processes. It has been stated that there have been formed many small land holdings which consist of a number of even smaller units of land parcels in Latvia. Fragmentation of the agricultural land (here and after referred to as AL) affects not only the land management, but it also increases the transport costs [1].

At the same time, in mass media it appears that the AL consolidation is currently happening. Moreover, there is an interest on bigger land parcels and their impact on rising prices [2].

The aim of the research is to explore whether there is coherence between the unit of the land area and its cadastral value.

The cadastral value is a value of land and buildings, which is calculated according to the common and government approved criteria across the country. As one of the determining factors the area of a property is regarded [3].

The research was done including 250 real properties in Vircava, which consist of one land unit. In the research the aim of the land use units is the land on which the main economic activity is agriculture. In the research the land parcels were divided into groups by the size of AL and it was concluded that there is an inverse connection between the unit of the land area and the cadastral value because if the unit of the land area is smaller, the average cadastral value per ha of AL is higher.

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RAISING INTEREST IN DEVELOPING INTERNATIONAL COOPERATION COMPETENCE

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As the international cooperation of organizations working in Latvia is expanding, it is necessary to boost the cross-cultural communication and international cooperation competence of the prospective specialists within their studies. To ensure that, interest must be raised in students to practice the mentioned skills, by means of motivating them. As the previous research of the author reveals, the students can be motivated in this respect in two ways: explaining the importance of such skills, as well as diversifying the practical activities within the Cross-cultural Communication classes [1; 2]. Students of external relations prefer simulations over other international cooperation teaching methods, as they are interesting and reflect true behaviours, as well as give a chance to practice (act) and observe the cooperation results as in reality, however there are several specific ways of simulating the content that the students like (descending order): filming real foreigners in real situations; filming real foreigners in simulated situations; using existing or newly created animated videos; etc. [2]. As the students have explained that they prefer these activities due to the fact that they differ from the methods used in other study courses, as well as are up-to-date and attracting attention, the used methods could be supplemented also with computer simulations and games.

To create computer simulations for developing international cooperation competence for Latvians, allocation of financial resources is needed, however adapted (to Latvians) computer aided video simulations can be created by means of using the existing resources and materials and developing a system for organizing video simulations that would comprise sets of videos to be played according to the students' actions: after each student's reaction there would be several filmed options for the continuation of the simulation.

It can be concluded that to raise interest in students, simulations should be used in developing international cooperation competence by means of diversifying the activities and including also adapted computer simulations that could be either bought/ordered or created by means of manual playbacks of the existing or newly filmed videos depending on the students' reactions.

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HISTORY AND PERSPECTIVES OF MILITARY ROBOTS

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Today we are living in the time where all over the world there are risky jobs which are difficult to be handled manually by humans, and such is a reason why scientists are looking for new ways to use modern technologies in robotics. The robots used for military purposes are usually employed with integrated systems, including video screens, sensors, grippers, cameras and guns, and they also have different shapes according to the purpose of each robot.

Prof. Hans Geser [1] has described a modest prospective for military robots in today's asymmetric wars. This source is useful for understanding of functional capacities and potential role assignments of military robots and the social connection between humans and machines.

History and development of robotics are described in source [2], it gives information about robots that are used in wars today and the history of them in the First and Second World Wars. This is a good source for people who want to understand military robot development, but it contains quite non detailed information.

Analysing the material given in "Robot Building for Beginners" by David Cook, it can be concluded that this source is good for beginners but not for serious professionals. It allows understanding the basics of robot building; describes simple circuit boards, soldering processes and use of motors. It shows also how to build a robot on your own step by step with animations [3].

In the development of military robots, we can consider that they will play big role in future. They ensure the safety of people and help in science development; they can be used in sectors like medicine, military service and exploration.

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CURRENT STATE OF PUBLIC ORGANISATION ACTIVITY: PROBLEMS AND PERSPECTIVES OF DEVELOPMENT

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Public organizations are ones of the first social institutes that improve and widen educational space according to the changes in pupils' current needs.

In A. Prutchenkov's view, it is teachers' close attention to the choice of public organizations for cooperation, which leads to their abrupt decrease of popularity and interest among pupils themselves [3]. In other words, the most significant task for contemporary public organizations is adaptation of their areas, forms and methods of work to the current pupils' needs, which in their turn are determined by rapid modernization of social environment.

Moreover, there is a trend nowadays to create transnational educational space with such peculiarities as "voluntary, informal communication, self-expression, independent choice of forms and aids of activity that are used in the foreseen circumstances and on the basis of the internal needs and personal motives, in which co-authorship, empathy, attraction and reflexive self-regulation play the most important role" [1].

So, it is rather clear that the perspective of the development of transnational educational space is based on the interaction between schools and international public organizations due to modern information technologies.

For instance, S. Lesnikova admits that owing to the Internet "participants of children's public organizations have a possibility to keep in touch, to exchange information, thoughts and ideas in real time" [2].

To draw the conclusion, everybody can see the correspondence between the changes of public organizations' activities and the updated, technologically developed society. Among all the variety of public organizations we can mark out national organizations which make use of the Internet and international public organizations which are aimed at creation of transnational educational space.

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NATURE OF THE VERB

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The vocabulary is composed of many layers that are distinguished by stylistic usage, frequency and belonging to different semantic fields. A man uses different layers of vocabulary in various situations, but we can say with confidence that no one can manage without verbs of motion. Motion is the main form of existence which defines all the properties and manifestations of the world around us.

“The verb as a notional part of speech has the categorial meaning of a dynamic process, or process developing in time, including not only actions as such (*to work, to build*), but also states, forms of existence (*to be, to become, to lie*), various types of attitude, feelings (*to love, to appreciate*), etc” [1].

Therefore, we can say that the verb is a means of identification connections and relationships – effective, dimensional and temporal, and its primary function is to determine the semantics of statements because the verb in its meaning and connections determines the overall structure and sense of a sentence.

“The verb is the surface form of the predicate, and the predicate is the core structure, the purpose of which is to display some events or situations in reality” [2].

So, the complex nature of the verb denotatum (world events, actions, and relationships) determines that the linguistic meaning of verb lexemes is a complex phenomenon, what in its turn explains the special, synthetic role of the verb which can display not only the situation but also a set of situations, becoming a powerful tool of analysis, synthesis, coding, and expression of relations between objects and phenomena.

Thus, the verb possesses the richest semantic, grammatical and stylistic features in the total forms and meanings.

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NUCLEAR POWER STATION: HOW IT WORKS

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The only purpose of a nuclear power plant is to produce electricity. To produce electricity, a power plant needs a source of heat to boil water which becomes steam. In fossil fuel plants the source of heat is burning coal, oil, or gas. In a nuclear plant the source of heat is a nuclear reactor. Although the basic process is simple, making it work is rather complicated.

The beginning of all process is the condenser, inside of which there is water. The water gets pumped by a compressor through the pipes inside the reactor core (the heart of the reactor). The reactor core is the region within a nuclear reactor where heat is generated. It consists of two chemical elements uranium and plutonium, control rods, a pressurized water reactor and containment structure. The uranium and plutonium mix produces the heat and to cool down all this process the system needs a pressurized water reactor, where primary coolant water is pumped under high pressure to the reactor core. That controls the temperature. The system needs control rods that control the rate of fission of uranium and plutonium, it means that if in the reactor core something goes wrong, mostly the temperature rises and these control rods shut down the fission process of uranium and plutonium, and that means there will not be explosion. In the fission process the radiation rises and to confine it we need a containment structure, which is a steel or reinforced concrete structure enclosing the nuclear reactor.

When the fission process of the reactor combines with the cooled water, it makes the water hot and the water becomes steam. The steam then goes through the steam turbine - this turbine moves the steam to the main turbine, which is connected to the generator. So the turbine turns the generator, which is connected to the high-voltage line, and produces electricity. And the steam cools down becoming water and gets back in the condenser, and the cycle starts again.

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HYDROCHEMICAL RESEARCH IN SMALL RIVERS BASIN OF CROSS-BORDER RIVER WESTERN BUG

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At present heavy metals are considered to be one of the most dangerous groups of toxicants.

The main purpose of the research – evaluation of the level of accumulation and identification of the distribution of heavy metals in water, sediments and higher aquatic plants (macrophytes) in four small rivers cross-boundary river basin Western Bug.

The field research of the author during organizing scientific expeditions in 2008-2012 served as a material for the work. Herbarium and indicative material – samples of higher aquatic vegetation, water and bottom sediment were collected. In the research more than 900 samples of macrophytes, 340 bottom sediment samples and over 300 water samples were collected and analyzed.

The content of heavy metals (Pb, Cd, Cu, Mn, Zn, Fe, Ni, Co, Cr) in the indicator material is defined by the author in the accredited laboratory of biochemistry of the Polesie Agrarian Ecological Institute of the NAS of Belarus by the atomic-absorption method with the flame atomizer on a spectrometer of SOLAAR MkII M6 Double Beam, 2004 of release, UK.

Geobotanical examination of the territory is conducted, the prevailing types of communities and their main dominants are revealed. It is established that the hydrophilic component of vascular plant flora of the studied small rivers is made by 104 species of the highest vascular plants.

Taking into account the interaction of the water environment with higher aquatic vegetation and probable streams of heavy metals we allocated and studied four ecological groups. In the taxonomical relation all revealed types belong to vascular plants and are presented by 34 families and 67 genera. Floristic research down the river Wood is discussed in the work [1].

The calculated coefficients of biological accumulation of water and bottom sediments for macrophytes among four ecological groups of smaller rivers allowed identifying the species, which are the best phytoindicator of the ecological status of the surveyed watercourses.

The work was supported by the grant for young scientists BRFFR Science-Y-2009 "Features of the migration of heavy metals in sediments and higher aquatic plants r. Wood and r. Kopayuvka» (supervisor – Misyuta Yury).

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COMMUNICATION IN SOCIAL NETWORKS – DIFFERENCE BETWEEN “FACE TO FACE” AND “ON FACEBOOK”

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Nowadays social media is a new reality. Each of us has at least one account in a social network. According to the statistics Facebook has officially registered one –seventh of the earth’s population (over 1 billion people), Twitter has over 500 million users and over 200 million people use LinkedIn.

It comes as no surprise that more and more people prefer this kind of communication and we are not an exception. But let us think about the other side of the coin. Social networks are a convenient and entertaining way of communication, but be careful, because it is easy to fall into the hidden trap of the virtual reality. It is vitally important to take some disadvantages into account. On the one hand, thanks to social networks, we can communicate with a widening circle of friends – no matter if they live in our country, or abroad; “chat” with a big group of people simultaneously; spread our message worldwide in seconds and share common interests with different people. Moreover, we can start a successful business by using a social network; actually, the naked truth is that nowadays it is irresponsible and even stupid to underestimate the powerful influence of social media.

On the other hand, nothing can replace personal communication “face to face” (not on Facebook). Look around you! There is at least one person next to you. A real person – not a photo. You can touch him or her, smile at them and that is better than “poke” or “like” them because you can feel and experience their innermost emotions. We are all humans with different characteristics - not robots, profiles or just users. May be you think that it is easier to talk with people in an indirect way – there is not so much embarrassment and awkward moments after all. But are you honest? Are the other people behind the screen honest? You will never know that. Social networks represent a play where we are the actors and we have to wear masks because of the “social approval”. Another great problem of virtual communication is that it sets us in a framework which prevents us from revealing our communication potential. On top of that, specialists have heated discussions about the influence of social media over people’s grammar. Some of them claim that spelling mistakes are a result of the specific language used in social networks.

In the conclusion, it is advisable to balance carefully between the virtual reality and the real life.

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NUTRITION AS SIGNIFICANT HEALTH-RELATED QUALITY OF LIFE PROMOTING FACTOR

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Health-related quality of life (HRQoL) is a multi-dimensional concept that includes domains related to physical, mental, emotional and social functioning. It focuses on the impact the health status has on the quality of life.

Good nutrition improves HRQoL by promoting general health, averting secondary malnutrition that is caused by or associated with other diseases, preventing dietary deficiency disease and promoting optimal functioning. Food and nutrition are essential components of "the good life." Good food is a sensory and psychological pleasure in its own right [1].

Excessive dietary intake and insufficient physical activity pose health and mental health problems, especially when they result in obesity. The consequences of obesity include increased risk of several chronic diseases, e.g., diabetes, cancer, cardiovascular disease, and premature death. Excessive intake of alcohol also has a well-known toxic effect on mental health, social interaction, physical health and well-being, and HRQoL [3].

A few longitudinal studies have analysed the influence of diet on the quality of life of healthy populations. Several studies have found that the adherence to a Mediterranean dietary pattern rich in fruits and vegetables, legumes, fish and olive oil, was associated with higher scoring for self-perceived health. On the other hand, some studies have shown the detrimental effects on health of a "Western-type" dietary pattern rich in processed and red meats, refined grains and commercial baked goods [2].

Proper nutrition prevents health problems; it can improve health, help avert impairments in functional status, and increase the quality of life and well-being. Examples of dietary patterns and foods promoting health and decreasing the risk of chronic diseases, as well as easy ways to switch to filling fibers and antioxidant-rich menus will be given.

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NUCLEAR POWER PLANT

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A nuclear power plant is a thermal power station in which the heat source is a nuclear reactor. As in a conventional thermal power station the heat is used to generate steam which drives a steam turbine connected to a generator which produces electricity. As of 16 January 2013, there were 390 nuclear power plants in operation. A nuclear reactor is a device to initiate and control a sustained nuclear chain reaction. The most common use of nuclear reactors is for the generation of electric energy and for the propulsion of ships [1].

The 2011 Fukushima Daiichi nuclear disaster in Japan prompted a rethink of nuclear energy policy in many countries. Germany decided to close all its reactors by 2022, and Italy has banned nuclear power. As of 2005, nuclear power provided 6.3% of the world's energy and 15% of the world's electricity, with the U.S., France, and Japan together accounting for 56.5% of nuclear generated electricity. In 2007, the IAEA (International Atomic Energy Agency) reported there were 439 nuclear power reactors in operation in the world operating in 31 countries. Fusion power has been under intense theoretical and experimental investigation since the 1950s. On June 27, 1954, the USSR Obninsk Nuclear Power Plant became the world's first nuclear power plant to generate electricity for a power grid, and produced around 5 megawatts of electric power [2].

Safety focuses on unintended conditions or events leading to radiological releases from authorized activities. It relates mainly to intrinsic problems or hazards. Security focuses on the intentional misuse of nuclear or other radioactive materials by non-state elements to cause harm. It relates mainly to external threats to materials or facilities. Safeguards focus on restraining activities by states that could lead to acquisition of nuclear weapons. It concerns mainly materials and equipment in relation to rogue governments [3].

Nuclear energy is very popular in the world. But because of the last twenty years of the disasters, nuclear power plants are not considered safe to humans and the environment.

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ELECTRICITY FROM SUNLIGHT

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What can be simpler than to grasp the concept of the sun nowadays? It is the main reason for existence of the physical world and the first thing what we see every morning. Can you imagine your life without it? In the 7th century BC in ancient Egypt the houses were built so that the solar radiation could be collected during the day and used during the night. Thanks to the investment of a few inquisitive individuals in this field, we are capable of making fossil fuels more and more obsolete every day. There are three types of cells: single-crystal, polycrystalline and amorphous cells. The first one, as its name denotes, consists only of one cell, thus making it the most efficient (20-25%) of them all, however, it is the most expensive, too. Polycrystalline cells are less efficient (10-15%) and less expensive consequently. Subsequently, there are amorphous cells that are designed for a bulk power generation. Their efficiency is only 3-5% and they are used in simple devices such as calculators. This least efficient technology allows us to make thin 1m solar cells since there is no cell structure at all. For a good performance the current and voltage must be as large as possible. The maximum value of the current would be obtained if all photogenerated electron-hole pairs were collected as photocurrent and the current can achieve 80-90% of this limit if light absorption and minority carrier collection are both highly efficient. The limiting value of the voltage is the built-in voltage, corresponding to a complete attending of the bands across the junction. This could only happen under extremely intense illumination, and 1 Sun voltage values are usually no more than 70% of the built-in voltage. The ideal isotropic single-junction cell of optimal band gap $\approx 1.4\text{eV}$ is 32%. In real cells, 'non-ideal' loss mechanisms (for example, non-radiative recombination of carriers in the cell interior or at junction defects or cell surfaces) lower the efficiencies below the ideal limit. The route to high efficiency in a single-junction cell lies in eliminating the non-ideal losses as far as possible. Although the capabilities of this system are limited, it is still a good investment of money. Its average lifespan is around 20-25 years. It pays off after 10 years of usage, whereas a wind turbine pays off in 3-7 years. Nevertheless, it is definitely worth spending time and money on acquiring knowledge in this field. Rapidly ascending progress of PV systems found its inception in the first Photovoltaic Energy Conference in 1977 that is held every year since, paving the way into the future developments. Another factor is the developing space industry, which is using this technology as the main source of power.

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CASH FLOW AS IMPORTANT INDICATOR OF FINANCIAL HEALTH OF FARMS

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Cash flow is seen as a sum of all company incomes increased by non-cash expenses as depreciation and amortization. Better expression of cash flow is to evaluate its difference between the real amount in cash which flows into the company from different activities and the real amount of cash which company has to outflow on the activities during a time period [1].

Cash flow statement is a very important source for financial analysis. It is a supplement to profit and loss statement. This statement informs about incomes and outcomes and the difference between them is very important. The cash flow statement characterizes the process and results of the reproductive process [2].

Cash flow is reported in balance and in column form [3]. The cash statement is created from three company activities and it is: operating, investing and financing activity. The operating activity is most important. It expresses the extent to which profit corresponds to operating activity to real obtained money. Investment activity gives us the information about investment outcomes and incomes from sale of the company property. Financial activity follows the movements of long-term capital [4].

For cash flow calculating the following methods are used: direct method, modified direct method and indirect method [5].

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EVALUATION OF SURFACE WATER RUNOFF AND SOIL LOSS IN CULTIVATION OF MAIZE CROPS

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The Czech Republic is characterized by a high average gradient of agricultural land. Tippl, Janeček and Bohuslávěk report that more than 53 % of the area in the Czech Republic is situated on land with an average slope greater than 3°(1). The high slope of land, combined with light soil and expanding wide-row crops (maize) are at increased risk of water erosion. The risk of erosion events, although it is not possible to completely eliminate it, may reduce the appropriate farming techniques (2). Interventions usually consist of direct management of crop residues and using reduced tillage. Protection against water erosion of soil consists mainly of creating conditions to increase infiltration of water into the soil and reduce surface runoff.

On light soil with an average slope of 5.4° field trials of seven variants of soil cultivation, sowing corn and oats were performed. Using the retention method microplots were evaluated by surface runoff and soil wash off during intense rains when sowing crops in spring till late summer of 2012. For conventional tillage and sowing maize statistically significantly higher soil loss by water erosion in the erosion events was found than for other variants based on corn and spring cereals. The results confirm the importance of soil conservation technologies of soil cultivation and sowing of maize to reduce the risk of land degradation by water erosion.

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INFLUENCE OF ENVIRONMENTAL LEGISLATION ON VALUE OF ENTERPRISE TECHNICAL EQUIPMENT FOR INTENSIVE REARING OF POULTRY

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The development of environmental law and the changes as a result of it are intensively projected into the replacement of the national legal regulations of the Czech Republic after integration into the EU. The development and changes directly or indirectly affect the development of other branches of law and consequently the behaviour of legal subjects. The European Community Council Directive 96/61 EC Integrated Pollution Prevention and Control has been implemented into the national law of the Czech Republic. By adopting this law the business environment in the Czech Republic was changed because the affected equipment must have had a valid so-called integrated permit on the date of October 30, 2007, which is being issued on the basis of a positive result of administrative procedure with regards to the equipment, which meets the criteria of so-called Best Available Techniques (BAT) [1].

Based on expert analysis methods there are techno-economic contexts and influences of the established legal regulations formulated concerning the equipment of rearing poultry, which influenced the business environment because these regulations did not directly affect all equipment. For assessment of the effect size on the change of the business environment in the Czech Republic or the effect size of the environmental regulations on the value of technical equipment of an enterprise, the level of acquisition prices at the time of purchase of respective equipment was ascertained. The identified acquisition prices of respective equipment were recalculated according to the methodology of valuation of machinery and equipment for the general price in the years 2007 and 2008. According to the methodology, the influence of the change in relevant legal regulations on techno-economic parameters of three plants for rearing and three plants for intensive rearing of poultry was analysed [2]. The obtained results show the influence of the relevant legislative regulations on prices.

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"SUPERFLUOUS MAN": THE ANTI-HERO OF THE NINETEENTH CENTURY

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The Slavic spirituality went through the nineteenth century marked by the forms of a persistent romanticism, all the more so as it had acquired its resorts from the Russian national character. The intellectual background, education and intrinsic ability to perform major changes in the immediate reality of the "superfluous man", all these factors are identical to those characteristic to a revolutionary.

An even more striking difference between the two types is the belonging of the former to romanticism and the detachment of the latter, in favour of a realistic way. Given the contribution of the social reality in shaping the "superfluous man", the authors such as A.S. Pushkin and M.I. Lermontov inserted in Romantic texts techniques devoted to psychological realism. As anti-heroes, Eugene and Pechorin get away from the value system enshrined in the Slavic spirituality and mark out their existence according to personal principles. Pechorin completes the portrait of the new literary type by means of the compositional strategy chosen by Lermontov: nesting two memoir styles, belonging to two different authorial instances (to the character-narrator and to Pechorin). The insertion of the diary fragments requires a registry closer to the psychological structure of the character. Thus, if the reader is confronted with difficulties in perceiving Pechorin in the first part of the novel, the diary chapters are designed to solve the riddles of the personality of this actor by means of past episodes, stories and memories that are the key to redemption of the Lermontovian "superfluous man".

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GEORGIAN TRILOGY- ABOUT ART AS COERCIVE ACT

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The mysterious and miraculous Georgia gave the world Tengiz Abuladze, an exceptional film director, a symbiosis between the oriental spirit and the eastern-orthodox one. He is recognized by the art lovers for his sculpture in light, which was later called The Plea (The Supplication- 1968), for the recovering the idilic purity in The Three of Desire- 1976, and the revival of the human consciousness in Repentance- 1984.

Abuladze was a discreet figure in the public space, allowing the word to speak only through the camera. He reaches out for tradition to discover the authentical values which the society of the new man rejected, therefore creating a conflictual relation with the present. He detaches from the world in which he lives in, in which he was born, and refinds himself in a timeless world, of the kind consciousness, of his own heart.

Abuladze does not limit himself to his self, and neither to his contemporaries, he transcends time and relates to all that God is- the beginning and the end, but in a quiet way, an intelligent way, revealing the Truth to a world that had lost its eyes to see and its heart to understand.

The first movie, The Plea, is a black and white move, made in such a manner to increase the contrast between the light and the darkness, but also to focus the eye of the spectator on what is essential, putting aside the details, the colors.

The movie is very complex, and is full of ancient Georgian history, concerning the lives and habits of the tribes that lived among those mountains. The main idea is that of the transformation that happens within a man, when at a turning point, he leaves all behind in the search of God, and also in understanding his purpose.

Art is not for visual pleasure, but for helping a man reunite with his inner self, to remove all that is bad from one's being, and regaining the purity with which we were initially born. Tengiz Abuladze is one of the true artists of this world, for the does not forget how to be happy and how to make others be happy.

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ADAPTATION OF TRACTOR FOR USE OF DIFFERENT BIOFUELS

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The growth of the fossil fuel prices during the recent years has been very rapid, which stimulated the search for new energy sources trying to reduce the fuel costs without affecting the economical development. For farmers whose business area is strongly dependent on fluctuations of the fuel prices the use of fuel, which could be produced from locally grown raw materials (like rape seed), is the best alternative to increase the competitiveness and development. As the creation of such production units is implemented in Latvia and fuel is available, then there are no special barriers for the use of fuel without adaptation of the vehicle. The economic viability of adaptation of the tractor engine depends on many factors; the most important of them are the costs of conversion, the price difference between biofuel and fossil fuel and the annual fuel consumption [1]. As rapeseed oil (RO) and fossil diesel (FD) have different viscosities, RO is used in diesel engines mainly in two ways: (1) adapting the engine for the fuel or (2) adapting the fuel for the engine [2]. The first way is connected with direct use of RO in engine, but the second one – with transesterification of RO to get biodiesel. The use of both of these fuels needs additional investments and the aim of this research is to find out the best fuel for the local farmers.

For the adaptation the tractor *Belarus 892* was chosen. Detailed calculations were performed to compare the conversion costs and the payback period using RO and biodiesel. The results showed that for the use of rapeseed oil it is necessary to install a separate tank, heat exchanger, thermal switch, two solenoid valves, heated fuel filter, fuel hose, and coolant hose with the total costs of 493 LVL. For the use of biodiesel it is necessary only to exchange the non-compatible gaskets, hoses and elastomers with the total costs of 54 LVL. The results showed that the payback period of the adaptation costs of the tractor for the use of biodiesel will be lower than for the use of RO. The adaptation of the tractor for the use of RO would be more economically reasonable if RO will be used for a long term period taking into account the lower price compared to FD and biodiesel. Besides that, additional costs for the use of both biofuels could be expected due to special storage conditions.

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DEVELOPMENT OF BIOMETHANE AS VEHICLE FUEL IN LATVIA

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Increasing of the transport sector in the recent few years produces a significant amount of emissions and it shows a necessity for some more alternative transport fuels, and one of the perspectives is biogas – a clean, renewable source of energy produced via anaerobic digestion and it could be used as a motor fuel due to the high methane content. Before using in vehicles biogas must be upgraded till natural gas quality with the methane content between 90 and 100%. Only after that we get the fuel with the name biomethane, which is suitable for application in vehicles the same as natural gas. There are different biogas upgrading technologies, but the investment costs and specific operational costs for them are very high. The experience for usage of these technologies in Europe is more than 20 years and the most experienced country is Germany, but in Latvia these technologies are just in the process of development.

Natural gas / biomethane is mainly used in vehicles, after compression at a fueling station it is stored in cylinders on the vehicles at pressures of about 20 MPa [1]. The technology for the use of this gaseous fuel is known very well for quite a long time. Vehicles can operate on natural gas or biomethane using specially designed engines or modified conventional diesel or gasoline engines. The availability of vehicles with such engines is increasing every year and now such vehicles are offered from many largest car manufacturers. Nowadays, such technology is effectively used mainly in busses and commercial trucks in many countries. The use of natural gas is on rapid development, so the development of biomethane also could be successful in the future as there could be used the same infrastructure as for natural gas. Additionally, the use of this renewable gaseous fuel could help to improve the ecological situation in case of reduction of carbon dioxide, particulates and other components. During the recent years biogas production has developed rapidly also in Latvia, but the gas produced by the local biogas companies is mainly used for production of electricity burning it in CHP plants. Lack in the development of biogas upgrading for further use in transport is connected with the high investment costs. The next barrier is also non-existence of the necessary fuelling infrastructure, which impacts the number of vehicles in the country. The energetic strategy of Latvia prognoses increase of the use of biogas in transport in the time period till 2030 [2], but further development of it is connected with political decisions and additional support.

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ISCP (INDONESIAN SPECIES CONSERVATION PROGRAM): ACTION AGAINST LOSS OF BIODIVERSITY IN INDONESIA (SUMATRA)

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How is it with the current environmental situation in South-east Asia? What is the future of this region? What is going on today and how is it possible to fight against the present-day trend of deforestation and biodiversity loss?

The answers are not very positive. The reasons for deforestation and biodiversity are: deforestation in order to set up palm oil plantations, logging, human expansion, illegal hunting etc.

The current environmental situation in the countries of Indonesia and Malaysia which are endangered nowadays are analysed by the author. This danger affects the palm oil plantations that produce palm oil. Palm oil occurs in almost 50% food and cosmetic products [1]. The article analyses what global responsibility and impact on the loss of environment the consumers (including us) have and how we influence what is happening on the other side of the earth, and how we can influence our negative impact as well.

For instance, do you know that 130 000 km² of full palm plantations, which have replaced indigenous undamaged rainforests full of life, are found in Indonesia and Malaysia nowadays? And do you know that in Kalimantan (Indonesian part of the island Borneo), the area of natural environment of a popular Indonesian symbol- orangutans was reduced by 50% in less than one orangutans' generation? The area covering former rainforest was reduced by 90% on the Sumatra Island since 1975 [3]. Thanks to these numbers one can see that issues of palm plantations are really present.

The next problem is illegal hunting of wild animals for food, trophies, traditional Chinese medicine and breeding wild animals as pets. As noted in [2], the hunting together with the loss of environment is a major cause for the loss of biodiversity.

These issues will be the main chapter of the current project of the author of the article. A list of environmentalist activities that try to prevent the loss of biodiversity will be based on the author's experience from the stay in the Sumatra Island.

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PHENOLIC COMPOUNDS AS NATURAL ANTIOXIDANTS OF LOVAGE

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Lovage (*Levisticum officinale* L.) is a perennial herb belonging to the *Umbelliferae* family. All parts of the plant being strongly aromatic, the seeds, leaves and roots are commonly used. Polyphenols are a large, important and diverse class of antioxidants, beneficial to both plants and humans.

The aim of the experiment was to compare the content of phenolic compounds and antioxidant activity in different genotypes of lovage roots.

The experiments were carried out at the Faculty of Food Technology, Latvia University of Agriculture. Three genotypes (L1, L2 and L3) of lovage roots were collected in Latvia during the period from September to November, 2012. The content of phenolic compounds and antioxidant activity were determined using spectrophotometer methods. For statistical analysis the Tukey's test and Linear Correlation analysis were used. The differences were considered significant at $p < 0.05$.

The results of the Tukey's test showed that the total phenolic (TPC) and flavonoid (TFC) content in lovage roots belonging to various genotypes differed significantly ($p < 0.05$) and ranged from 262.65 to 371.36 mg GAE 100 g⁻¹ dry weight (DW) and from 310.88 to 458.15 mg CE 100 g⁻¹ DW, respectively. The highest TPC and TFC in different genotypes were detected, L3 and L2, respectively. The ratio between TFC/TPC shows that in genotype L3 the content of flavonoids is the lowest, but in extracts of this genotype roots the antioxidant activity was the highest. Very strong positive correlation between TPC and antioxidant activity was observed, whereas correlation between TFC and antioxidant properties is weak. TPC and total antioxidant capacity differs significantly ($p < 0.05$) amongst three genotypes of lovage roots, that is similar to the results obtained for horseradish roots [1] showing the importance of genetic background. Whereas for strawberries no influence of genotype to the content of phenolic compounds was observed [2]. TPC can be used to predict antiradical activity, but flavonoids are not strong antioxidants.

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TUBE BENDING METHODS

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We meet bent tubes everyday in our lives; generally, they are used for structural (sometimes decorative) purposes or as passageways carrying fluids or gases.

As an example: we can meet structural bent tubes as bicycle handlebars, furniture frames, grab bars, roll bars, etc. In passageways we can meet them as hydraulic lines, fuel lines, exhaust pipes, water lines, etc. Industries typically using bent tubes/pipes are automotive, aircraft, off-road and farm equipment, boiler, air conditioning, ship building, furniture, power generation, recreational vehicle, railroad, etc. industries.

We often meet them, but most of us do not know how these bent tubes are obtained.

Theoretical articles and practical experience of the author were used for the research, where theoretical information on the tube bending methods was obtained.

As a result, it is possible to collect and present the obtained information about the tube bending methods, their advantages/disadvantages.

There is no ideal method for tube bending. The choice of the method depends on many factors, such as the tube diameter, wall thickness, required bend radius, pipe material, required quantity and quality of bent tubes.

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EXTREMELY MOBILE DEVICES

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The 21st century is a century of most complicated machines that have ever been made which relieve human life and make it more comfortable. By 2011 Silicon Valley started their project, hoping to create a fully autonomous automobile capable of things people have only dreamed about, for example, it accelerates, passes vehicles, and abides by traffic laws, it can be upgraded not only by new parts but also by Internet connection, it remembers and reminds of important events and has lots of more features. It is not only a car; it is a very smart, very fast and increasingly opinionated information system.

The auto industry in Silicon Valley is making “smart” cars. They modify cars in labs to drive without a human [1].

By 2030, one engineer predicts, we will be summoning driverless cars by cell phones to come pick us up at the airport.

Robo-Coach: BMW uses its Track Trainer, a self-driving sedan, to teach racers how to make optimal turns and engineers how to make optimal drive systems [2].

There is no need of expensive professionals to learn how to do the best race in racing tracks, just sit in the BMW Track Trainer car and it will guide you through the track and show all the fastest and safest ways how to finish it.

The number of chips in the average automobile has grown so that cars now contain anywhere from 50 to 200 processors and a mile of wiring. The increasing prevalence of hybrid and electric cars is accelerating that trend; the plug-in electric Chevrolet Volt, for example, requires 10 million lines of code, two million more than it takes to run a Boeing 787 [3].

The science has gone so far that things which took a lot of room now are only in a size of microprocessor.

Things which people expected never to be invented are becoming a reality, a part of our lives and as Silicon Valley engineers presume the main idea is to change the relationship between humans and machines.

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LITHIUM-ION BATTERY

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Lithium-ion batteries emerged in the early 1990s, fighting nose-to-nose to gain customers' acceptance. Today, lithium-ion is the fastest growing and most promising battery chemistry. Some of lithium-ion batteries have more than 2000 charging cycles.

Lithium-ion is a low maintenance battery, an advantage that most other chemistries cannot claim. There is no memory and no scheduled cycling required to prolong the battery life. In addition, the self-discharge is less than half compared to nickel-cadmium, making lithium-ion well suited for modern fuel gauge applications [2].

The Li-ion charger is a voltage-limiting device that is similar to the lead acid system. The difference lies in a higher voltage per cell. While lead acid offers some flexibility in terms of voltage cut-off, manufacturers of Li-ion cells are very strict on the correct setting because Li-ion cannot accept overcharge [1].

To insure safety and sustainability batteries need special protection. Despite its overall advantages, lithium-ion has its drawbacks. It is fragile and requires a protection circuit to maintain safe operation. Built into each pack, the protection circuit limits the peak voltage of each cell during charge and prevents the cell voltage from dropping too low on discharge. Usually in lithium-ion battery there is PTC, CID, and PCB protection [3].

Lithium-ion batteries are the most popular batteries used in mobile phones, flashlights, computers and many other devices. This type of battery has very low internal resistance.

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THEORETICAL ASSESSMENT OF LATVIA NATURAL WILLOW SPECIES FOR BIOMASS PRODUCTION

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Abandonment and natural afforestation of agriculture land with native tree and shrub species have been relatively intensive in Latvia. Over the last several years, increasing attention has been paid to use of fast-growing species for energy production in these areas.

Willow species are used in eastern North America and Europe as crops for bioenergy and bio products [1] and willows are among the most suitable species for short-rotation forestry (SRF) in temperate climate [2]. Also in Latvia species of willows have an excellent ability to grow in areas where other species are reluctant to grow, especially in meadows and abandoned agricultural lands.

Willow SRF systems are used for phytoremediation and in wastewater purification, in combination with biomass production [3]. SRF provides efficient land use and a new source of renewable energy, positive effects on biodiversity, and the development of rural areas [4]. However, the effect of SRF on biodiversity and sustainable land use is evaluated contradictory.

The profitability of willow cultivation mostly depends on the average annual yield, but the potential yield depends on climatic restrictions [5], clonal material, fertilization, irrigation and a long harvest cycle [1].

Valid evaluation of the economic potential of willow species is possible through detailed exploration of willow tree species and estimation of biological productivity.

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EXHAUST GAS REGULATIONS OF NONROAD DIESEL EQUIPMENT

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Environmental regulatory agencies focus on four types of engine emissions: carbon monoxide, hydrocarbons, nitrogen oxides, and particulate matter. As more focus is placed on health and environmental issues, the governmental agencies throughout the world are enacting more stringent laws to reduce these emissions [1]. As so many diesel engines are used in trucks, the U.S. Environmental Protection Agency and its counterparts in Europe and Japan first focused on setting the emissions regulations for the on-road market [2]. While the worldwide regulation of nonroad diesel equipment came later, the pace of cleanup and rate of improvement have been more aggressive for nonroad equipment than for on-road engines [1]. The nonroad industry has made significant gains in its efforts to reduce emissions and improve the performance. Currently, less than 0.3 percent of the nonroad engine exhaust contains emissions pollutants like NO_x, CO, HC, and PM. The rest (99.7 percent) of the engine exhaust is made up of natural elements in the air like nitrogen (N₂), oxygen (O₂), and water vapour (H₂O) [3]. Tier 3/Stage III A emission regulations required 40 percent reduction in NO_x compared to Tier 2/Stage II. Interim Tier 4/Stage III B regulations require 90 percent reduction in PM along with a 50 percent drop in NO_x compared to Tier 3/Stage III A. Interim Tier 4/Stage III B and Final Tier 4/Stage IV must pass additional emission tests including the steady-state 8-mode test (ISO 8178) and the rigorous nonroad transient cycle (NRTC) test [2]. The final Tier 4/Stage IV regulations, which will be fully implemented by 2015, will maintain the levels of PM and require an additional 80% reduction in Nox compared to Interim Tier 4/Stage III B [1]. For reaching these standards the manufactures use two main methods – cooled exhaust gas recirculation (EGR) and/or the selective catalytic reduction (SCR) technology. For latest regulations the manufactures plan to use both technologies.

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VERTICAL EARTH CRUST MOVEMENTS IN TERRITORY OF LATVIA

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The leveling data obtained in previous campaigns of leveling are used for vertical earth crust movement research in the territory of Latvia. Multiple levels were discussed: pre-war (1929 till 1939), post-war (1967 till 1974) and current leveling periods (2000 till 2010). The remained leveling marks enable comparison of a particular height of the point value changes over different epoch leveling. Most of the pre-war leveling marks have not remained till our days, as most of them were installed in railway bridges and station buildings. In each epoch complete leveling of the first class leveling lines was researched. Elevation differences between the pre-war leveling points were compared with the post-war and our days point elevation. Respectively, in the research the elevation differences are calculated from 1929 until 1939, from 1967 until 1974 and from 2000 until 2010 leveling data and the first class leveling line height difference changes from one period to another are analysed. The height differences mainly increase from north-west to south-east when the three epoch first class leveling in the territory of Latvia is compared according to the obtained results. The height difference between the change differences in the reviewed lines of the time since 1970 to 2005 has increased compared to the changes of 1935 to 1970. In summary, the change difference and direction are stable and constant. Using this method of research a summary can be made to find the causes of these changes in time - due to human or vertical crust movement activity. Providing the height value comparisons of geodetic marks has given an insight into the vertical earth crust movements, and made it possible to make predictions about the possible trends for the next 15 -25 years. These predictions should be taken into account in the long-term national development planning.

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REPRESENTATION OF PERCEPTIONAL QUANTA OF KNOWLEDGE

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The process of perception is the most important and essential during the whole life of a human. According to the Wikipedia dictionary, perception (from the Latin *perceptio, percipio*) is the organization, identification and interpretation of sensory information in order to represent and understand the environment [1]. B. Velichkovskiy presupposed that perception is a continuous cyclic process of functioning of cognitive structures. It mediates with informational interaction of a human with environment. This process is contiguous, leads to accumulation of information and contains the tendency of development; the way of organization of the perceptual process deals with enmity of gestalt and elementary. The hierarchical organization of perceptual structures allows considering the process of perception as multistage [2].

Perception of the world around us takes place due to the five receptors (sense organs): vision (usually individual experience), hearing (considered to be one of the most important in human life), touch (complex lump), olfaction (usually taken together with taste), taste (peripheral perception). I. Rysin defines them as perceptual modi or modi of perception. Besides, in vision they single out some submodi: perception of light, colour, shape, size, precluding the place in space and spatial movement [3].

Perception – a psychological process, consisting in reflecting of a subject or phenomenon in the whole during its exposure on different receptors.

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INDUSTRIAL ROBOTS

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Industrial robots [1] are an established technology with very high reliability of the robot. To be used and implemented in industrial automation in an efficient way, it is important to understand the basic design of robots, what characteristic features they have, limitations, arms, etc [2]. Such features, defining a "specification" of the robot, both in terms of functions and technical parameters, describe how a robot can operate. In many cases, however, it is more important to know what a robot cannot do, what the limitations are, and why. To know this, it is important to have an understanding of the different subsystems, their limitations and how different solutions work together in an integrated system. Through this knowledge, better robot systems in industrial automation can be designed and, when problems are expected, alternative solutions can be implemented that result in a robust system that fulfills any requirements set up from the start. Traditionally, implementation of robots is common in serial industry; however, their using for individual production would be a challenge in medium size enterprises. To make it true, it is necessary to create adaptive software larger of the well known design software, such as Solidworks, Catia.

Industrial robots are used in a great variety of tasks and manufacturing processes [3], which also by definition is an important characteristic feature of robots. Depending on what a robot is used for, it is in many cases equally important to have an understanding and knowledge about these work processes. Within each of the various work processes, such as arc welding, gluing, spray painting, there are a number of process variables to control and disturbances to counteract on. Successful implementation and use of robots in industrial automation puts great demands on the engineering skill of all staff involved to make the right decisions in selection of the equipment, integration, customization, programming and control of all interacting equipment within the system.

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ELECTRONIC RUST PROTECTION SYSTEM

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The electronic rust protection system has been used to prevent underwater steel bridges and underground pipelines from corrosion. This method has been also widely used in water transport, land transport and other metal stationary constructions. This method is also adjusted in the sphere of vehicles and it is used as one of the anti-corrosion alternatives.

Electronic rust protection interferes with the electrical charge between iron and oxygen so it becomes hard for them to combine to form rust [2]. We achieve this by creating negative (-) charge (electrostatic field) on the metal surface [1].

The cathodic protection method works from the source of direct current which is taken from the vehicle battery. The protected construction is connected to the negative pole of the direct current and the protector plate is connected to the positive pole. Due to the electronic flow the protected steel surface starts working as an anode. The conventional chemical applications protect the vehicle from the window line down but now the electronic rust modules protect the entire vehicle up to the roof [2]. In comparison to the usual anti-corrosion methods where metal is covered with paints and lubricants, this system continues its protection even when scratches and the metallic layer are revealed. Laboratory tests demonstrate a reduction in the corrosion process by as much as 80% [3].

This efficiency serves as additional protection and it can be used in combination with other anti-corrosion technologies.

One of the advantages is that the electronic rust protection system protects not only the outside, but also the inner, hidden parts of the vehicle. This device is easily installed and can be removed without any difficulties. It also does not contain chemical substances, therefore it is considered to be environmentally friendly.

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SOLAR AIR HEATING COLLECTOR ENERGETIC EFFICIENCY

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Today, solar heating is becoming more important than ever before. Natural gas and oil, which are burned to heat our homes and water, are limited. As the reserves of gas and oil shrink, these fuels become more expensive. If more people began using solar heating systems, fossil fuels such as oil and gas would become less expensive and last longer. Burning natural gas and oil in our heating systems also causes air pollution. So, if more people used solar energy to heat the air and water in their homes, our environment would be cleaner [1].

Solar energy is used to heat and cool buildings (both actively and passively), dry products, heat water for domestic and industry use, heat swimming pools, generate electricity, for chemistry applications and many more operations [2].

The aim of our investigations was to compare different absorber material efficiency, we wanted to state the sun following and stationary collector efficiency and also the efficiency of isolated and non-isolated collectors. The 0.1x0.5x1.0 meter long experimental solar collectors were constructed for the investigations and different types of absorber materials were made. We analyzed the manifold length and the sun radiation effect on the degree of air heating. ASHARE used standard 93-2003 is calculated for isolated and non-isolated solar collectors and absorber effectiveness. We determined the influence of sun radiation to the air heating degree for these types of absorbers. The experimental data were measured and recorded in the electronic equipment REG. The collector covering material was a polystyrol plate and different absorbers. We compared isolated and non-isolated collectors to prove that isolated collectors are more effective. The isolated collector was made by the collector surfaces faced with cellular plastic 2 cm plates. Our task was to calculate the air heating solar collector efficiency.

The sun-following collectors are approximately 30% more effective as the same type of the stationary collectors in operation time six hours. Isolation shows great efficiency in windy weather conditions. The isolated collector gives almost two times more efficiency than the non-isolated collector (up to 93%) with the absorbent material steal tinplates on the top.

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TOTAL CONTENT OF FLAVONOIDS IN SCHIZANDRA CHINENSIS FRUITS

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Schizandra chinensis has raised major interest in comparison to all of the Schizandra species. It grows in Japan, Manchuria, Russian Far East, Coastal area, Sakhalin and Southern part of Khabarovsk [1].

Science development is the reason why a secret of Schizandra has been gradually discovered. It has been clarified that this plant is healthy and very useful. Schizandra berries are also called „five flavour berries”. They are sour, sweet, salty and bitter with a tang of resin and mescaline. The berry skin is sweet and salty but the seeds are spicy and bitter. Schizandra is a unique stimulant. The berries and seeds were already known in the 5th century, because of their tonifying and refreshing characteristics [2].

The medicinal character of Schizandra has already been confirmed. Antioxidants that are in Schizandra affect positively on the human`s body. Long time ago Schizandra berries were used to refresh strength after a disease and to improve vision. In Eastern culture medicine Schizandra berries are used as a restorative and stimulating instrument to treat anaemia, impotence; different illnesses connected with lungs, stomach, liver and kidneys; to cure nerve and mental illnesses and also in case of frost-bite and different infections [3].

Schizandra is full of different micro and macro elements that are very important for development of the organism and health improvement.

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LAND RENT IN V4 COUNTRIES

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Land is very important input for all agricultural producers. In many countries the price of land is very high and most of producers rent the land. The category „rent“ is the price of land use. The land rent belongs to the farmer`s costs and it has impact on the profitability of the farmer. In all EU countries this category is used because of usage not just own land but also rent land. The Slovak Republic and Czech Republic belong to the countries where the share of land rent is one of the highest. The main reason for this situation is the outstanding ownership relationships. A similar situation is in the Western countries too, where the share of land rent is considerable [1].

The Slovak Republic belongs to countries with different natural conditions. And the price of land rent is various from region to region. The price of land rent is among from 4 € to 135€/ha. The prices of land rent depend on the time life of the contract, conditions of the owner and mainly on the soil quality [2].

The Czech Republic has a similar condition by rent land as the Slovak Republic. In average 86% of land is rented and subsidies from the EU are bounded on land. The amount of land rent depends on the natural conditions and in the Czech Republic a farmer can rent one hectare of land for 30 – 70€ [3].

In Hungary the price for land rent is around 30 kg of crop for golden crown. The rent is calculated through crop or with an equivalent value of the crop price, the rent is influenced by the price of the crop, too. The soil quality in Hungary is evaluated with the system of golden crowns (from 1 up to 40 golden crowns). One hectare of land (average quality) is 20, good soil quality 30 – 40 and bad quality 5 golden crowns [4]. Poland has the worst soil quality from V4 Countries what is influenced by the low value of pH. In some productive areas the price of land rent reaches around 350€/ha [5].

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SUITABILITY OF COMMON BEANS (*PHASEOLUS VULGARIS* L.) FOR VEGETARIAN BEAN SPREADS

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Legumes are the most important source of protein for vegetarians. Common beans (*Phaseolus vulgaris* L.) are the most significant legume in human nutrition, accounting for more than 90% of the world's total bean production.

Common beans are a rich and fairly inexpensive source of protein, carbohydrates, dietary fiber, minerals and vitamins, especially iron, potassium, selenium, thiamine, pyridoxine, and folic acid [1]. According to the latest data about 3 to 5% of Latvian population identify themselves as vegetarians [2]. There are about 10 plant protein spreads commercially available that differ very much in nutritional value and ingredients.

The aim of the research is to determine whether common beans are suitable for vegetarian bean spread production.

New bean spreads were developed using white, kidney and pinto beans and subjected to sensory evaluation. It was concluded that the bean spread made with white beans has optimal sensory properties for developing bean spreads for vegetarians. Further bean spread development was continued with white beans. Four different kinds of bean spreads were developed: classic bean spread, bean spread with basil, bean spread with curry, and bean spread with sun-dried tomatoes.

Current microbiological quality guidelines [3] for bean products show that the quality of freshly made bean spreads is acceptable (criteria for aerobic colony count, CFU g⁻¹) but after seven day storage (3-4 °C) aerobic colony count increases significantly (p<0.05) and the quality is considered to be inconsistent.

To produce acceptable quality bean spreads either pasteurisation, addition of preservatives or appropriate packaging is needed.

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PRINCIPLES OF CLASSIFICATION OF PHRASEOLOGICAL UNITS

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Phraseological units or idioms are the core of any language, and, of course, the most colorful, expressive part of the language vocabulary. Through idioms we can see vivid national features, traditions, beliefs, history and scraps of folk songs and fairy tales. Phraseological units as a complex phenomenon can be studied from different points of view and there are a considerable number of classifications by different scholars based on different principles. The aim of this article is to analyze some of them.

The first principle of classifying phraseological units is *thematic* or *etymological*. Idioms are classified according to their sources of origin, the 'source' referring to the particular sphere of human activity, of life nature, etc. Professor L. P. Smith presents in his classification groups of idioms used by sailors, fishermen, soldiers, hunters and associates the phenomena and conditions of their occupations. This principle of classification has real merit but it does not take into consideration the linguistic features of the phraseological units [1].

The semantic principle of classification is offered by V.V. Vinogradov. He divided idioms into: fusions (*to leave smb. in the lurch*), unities (*to lose one's head*), and combinations (*to have a bite*). But the borderline separating unities from fusions is vague and subjective [2].

Professor A. V. Koonin subdivided phraseological units into: 1) nominative; 2) nominative-communicative; 3) phraseological units which are neither communicative nor nominative; 4) communicative phraseological units [1].

I. V. Arnold's classification includes: 1) noun; 2) verb; 3) adjective; 5) adverb; 6) preposition; 7) interjection phraseological units [3].

The main difference of these two classifications from the above mentioned, is that they include proverbs, sayings and quotations into the classification of phraseological units.

So, the conclusion is that these classifications complement each other, and it is difficult to analyze phraseology excluding any of them. As phraseology is a complex phenomenon it cannot be entirely covered with one classification based on one principle.

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SYNESTHESIA OF PERCEPTUAL VOCABULARY

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Synesthesia was firstly described as psychological phenomenon. The assistant of the mental asylum I. Ermakov gave the following definition to this phenomenon: an ability of perception of one sensation with the help of two senses which usually cannot be combined [1].

The idea of synesthesia also gets attention in great amount of works belonging to B. Galeev. He suggests that synesthesia means not “co-feeling” but “co-presentation”. By its psychological nature it is an intersensory association. It refers to the manifestation of synesthesia in other modalities that are fixed in a language as well-known metaphorical comparisons. B. Galeev highlights that characteristics and features of one modality are described by features of other modality (*black deed* – ‘illegal, forbidden’; *to be blue* – ‘to be upset, scared’) [2].

Analyzing these two approaches we see that B. Galeev’s approach is deeper and more exact, although we should take into consideration that I. Ermakov’s theory was introduced nearly one hundred years ago [3]. I. Ermakov singles out synesthesia of neurotic character only. In his turn, B. Galeev makes a conclusion that synesthetic phenomenon is observed in every person, in most cases it shows up on the unconscious level, appears spontaneously. Psychological reality of connections is revealed between objects of different modality through metaphorical comparisons or during the process of psychosemantic experiments. So B. Galeev shows that the “emotional connection” with its activity identifies the productive character of human fantasy with the help of synesthetic images, forming against any logics, but in conformity with feeling and mood.

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BIOGAS PRODUCTION FROM MUNICIPAL SOLID WASTE IN DRY ANAEROBIC FERMENTATION

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Dry fermentation is a new introduction in Latvia. The goal of the investigation was to identify the suitability of the garage-type bioreactor and the production technology for biogas production from MSW (municipal solid waste) and to identify the biogas obtaining potential.

Biogas output was investigated at 37-38 °C.

The analysis was measured using standardized methods. The bioreactor operated in a single filling mode without substrate stirring. The raw material – MSW – was taken from the landfill „Daibe”. Biomass shredding had occurred in “Daibe” landfill; the bioreactor was filled using the standard methods. Three investigations were made.

The fermentation process was measured on pH 7.21- pH 7.99 levels.

The garage type bioreactor and the production technology are suitable for biogas production using MSW.

The obtained gas value in four weeks: Investigation A – 157.13 l/kgDOM of biogas; Investigation B – 155.57 l/kg DOM of biogas; Investigation C – 237.81 l/kgDOM of biogas. The obtained biogas value of 1 ton waste in four weeks: Investigation A – average 23.21 Nm³/biogas, Investigation B – average 34.23 Nm³/biogas, Investigation C - average 40.89 Nm³/biogas.

The optimum retention time in the garage type bioreactor could be around 32 days, despite the fact that after Day 21 the value of the obtained gas is significantly lower; the methane content still is above 60 % and the gas is emitting.

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SYSTEMS OF GRAIN TRANSPORTATION

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Harvesting in Latvia lasts only a couple of weeks every year. It is very tight time, so it is important not only to use fully every hour, but even every minute. One of the most labour-consuming processes in grain treatment is grain transportation to the certain place such as grain cleaning, drying or storing. Misfunction of some systems of transportation might cause big damages, because the grain can overheat or even deflagrate. It can also cause some extra expenses due to the work stoppage for the machinery, which is unable to fulfil the work duties.

This report is an overview of various grain transportation systems and the usage of them in different sized homesteads, grain warehouses and sea-ports as well as the principles of selection for the most suitable materials for establishment of the grain transportation system.

The most common types of grain transportation systems are:

Pneumatic: hoover-type, blower-type and blower-type with funnel;

Mechanic: cups, shelves, suspended gantries, worm gears, springs, ribbons, vibration systems.

Farms in Latvia are different-sized and there are diverse types of transporters being used in them. The type of transport is chosen due to the amount of grain and other preconditions, such as the necessity to carry grain horizontally or vertically, grain moisture and the distance for transportation.

Usually transportation systems are made of galvanized iron, but they have no resistance to wear, because grain is an abrasive material and the transportation systems are under conditions of friction so the process of wearing-off is inescapable. Iron pipes are replaced with polyester pipes to prolong the usage of the transportation systems. Some polyester materials have contagion to nutrition products, so some items of polyester are forbidden to be used in grain transportation. If overturn is big, polyester can be replaced with ceramics, but it makes the mounting more complicated and increases the expenses.

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MAIN FEATURES OF FORMING TOLERANCE IN ADOLESCENCE

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Adolescence is a very sensitive period of life in terms of tolerance. The child is in search of his/her own social identity at this age. He/she shows a great interest in other people, their beliefs, values, social standards and behavior patterns. In adolescence, the child formulates the basics on social views, economic and political issues in the society. The child builds up the picture of the world, looks for new ways and means of interaction with the world, tries to know who he/she is and determines the place in this world. The child's personal stand position acquires special significance. The premise for this is a great interest in the child, his/her inner world, development of reflection and responsibility.

Therefore, there is a need to address the problem of teenagers in the frame of forming a tolerant person. Forming tolerance is not an easy task for teachers, because social environment is not sympathetic to such an important and necessary quality.

In this regard, teachers set themselves the following tasks:

- to help adolescents to overcome their personal stereotypes of social reality;
- to use extracurricular environment for the purposes of children development;
- to use role-playing classes in order to simulate typical relations of adults;
- to establish trust-fostering relationships with children; to treat them as adults;
- to demonstrate tolerance to teenagers' subculture.

Teenagers become self-sufficient in community related activities. The need to live among people motivates them. However, in reality they are excluded from actual social activities. Interest in the world of adults and the desire to express their opinions on important issues indicate that teenagers are ready for conscious discussion of social, political, religious, and national issues, thus responding to many social problems. The capacity of adolescents to respond to many important issues of our life is one of the most important premises of an independent, altruistically oriented and tolerant person.

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TYPES OF LAND USE IN LATVIA AND FOREST LAND

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According to characterization of the land area in accordance with the natural parameters and the current utilization in national economy the whole land in Latvia is divided into land use categories – agricultural land, forests, bushes, swamps, land under water, roads, yards and other land. The land use category consists of similar types of land use. The types of land use should be determined and updated by performing a cadastral survey and recorded in the State cadastre information system [1, 2]. Besides the general classification, the Law on Forests determines classification of forest land into forest land categories – forest, overflowing clearings, swamps, glades and land under forest infrastructure facilities. Forest land categories are divided into types of forest land in forest management. Categories of forest land should be classified in the forest inventory and registered in the State Forest Register [3, 4]. The research is based on the analysis of classification of types of land use and classification of types of forest land in forest management. Comparing similarities of classifications, both classifications have categories of “forests” and “swamps” while the rest of the categories are different. For that reason, by the data entered in the State cadastre information it is impossible to determine areas of forest land. Coincidence of the recorded areas is not provided in both Registers, for example, on January 1, 2012 the State cadastre information system recorded almost two thousand hectares of forests more than the State Forest Register, but in previous years larger areas of forest were registered in the State Forest Register. The situation has a negative effect, because the areas of forest land recorded by the State Forest Register are used for valuation of forest land [5, 6].

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TENSILE STRENGTH OF HOP TRAINING WIRES AND THEIR ATTACHMENTS

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One of the issues of hop growing technology that are most at risk is making of hop strings and the way they are attached to the ceiling of wirework. In the following years, mainly due to the influence of the applied chemicals, these attachments get loose spontaneously and are one of the causes for penetration of impurities into another stage of technological process where they are separated only with difficulty (Vent et al., 1970). Thus, with technology of hop growing mechanized pull-down of harvested hops to pull down the guide wire together with hop vines and their attachments in a way so that all of the attachment stay connected with the wire and there would be only attachment residues left on the hop trellis would be suitable (Ciniburk et al., 2009), (Srivastava et al, 1993). The article summarizes the results of field experiments done during the pull-down of hop vines using a common hop string, but with different technologies of attachments with the aim of searching for the most suitable variant which would exclude the risk of impurities penetrating from this stage of technological procedure into the final product.

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PROTEST OF YOUNG PEOPLE IN BULGARIA

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Protest is a form of expressing public opinion, which consists of demonstrating one's strive to upset the status quo via words or actions, individually or in a group. History recognizes many notable examples, some of the most recent being part of the Arab Spring and the series of campaigns of socially engaged young people, which were to follow suit. There is a good reason to state those were an effective showcasing of the spirit of the times.

The actions of the Bulgarian youth, which followed the Arab Spring, are met with indulgent disappointment. In the case of Bulgaria, traditionally characterized by civil discontent, pessimism, dissatisfaction with authority and institutions, low living standard, and low quality of life assessment, protest only happens pro forma.

Bulgarian setting is situated with neither the social maturity, nor the sharp contrast of the categories “good” and “bad” (despotism-freedom), which dictatorships are accustomed to. What motivates young people is the feeling of unity, which, when matched with the relevance of the moment, instills the illusion of social growing up. Even being aware of the ideological flaws does not estrange protesters from their respective cause. Protests are apolitical, because they do not support any single political party, yet there is always the doubt they have been organized with political intervention. This deprives the young of a political concept, around which they would otherwise unite and restricts them to being nothing more than an “angry mob”. Having a platform would allow them to manifest their demands. The opposite will prevent them from doing anything aside from defying anything existing at the moment.

The division between protesters and politics, their disregard of democratic process and the social contract, their unwillingness to bear social responsibility or pick a leader, or the natural lack of such, make them ineffective and unable to earn acknowledgement for their point of view. They defend certain causes, but they do not make a change in the local, much less in the global status quo.

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СПОСОБЫ ПОВЫШЕНИЯ ЭНЕРГОЭФФЕКТИВНОСТИ ЗДАНИЙ, ИСПОЛЬЗУЯ РАЗЛИЧНЫЕ ТЕХНОЛОГИИ УТЕПЛЕНИЯ

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В работе исследуются различные способы улучшения энергоэффективности жилых зданий. Для жилого сектора Латвии характерно высокое потребление энергии, которое возможно уменьшить, производя реновацию зданий. Повешение энергоэффективности весьма актуально, так как большинство жилых зданий Латвии были построены более 20 лет назад и не соответствуют современным, более жестким, нормативам энергосбережения.

Реновация зданий является длительным процессом, состоящим из различных проверок, получения разрешений, экономических и инженерных расчётов, анализа, а так же проведения работ. Чтобы реновация здания имела техническую и экономическую выгоду, необходимо не только правильно выбрать материалы и технологию утепления, но и найти индивидуальное решение проблем каждого здания, ведь оно – уникально.

Современный рынок предлагает различные утеплители, самыми распространенными из которых являются пенополистирол (коэффициент теплопроводности $\lambda = 0,037 - 0,043 \text{ W/mK}$) и минеральная вата ($\lambda = 0,035 - 0,041 \text{ W/mK}$). На практике в основном используется минеральная вата, но экспериментальное исследование и математические расчёты автора показали, что для улучшения энергоэффективности зданий Латвии оптимальнее использовать пенополистирол.

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РЕГУЛИРОВАНИЕ ПРОЦЕССОВ ПЕРОКСИДНОГО ОКИСЛЕНИЯ ЛИПИДОВ В ПРЕПАРАТАХ ПНЖК ИЗ ГИДРОБИОНТОВ

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Высокая ненасыщенность полиненасыщенных жирных кислот (ПНЖК) на основе липидов гидробионтов способствует быстрой окислительной порче препаратов — главной причине снижения их качественного состояния. В связи с этим актуальны поиск и разработка соответствующих ингибиторов, антиокислителей и консервантов. Функциональными элементами могут служить антиокислительные средства природного или синтетического происхождения. Но наиболее целесообразно использовать против повреждающего действия внешней среды природные антиокислители — флавоноиды (кверцетин, кемпферол, мирицитин), катехины или фенолы (карнозол, розманол, розамиридифенол), фенольные кислоты (карнозиновая, розмариновая), а также токоферолы, аскорбиновую и лимонную кислоты. Данные вещества применяются индивидуально или же входят в состав комплексных растительных экстрактов. В качестве источников эффективных ингибиторов перспективно использование таких растений как черника, тыква, шиповник, боярышник и др. Выделяемые из этих растений природные компоненты не только обладают выраженным антиоксидантным эффектом, но могут служить также действующим началом композиций лечебно-профилактического назначения при хронических заболеваниях, вызванных оксидативным стрессом [1].

Действующим способом ингибирования пероксидного окисления ПНЖК является капсулирование и микрокапсулирование в защитные оболочки. Для изготовления капсул традиционно используются желатин, альгинат натрия и другие материалы. Перспективным для сохранения ПНЖК может стать применение микрокапсулирования с использованием для оболочек микроконтейнеров многослойных синтетических и природных полимеров, хорошо зарекомендовавших себя при защите льняного масла и рыбьего жира. Более эффективному ингибированию процесса окисления липидов способствует включение в состав многослойной пленки микроконтейнеров хелатирующих агентов (растворов этилендиаминтетрауксусной кислоты, таниновой кислоты), которые связывают также катионы металлов, являющихся прооксидантами в цепных реакциях [2].

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ОТЧУЖДЕНИЕ НЕДВИЖИМОГО ИМУЩЕСТВА ДЛЯ ОБЕСПЕЧЕНИЯ РАЗВИТИЯ ТРАНСПОРТНОЙ ИНФРАСТРУКТУРЫ

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Отчуждение недвижимого имущества для нужд общества существует во всех странах мира. Несмотря на то, что отчуждение недвижимого имущества является весьма редким явлением, все же это остается достаточно актуальным вопросом для владельцев недвижимого имущества. Целью исследования является анализ основных вопросов, связанных с отчуждением недвижимого имущества для обеспечения развития транспортной инфраструктуры.

Понятие «транспорт» включает в себя транспортные средства, дороги и трассы, а также различные технические строения и сооружения, обеспечивающие нормальное функционирование транспортных средств и дорог. В Латвии в понятие «транспорт» входит транспорт железной дороги, автотранспорт, мореходный и авиационный транспорт [1].

Отчуждение недвижимого имущества для нужд общества происходит при добровольном соглашении или в принудительном порядке на основе отдельного закона [2]. Отчуждение недвижимого имущества в принудительном порядке допускается только в порядке исключения и только путем справедливой компенсации. Компенсация может быть предоставлена в виде обмена недвижимого имущества на равноценное или в виде обмена на другое недвижимое имущество с доплатой в случае, если предлагаемое недвижимое имущество не соответствует отчуждаемому по своей стоимости. Владелец недвижимого имущества может также требовать полную компенсацию в денежном эквиваленте за отчуждаемое имущество.

В Европейском союзе отчуждение недвижимого имущества также происходит в интересах общества. В Литве в 2007 году был принят закон, регулирующий процедуру отчуждения земли и размер компенсации. Конституция Литвы предусматривает, что отчуждение земли допустимо только для нужд общества.

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ВОЗМОЖНОСТЬ ИСПОЛЬЗОВАНИЯ ХИМИЧЕСКИХ СЕНСОРОВ НА ОСНОВЕ ПРОВОДЯЩИХ ПОЛИМЕРОВ ДЛЯ ОПРЕДЕЛЕНИЯ СВЕЖЕСТИ РЫБЫ

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Известно, что рыба, прошедшая начальный этап свежести, приобретает характерный рыбный запах, обусловленный накоплением летучих аминов, таких как аммиак (NH_3), диметиламин (ДМА), триметиламин (ТМА), объединяемых общим названием — азот летучих оснований (АЛО). ТМА из всех аминов, входящих в состав АЛО [1], является наиболее летучим и обладает довольно сильным характерным «рыбным» запахом в виду очень низкого порога обнаружения [2], благодаря чему служит одним из основных индикаторов порчи морских видов рыб.

Таким образом, ТМА один из всех аминов, образующихся в рыбе после вылова, наиболее точно отражает степень порчи, так как увеличение его содержания тесно связано с бактериальным ростом. Следовательно, ТМА может быть использован в качестве объективного показателя свежести рыбы путем определения изменения его концентрации, увеличивающейся с течением времени с помощью химических сенсоров на основе проводящих полимеров.

В работе были исследованы газочувствительные характеристики кондуктометрических химических сенсоров на основе полианилина по отношению к триметиламину. Чувствительность сенсорных элементов к данному веществу была рассчитана на основании измеренных значений проводимости, как отношение разности проводимости образца на воздухе и в атмосфере детектируемого газа к проводимости его в воздухе и выражена в относительных единицах, к концентрации аналита (ТМА), представляющего собой объемную долю его паров, выраженную в ppm (*parts per million*).

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ПОСЛЕДНЯЯ БЕЛОРУССКАЯ УЗКОКОЛЕЙНАЯ ЖЕЛЕЗНАЯ ДОРОГА

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Цель работы — исследование истории железных дорог Беларуси. Объектом исследования выступила узкоколейная дорога Новоельня — Новогрудок — Любча.

В годы Первой мировой войны на оккупированной немцами Новогрудчине было начато строительство узкоколейной военно-полевой дороги от станции Новоельня к линии фронта. Железная дорога с шириной колеи 600 мм была построена менее чем за год, и прошла она через деревни Зарой, Скрыдлево, Городечно, Басино, Большие Воробьевичи, Няньково, Новоселки, Ачукевичи. Узкоколейная линия начиналась на станции Новоельня ширококолейного участка Лида — Барановичи. Железная дорога работала исключительно для снабжения германской армии. Очевидно стратегическое значение этой линии: даже в случае выхода из строя 40-километрового участка Новоельня — Барановичи он благополучно дублировался 59-километровым.

В 1919 году с установлением Советской власти исполнительный комитет Новогрудского повета принял решение о возобновлении работы узкоколейки для нужд хозяйства. Исправно работала узкоколейка и «при первых Советах». Во время немецкой оккупации (1941-1944 гг.) узкоколейка использовалась исключительно для нужд оккупантов. В июне 1943 года партизанский отряд «Грозный» практически вывел из строя всю узкоколейку путем организации двух подрывов. После освобождения от фашистов только 31 марта 1947 года Новогрудский городской Совет инициировал ремонт и открытие узкоколейки.

Управление Белорусской железной дороги в 1963 году усилило узкоколейку паровозами и вагонами, вкладывались средства и материалы. Так продолжалось до середины 60-х годов, но узкоколейка стала убыточной. Пассажирские перевозки прекратились вовсе, потому что стало удобнее и быстрее ездить автобусом. В 1965 году узкоколейку закрыли. После ее закрытия железнодорожный вокзал в Новогрудке был передан автомобилистам и по сегодняшний день служит в качестве автовокзала.

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НАПРАВЛЕНИЯ ДИВЕРСИФИКАЦИИ СЕЛЬСКОХОЗЯЙСТВЕННОЙ И НЕСЕЛЬСКОХОЗЯЙСТВЕННОЙ ДЕЯТЕЛЬНОСТИ В СЕЛЬСКОЙ МЕСТНОСТИ

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Перед аграрной экономикой Беларуси возникла достаточно широкая комплексная проблема трансформации практики использования земель в направлении ее экологизации. Под экологизацией сельскохозяйственного землепользования необходимо понимать постепенное восстановление природных свойств земель сельскохозяйственного назначения и процесс охраны земельных и других видов природных ресурсов с целью создания условий для эффективного, устойчивого использования данной категории земель для сельскохозяйственного производства. Решение указанной проблемы находится в диверсификации сельскохозяйственной и несельскохозяйственной деятельности в сельской местности при условии установления жестких экологических регламентов: 1) в сфере сельскохозяйственного производства — развитие устойчивого сельскохозяйственного землепользования; органическое производство с сертификацией продукции; 2) в сфере несельскохозяйственного производства – сельский туризм; производство биотоплива; 3) в сфере экологической регламентации сельскохозяйственной деятельности с целью уменьшения техногенной нагрузки на окружающую среду — структуризация сельхозугодий в направлении установления оптимальных соотношений пашни, насаждений, сенокосов и пастбищ; объединение природоохранных мероприятий с технологиями производства; внедрение принципа «перекрестной ответственности» при осуществлении бюджетной поддержки сельскохозяйственных товаропроизводителей (размер дотаций фермерам должен быть поставлен в зависимость от выполнения мероприятий по охране земельных ресурсов и окружающей среды).

Развитие этих направлений нуждается в определенной государственной поддержке. Экологическую диверсификацию сельскохозяйственного производства можно осуществить в рамках разработки и реализации государственной целевой программы развития экологически-ориентированного аграрного производства, которая должна преследовать как экономико-социальные, так и природоохранные цели.

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СОВРЕМЕННЫЕ ТЕНДЕНЦИИ ПРОИЗВОДСТВА МЯСА В МИРЕ И РЕСПУБЛИКЕ БЕЛАРУСЬ

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Цель работы — проанализировать уровень развития современного состояния производства мяса в Республике Беларусь. Исходным материалом исследований явились отчеты о результатах деятельности сельскохозяйственных организаций и предприятий мясной отрасли Минсельхозпрода Республики Беларусь. В качестве методов исследования использовались экономико-статистические методы.

Беларусь является безусловным лидером среди стран СНГ в производстве мяса на душу населения — в 2008 г. произведено 87 кг. В 2009 г. этот показатель по республике возрос до 95 кг, при этом потребление мяса практически достигло рекомендованной медицинской нормы и составило 77 кг на душу населения. Увеличение производства мяса в Беларуси происходит благодаря двум факторам: росту поголовья животных и увеличению их продуктивности. Здесь характерны те же особенности, что и во всем мире, — увеличение доли свинины и особенно производства мяса птицы.

В Республике Беларусь удельный вес мяса птицы в структуре производства мяса всех видов в 2008 г. составил 21,2%. Вместе с тем в отраслях животноводства существуют и определенные проблемы. Это сказывается в первую очередь на основном экономическом показателе — рентабельности производства. В последние годы сложилась негативная ситуация, связанная с низкой прибыльностью отраслей животноводства. Рентабельность большинства отраслей животноводства республики в настоящее время не превышает 10%, а производство мяса КРС — убыточно. Вместе с тем выход необходимо искать не в повышении закупочных цен, а в снижении издержек на производимую продукцию. В первую очередь необходимо изыскивать внутрихозяйственные резервы снижения себестоимости.

Чтобы выйти на конкурентные зарубежные рынки, республиканским предприятиям необходимо будет не только повысить объемы собственного производства мяса, но и повысить эффективность работы отрасли в целом. Одновременно необходимо разрабатывать новые каналы сбыта продукции, совершенствовать методы маркетинга, строить новые логистические цепочки.

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ПТИЦЫ ОБЩЕЕВРОПЕЙСКОГО ОХРАННОГО СТАТУСА (SPEC) ВЕРХОВЫХ БОЛОТ БЕЛОРУССКОГО ПООЗЕРЬЯ

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Изучение птиц, на территории верховых болот Беларуси было начато в середине прошлого века. Активизация орнитологических исследований на территории болот Белорусского Поозерья пришлась на середину 80-х годов. Однако в это время наибольшее внимание уделяется хищным птицам [1–3]. Настоящая работа основана на оригинальном материале, полученном при проведении исследования на наиболее крупных верховых болотах (Ельня, Болото Мох, Болото Жада) Белорусского Поозерья. При проведении исследований были использованы стандартные методы изучения птиц: маршрутный метод или метод учета птиц на трансектах и точечный метод учета птиц.

В результате проведенных исследований и анализе литературных данных на территории верховых болот Белорусского Поозерья отмечено 33 вида птиц имеющих общеевропейский охранный статус – SPEC [4]. Среди последних такие виды как: чернозобая гагара (*Gavia arctica*), беркут (*Aquila chrysaetos*), скопа (*Pandion haliaetus*), травник (*Tringa tetanus*), сизая чайка (*Larus canus*) и др.

Из 33 видов (SPEC) птиц к I категории охраны относятся 2 вида; ко II – 2; к III – 24, к IV – 5 видов. Большая часть видов (32) гнездятся на территории верховых болот Белорусского Поозерья. Отдельные виды встречаются на территории болот в период сезонных миграций, образуя крупные скопления, достигающие нескольких тысяч особей.

В перспективы дальнейшей работы входит уточнение статуса редких и охраняемых видов птиц верховых болот Белорусского Поозерья, изучение их экологических особенностей, факторов угрозы, а также разработка и внедрение рекомендаций по увеличению их численности.

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НАЦИОНАЛЬНОЕ ВОСПИТАНИЕ КАК ФУНДАМЕНТ, ИСТОЧНИК ФОРМИРОВАНИЯ ЛИЧНОСТИ ГРАЖДАНИНА УКРАИНЫ

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Среди многих проблем, стоящих сегодня перед педагогической наукой и практикой, одной из приоритетных является проблема национального воспитания школьников и учащейся молодежи. Ведь будущее любого государства зависит от того, каким будет молодое поколение. Национальное воспитание — это исторически обусловленная и созданная самим народом совокупность идеалов, взглядов, убеждений, традиций, обычаев и других форм социальной практики, направленных на организацию жизнедеятельности подрастающих поколений, в процессе которой усваивается духовно-материальная культура нации, формируется национальное сознание и достигается единство поколений [1, с. 229].

Национальная доктрина развития образования Украины в XXI ст. Среди приоритетных направлений — обеспечение национального характера образования и национального воспитания, превращение образования в действенную силу развития гражданского общества [3, с.565].

Решающее значение в формировании и практической реализации национальных интересов принадлежит социальной сфере, науке, образованию, культуре, национальной и этнонациональной политике. В основу современного украинского воспитания положена идея, которая способствует национальной идентификации, развитию культуры украинской молодежи, овладению ею ценностями общественной жизни, истории, общечеловеческими достижениями общества [2, с. 22].

Национальное сознание является тем базовым компонентом личности, фундаментом ее духовности, на основе которого формируется научное мировоззрение, которое влияет на смысл жизни личности. Таким образом, главной задачей национального воспитания является воспитание национально сознательных патриотов, граждан своей страны.

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ИСПОЛЬЗОВАНИЕ ВОЗОБНОВЛЯЕМЫХ ИСТОЧНИКОВ ЭЛЕКТРОЭНЕРГИИ В МНОГОКВАРТИРНЫХ ДОМАХ

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В работе показано обоснование использования возобновляемых источников электроэнергии, а возможность использования таковых в многоквартирных домах. Как пример взят жилой дом в городе Рига, находящийся по адресу ул. Прушу 1.

В качестве источников возобновляемой электроэнергии предложены солнечные батареи и ветренные генераторы.

Первым и основным источником информации и главным обоснованием данной работы является публикация бывшего вице-президента Соединённых Штатов Америки А. Гора «Скрытая правда» («An Inconvenient Truth», 2006).

Так как потребление энергии жильцов в доме является очень большим, то возобновляемые источники электроэнергии предложено использовать как дополнительный источник, позволяющий уменьшить оплату за коммунальные услуги (в них включается электроэнергия, которая нужна для общих нужд здания: освещение помещений общего пользования – подвалов, чердака, лестничных клеток, входа в подъезд, интернет-подключения в здании и т.д., электроэнергия для теплоузла – освещение, работа циркуляционных насосов, теплоузла и т.д.).

По итогам работы будут показаны расчёты, таблицы сравнения цен оборудования, а также степень и сроки окупаемости данных мероприятий для данного здания.

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ОСОБЕННОСТИ ПРОФИЛЬНОГО ОБРАЗОВАНИЯ В УКРАИНЕ

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Вхождение украинского образования в европейское образовательное пространство требует его реформирования, в первую очередь среднего образования. Новые подходы к организации образования в старшей школе заложены в Национальной доктрине развития образования (2002), законе Украины «Про общее среднее образование», Концепции общего среднего образования и Концепции профильного обучения в старшей школе. Профильное обучение будет создавать благоприятные условия для учета индивидуальных особенностей, интересов и потребностей учащихся, будет формировать у учеников ориентацию на будущую профессиональную деятельность. Общая тенденция развития старшей профильной школы — ее ориентация на широкую вариативность, интеграцию общего и допрофессионального образования. В последнее десятилетие в образовательном пространстве Украины начали работать лицеи, гимназии, колледжи, в которых профильность воплощается на практике. Но профильное образование не ограничивается только этими заведениями, оно касается старшей школы, в общем. Согласно Концепции профильного образования, обучение в 10-11 классах осуществляется по таким направлениям: общественно-гуманитарный, филологический, естественно-математический, технологический, художественно-эстетический, спортивный. В профильных общеобразовательных учреждениях подразумевается овладение содержанием предметов на разных уровнях: уровень стандарта, академический уровень, уровень профильной подготовки [1]. К сожалению, на пути введения профильного образования Украина столкнулась с рядом проблем, связанных с финансовым, кадровым, учебно-методическим, нормативно-правовым и организационным обеспечением. Концепция профилизации старшей школы может успешно вводиться только при условии учета реальных возможностей ресурсного обеспечения профильного образования, результатов широкого экспериментального тестирования содержания и технологий профилизации старшей школы, разработки учебно-методических комплектов.

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ОСОБЕННОСТИ ДЕЙСТВИЯ БЕНЗОЙНОЙ И САЛИЦИЛОВОЙ КИСЛОТ В СОСТАВЕ ИНСЕКТО-ФУНГИЦИДНЫХ КОМПОЗИЦИЙ

НА РОСТ ПРОРОСТКОВ ОЗИМОГО РАПСА

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Анализ литературных данных позволяет рассматривать салициловую кислоту как перспективный компонент в защитно-стимулирующих составах для практического применения с целью защиты растений от широкого спектра совместно действующих неблагоприятных факторов. Отработаны концентрации бензойной кислоты и ее производных — салициловой, мета-оксибензойной, пара-оксибензойной и пара-аминобензойной кислот и изучено их влияние на посевные качества семян озимого рапса и физиологическое состояние формирующихся из них на 7-12 день проростков с целью включения в защитно-стимулирующие композиции.

Установлено, что для данных кислот максимальная концентрация, которая не снижает всхожесть семян, не ингибирует энергию прорастания и дальнейший рост проростков — 2 М (2441; 2762; 2762 и 2743 г/т семян соответственно), в то время как для салициловой кислоты на два порядка ниже — 10^{-2} М (13,8 г/т семян). Изучены особенности действия защитно-стимулирующих составов, включающих аналог эталона ТМТД (тирам (75%-ная доза)), инсектицид-протравитель имидаклоприд и бензойную или мета-оксибензойную, пара-оксибензойную, пара-аминобензойную, салициловую кислоты в разных концентрациях.

По сравнению с эталоном ТМТД рост проростков стимулировали инсекто-фунгицидные составы с бензойной и салициловой кислотой (2441 и 13,8 г/т семян соответственно). Наилучшим оказался состав тирам (75%-ная доза) + имидаклоприд + бензойная кислота, который на 7-12-й день увеличивал массу корня на 21,6-7,7%, а на 12-й день – длину гипокотилия на 10,8% и массу семядолей на 27,9%. Состав тирам (75%-ная доза) + имидаклоприд + салициловая кислота на 7-й день увеличивал длину корня на 8,1% и его массу на 13,5%, а на 12-й день – массу семядолей на 23,0%.

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ВЛИЯНИЕ ИНКРУСТАЦИИ СЕМЯН ЗАЩИТНО- СТИМУЛИРУЮЩИМИ СОСТАВАМИ НА УРОЖАЙНОСТЬ ОЗИМОГО РАПСА

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В полевых опытах 2011-2012 гг. исследованы особенности действия разработанных защитно-стимулирующих составов для инкрустации семян озимого рапса сорта «Лидер», включающих аналог зарегистрированного фунгицида-протравителя с торговой маркой ТМТД (тирам (75%-ная доза)), инсектицид имидаклоприд и смесь брассиностероидов (БС) — эпибрассинолид + гомобрассинолид (ЭБ + ГБ, 20 мг/т семян) или бензойную кислоту (2441 г/т) или салициловую кислоту (13,8 г/т), на морфофизиологические параметры растений, их устойчивость и продуктивность.

По сравнению с ТМТД при использовании состава тирам (75%-ная доза) + имидаклоприд + ЭБ + ГБ (20 мг/т семян) достоверно увеличилась полевая всхожесть семян на 2,4%, до ухода в зиму высота растений существенно не изменилась, но их масса увеличилась на 73,6%, диаметр корневой шейки — на 25,9% (6,76 мм), сумма водорастворимых углеводов — на 9,3% за счет как моносахаров, так и сахарозы, количество хлорофиллов а + b — более чем в 2 раза за счет хлорофиллов а и b (при этом их соотношение а/b приблизилось к оптимальному значению 2,69) и не изменилось существенно количество каротиноидов. Зимостойкость растений увеличилась на 11,2%. Урожайность растений увеличилась на 30,0% (8,9 ц/га), количества стручков на растении — на 11,4%, количества семян на растении — на 12,0%.

При использовании состава тирам (75%-ная доза) + имидаклоприд + бензойная кислота (2441 г/т) перезимовало на 10,0% больше растений, однако весной их масса значительно снизилась, урожайность растений уменьшилась на 6,0% (1,8 ц/га) на фоне повышения густоты стояния растений на 6,7% за счет уменьшения количества стручков на растении — на 6,5%. При использовании состава тирам (75%-ная доза) + имидаклоприд + салициловая кислота (в концентрации на два порядка ниже по сравнению с бензойной кислотой — 13,8 г/т) не изменилась полевая всхожесть семян, а также высота растений до ухода в зиму, однако увеличилась их масса на 48,2%, диаметр корневой шейки — примерно на 26,6% (6,8 мм) и количество хлорофиллов а + b — в 1,8 раза за счет хлорофилла а. Зимостойкость растений увеличилась на 9,8%. Урожайность растений увеличилась на 11,8% (3,5 ц/га) за счет увеличения количества сохранившихся растений на 4,3%, количества стручков на растении — на 9,3%, количества семян на растении — на 6,0%.

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РАЗВИТИЕ СПОРТА В БАРАНОВИЧАХ

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Город Барановичи с момента своего основания был известным спортивным движением. Поселение вблизи двух железнодорожных станций было известно своими военными лагерями. Военный спорт из Баранович был известен и в Российской империи, и в Польском государстве, и в СССР. В поселении регулярно проводились локальные и международные соревнования. Активное развитие спорта характерно было для периода 1950-2000 годов. В настоящее время спорт стал неотъемлемым элементом городской жизни Баранович. Для занятий физкультурой и спортом к услугам горожан в настоящее время стадион, 4 закрытых и 4 мини-бассейна, 54 спортивных зала, 12 спортивных клубов, 23 стрелковых тира. Построен Ледовый дворец, который стал базой хоккейной команды «Барановичи» и секций по фигурному катанию, гимнастике, настольному теннису. В городских детско-юношеских спортивных школах занимается более 5 тысяч человек. «Взрослый» спорт высоких достижений представлен женским волейбольным клубом «Атлант-БарГУ», женским клубом по хоккею на траве «Текстильщик-БарГУ», футбольным клубом «Барановичи». На национальном и международном уровне известны достижения воспитанников БФСО «Динамо» по самбо, карате, дзюдо.

Спортивные Барановичи дали миру и олимпийцев. На Олимпийских играх в Атланте в 1996 году город представляли три олимпийца (Наталья Сазанович, легкая атлетика, Андрей Кан, спортивная гимнастика, Светлана Жидко, плавание). На олимпиаде в Сиднее в 2000 г. — Наталья Сазанович (бронза в семиборье), в Афинах в 2004 — четыре олимпийца: Оксана Драгун (легкая атлетика), Анна Щерба (плавание), Мария Щерба (плавание), Наталья Сазанович (семиборье), в Пекине в 2008 году — три олимпийца: Оксана Драгун (плавание), Ольга Осташко (плавание), Юрий Долгополов (малокалиберный и пневматический пистолет).

В городе открыт филиал Брестского училища олимпийского резерва, что позволяет готовить тренеров по различным видам спорта. Двенадцати тренерам города присвоено высокое звание «Заслуженный тренер Республики Беларусь». За последние три года подготовлены 3 мастера спорта международного класса, 59 мастеров спорта и 146 кандидатов в мастера. Уже в этом году 81 воспитанник местных спортшкол входит в состав различных национальных сборных страны.

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ДУХОВНО-НРАВСТВЕННОЕ ВОСПИТАНИЕ ЛИЧНОСТИ

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Данная статья посвящена аспектам духовно-нравственного развития личности, а также основным проблемам воспитания положительных духовно-нравственных качеств у ребенка. Основные теоретические положения духовно-нравственного воспитания личности рассматривали Е. Белоусова, Г.Дудкина и Е. Тамонова.

Духовно-нравственное воспитание способствует развитию личности, приносящей пользу обществу и способной результативно взаимодействовать с ним. Оно включает в себя три составляющие: педагогическую, социальную и духовную. Педагогический компонент — это взаимодействие воспитателя и воспитанника с целью формирования духовно и нравственно развитой личности путем восполнения недостатков. Социальный компонент — это те социально-биологические условия, которые влияют на воспитанника и преподносят ему образцы определенных этических норм поведения. Духовный компонент — это сохранение и развитие духовного потенциала воспитанника. Сферы влияния на ребенка: школьная, семейная, сфера ровесников и социум — на определенных этапах развития человека могут конфликтовать между собой, требуя от воспитанника достижения двух противоположно направленных целей. Поэтому возникает явление девальвации культурных ценностей. Решить эту проблему можно объединением усилий влияния двух или нескольких воспитательных сфер или появлением в сфере, где находится личностный недостаток, качеств лидера, у которого этот недостаток не нуждается в восполнении.

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ФИЗИОЛОГИЧЕСКИЙ СТАТУС СУТОЧНЫХ ЦЫПЛЯТ-БРОЙЛЕРОВ КРОССА РОСС-308

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Имеющиеся в литературных источниках сведения по основным физиологическим параметрам птиц часто бывают противоречивыми и требуют дальнейшего изучения. Наиболее актуальными являются вопросы, связанные с исследованием показателей естественной резистентности птиц при разных технологиях выращивания. Целью данной работы явилось изучение физиологического статуса суточных цыплят-бройлеров кросса РОСС-308 на основании исследования гематологических показателей и неспецифических гуморальных факторов защиты. Исследования проводились в Республике Беларусь в РУП «Птицефабрика Городок».

При подсчете эритроцитов было установлено, что их количество у исследуемых птиц составило $1,91 \pm 0,05 \times 10^{12}/л$. Содержание гемоглобина в эритроцитах исследуемых цыплят варьировало и в среднем составило $83,4 \pm 2,48$ г/л. Анализируя данные показатели, следует отметить относительно низкое их значение, что, возможно, является возрастной особенностью птиц. Количество лейкоцитов у исследуемых цыплят было в пределах от $34 \times 10^9/л$ — $40 \times 10^9/л$ и в среднем составило $36,4 \pm 1,16 \times 10^9/л$. Содержание тромбоцитов изменялось от $32 \times 10^9/л$ до $38 \times 10^9/л$, при среднем показателе $34 \pm 1,4 \times 10^9/л$. Лизоцимная активность сыворотки крови находилась в пределах 1,0%–2,6%. Среднее значение данного показателя в исследуемой группе цыплят находилось на уровне $2,06 \pm 0,29\%$. Уровень бактерицидной активности сыворотки крови у исследуемых птиц варьировал в пределах 17%–24% со средним значением $20 \pm 1,14\%$.

Таким образом, физиологический статус суточных цыплят кросса РОСС-308 характеризуется относительно высоким содержанием в крови лейкоцитов и тромбоцитов относительно литературных данных по данному виду птиц, которые обеспечивают защиту организма от неблагоприятных факторов внешней среды.

Содержание таких форменных элементов, как эритроциты, находятся на нижних границах физиологической нормы. Концентрация гемоглобина в них также невелика.

Относительно невысок и уровень лизоцимной активности сыворотки крови. В этот период жизни защита организма цыплят обеспечивается за счет других гуморальных факторов, которые составляют суммарную бактерицидную активность крови.

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ВЛИЯНИЕ ИНКРУСТАЦИИ СЕМЯН ИНСЕКТО- ФУНГИЦИДНЫМИ СОСТАВАМИ НА УРОЖАЙНОСТЬ ОЗИМОГО РАПСА

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В полевых опытах 2011-2012 гг. исследованы особенности действия разработанных в ГНУ «Институт экспериментальной ботаники им. В.Ф.Купревича НАН Беларуси» защитных составов для инкрустации семян озимого рапса сорта «Лидер», включающих аналог зарегистрированного фунгицида-протравителя с торговой маркой ТМТД (тирам (75%-ная доза)) и инсектицид имидаклоприд.

В контрольном варианте полевая всхожесть семян составила 75,7% (75,7 шт./м²); отмечено слабое поражение растений пероноспорозом и альтернариозом; численность крестоцветных блошек (1-3 шт. на 1 м²) не превышала экономический порог вредоносности; рапсовым пилильщиком было заселено 7-25% (средняя 11%), процент поврежденных растений составил 1-10% с численностью 0,01-4,0 ложногусениц на растение; перезимовало 71,6% растений от сохранившихся осенью; общая выживаемость растений составила 50,7%; биологическая урожайность растений — 24,8 ц/га. ТМТД увеличил полевую всхожесть семян на 7,6% (вероятно, это связано с защитой семян от плесневения); перед уходом в зиму растения существенно не отличались по высоте от контроля, но их масса была ниже на 10,0%, при этом сумма сахаров снизилась примерно на 10,0% за счет моносахаров; сумма хлорофиллов $a + b$ — в 2 раза в большей степени за счет хлорофилла a (при этом соотношение хлорофиллов a/b уменьшилось с 2,18 до 1,68); количество каротиноидов — почти в 1,5 раза; весной процент перезимовавших растений достоверно не отличался от контрольного варианта, общая выживаемость увеличилась на 6,6%.

Эффективность использования соединения инсектицидного действия имидаклоприд совместно с фунгицидом тирам не выявлена, т.к. численность крестоцветных блошек не превышала экономический порог вредоносности.

Анализ продуктивности растений показал, что применение ТМТД и аналога, включающего тирам в сниженной на 25% к рекомендованной дозе и имидаклоприд, способствовало повышению урожайности рапса на 4,9 и 5,5 ц/га за счет увеличения густоты стояния растений и количества стручков на растении на 4,3 и 3,0% соответственно.

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ПЕРСПЕКТИВЫ ИСПОЛЬЗОВАНИЯ ПРОФИЛАКТИЧЕСКОЙ СОЛИ И АНТИГИПЕРТЕНЗИВНЫХ ТРАВ В ТЕХНОЛОГИИ РЫБНЫХ ПРЕСЕРВОВ

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По данным Всемирной Организации Здравоохранения (ВОЗ) повышенное артериальное давление наблюдается у 35-40% лиц старше 40 лет. Данное обстоятельство обуславливает актуальность разработки новых пищевых продуктов, предназначенных для профилактики этого заболевания на принципах обогащения традиционных изделий функциональными компонентами.

Разработана технология рыбных пресервов из кильки с заменой в рецептуре соли пищевой поваренной на соль пищевую профилактическую и с добавлением при посоле настоев гипотензивных растений (омелы белой, аронии черноплодной, боярышника, мелиссы лекарственной, хвоща полевого, брусники). Мясо кильки в своем составе содержит незаменимые и заменимые аминокислоты, полиненасыщенные жирные кислоты, витамины, микро- и макроэлементы. Все травы содержат ценные биологически активные вещества, витамины, микроэлементы и алкалоиды, обуславливающие гипотензивный эффект добавок. Настои названных трав успокаивают нервную систему, снижают артериальное давление, положительно влияют на деятельность сердца, расширяют сосуды, обладают тонизирующим и общеукрепляющим свойствами. Профилактическая соль также обладает антигипертензивным действием и имеет улучшенные органолептические свойства. Отсутствие в технологии пресервов термообработки обеспечивает сохранность всех полезных веществ готового продукта, а природные антиоксиданты настоев лекарственных растений позволяют продлить срок годности пресервов без использования консервантов и при пониженном содержании хлорида натрия.

Обоснованы операции и режимы пресервов, позволяющие получить продукт повышенной биологической ценности с антигипертензивными свойствами.

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ГНЕЗДА ПТИЦ КАК МЕСТА ОБИТАНИЯ ЖЕСТКОКРЫЛЫХ ПОДСЕМЕЙСТВА *SAPRININAE* (HISTERIDAE) В БЕЛАРУСИ

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В настоящее время на территории Беларуси отмечено 19 видов жесткокрылых подсемейства *Saprininae* Lacordaire, 1854 (Histeridae, Coleoptera) [1, 2, 3]. Виды подсемейства относятся к различным экологическим группам: некробионтам, нидиколам, копробионтам и мирмекофилам. Однако, несмотря на относительную биотопическую разнородность, все жесткокрылые подсемейства являются активными хищниками (зоофаги) и выступают регуляторами численности имаго и личинок других насекомых, в том числе и паразитов.

Сбор жесткокрылых-нидиолов проводился с использованием стандартных методов (просеивание гнездового материала на почвенное сито, ручной метод сбора жуков и использование термоэлектратора), в отдельных случаях гнездовой материал промывался в бассейне диаметром 1,2 м.

Жуки подсемейства *Saprininae* присутствовали в гнездах 32 видов птиц (из обследованных гнезд 120 видов). В результате проведенных исследований в гнездах птиц на территории Беларуси было отмечено 7 видов (421 экземпляр) жесткокрылых принадлежащих подсемейству *Saprininae*: *Saprinus rugifer* (Paykull, 1809); *S. semistriatus* (Scriba, 1790); *Gnathoncus rotundatus* (Kugelann, 1792); *G. nannetensis* (Marseul, 1862); *G. communis* (Marseul, 1862); *G. buyssoni* Auzat, 1917; *G. nidorum* Stockmann, 1957. Установлено, что наибольшее число видов (6) жуков было зафиксировано в гнездах, расположенных над землей в укрытиях. Несколько меньшее число видов (по 5) – в гнездах открытого типа, расположенных над землей или над водой, и гнездах, расположенных в строениях человека. В гнездах птиц, расположенных на земле в укрытиях, выявлено обитание трех видов *Saprininae*.

Наибольшая встречаемость (35,9%) среди всех жесткокрылых подсемейства отмечена для *G. buyssoni* в гнездах, расположенных над землей в укрытиях, что указывает на высокую привязанность данного вида к этому типу гнезд.

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ОБ ЭФФЕКТИВНОСТИ ЭМОЦИОНАЛЬНО-СМЫСЛОВОГО МЕТОДА ИЗУЧЕНИЯ РУССКОГО ЯЗЫКА КАК ИНОСТРАННОГО

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Вопросы об эффективности того или иного интенсивного метода в процессе преподавания русского языка как иностранного актуальны. Анализ и изучение различной методической литературы по данному вопросу показал, что эмоционально-смысловой метод изучения русского языка как иностранного раскрыт не достаточно широко в методической литературе по методике преподавания русского языка как иностранного.

Сторонники классической методики считают, что в основе обучения русскому языку как иностранному лежит объяснение и заучивание его структуры. Это значит, объясняясь на неродном языке, слушатель как бы должен знать, какими грамматическими категориями он владеет, из каких элементов строит свою речь и каковы их функции.

В отношении этого позиция И.Ю. Шехтера совершенно противоположна. Много тысячелетий назад не было письменности, не существовало и самого понятия грамматики, но люди говорили. У некоторых народностей вообще отсутствовала письменность. Но ведь неграмотные люди, умеют говорить. Люди потому и люди, что могут говорить, не зная структуры языка.

Язык описывается, изучается, устанавливает его закономерности, определяются его литературные нормы. Но все это вторично. Язык не может быть превращен в свод правил, употребление которых достигает автоматизма. Главная его задача — объединять людей через разговорную речь, через обмен информацией, устной и письменной.

К языку нужно относиться не как к средству общения, а как к средству общения для решения жизненных задач. Тогда человек сможет говорить свободно, со смыслом. Существует немало методик обучения русскому языку как иностранному (суггестия, гипноз, погружение, ролевые игры и т.д.), но они направлены в первую очередь на то, чтобы человек им овладел, изучив сначала грамматику, фонетику, словари. В итоге не получается отойти от традиции и все опять сводится к заучиванию. Но есть другой путь — путь развития. Из этого и исходит эмоционально-смысловой метод И.Ю.Шехтера. В противоположность всем остальным методам он обращен на то, что надо делать с человеком, чтобы тот овладел чужим языком. Метод Шехтера не имеет аналогов. Его главное отличие — направленность на развитие живой речи.

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БИОДОБАВКИ ДЛЯ СПОРТИВНОГО ПИТАНИЯ НА ОСНОВЕ МИДИЙНОГО ГИДРОЛИЗАТА И ПЧЕЛИНОЙ ПЫЛЬЦЫ

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Целью работы является обоснование состава и технологии биодобавки для спортивного питания, в состав которой входят ценные компоненты двустворчатых моллюсков мидий и продуктов пчеловодства (перга или цветочная пыльца), необходимые спортсменам.

С учетом качественных и количественных затрат спортсменов предложена рецептура биодобавки, названной «Биомидилин», представляющей собой желатиновые капсулы, наполненные мидийным гидролизатом с растворенной в нем пчелиной пыльцой. Разработанная технология включает следующие операции: прием мидий и пыльцы пчелиной; размораживание мидий и их мойка; ферментативный гидролиз мидий с применением фермента протосубтилин ГЗх в течение 20-30 мин; отделение ферментативного гидролизата от створок; прогрев гидролизата при 90⁰С; упаривание гидролизата; гидролиз раствора соляной кислотой; донейтрализация смеси раствором NaOH; созревание смеси; фильтрование и смешивание гидролизата с пчелиной пыльцой; капсулирование композиции в желатиновую оболочку; выдержка капсул при температуре воздуха 5-10⁰С; отжим капсул от растительного масла, их сушка при 20-30⁰С; мойка и фасование капсул; маркирование; хранение при температуре не выше плюс 18⁰С (до двух лет).

Высокая биологическая ценность биодобавки «Биомидилин» обусловлена присутствием в ней ценных биологически активных веществ (БАВ) исходного сырья [1]: белки, углеводы, липиды, нуклеиновые и жирные кислоты, эссенциальные аминокислоты, микроэлементы (марганец, цинк, кобальт, йод, медь), витамины (В₂, В₆, В₁₂, РР, D и E), флавоноиды и другие БАВ, способствующие правильному функционированию основных биологических процессов спортсмена при высоких физических и эмоциональных нагрузках. Функциональность новой биодобавки обусловлена повышенным количеством валина, лейцина и изолейцина, которые необходимы спортсменам, занимающимся «мышечными» видами спорта. С учетом содержания данных аминокислот разработаны рекомендации по применению биодобавки в питании спортсменов [2].

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РАЗВИТИЕ ГИДРОЭНЕРГЕТИКИ В БЕЛАРУСИ

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Потенциальные гидроэнергетические ресурсы Республики Беларусь обусловлены расположением в середине ее равнинной территории водораздела между бассейнами Балтийского и Черного морей. Вытекающие отсюда реки не могут достигнуть значительной мощности прежде, чем оставляют ее границы. Это предопределяет строительство в республике главным образом малых гидроэлектростанций. В настоящее время экономический гидроэнергетический потенциал в Беларуси составляет 1,3 млрд. кВт-ч/год, или 325 МВт общей установленной мощности возможных ГЭС. Как источники энергии реки в Беларуси использовали издавна посредством сооружения многочисленных водяных мельниц, для которых возводились плотины простейшего типа с небольшим подпором воды — до 2-3 м. В послевоенные годы средняя мощность строившихся ГЭС из года в год увеличивалась. В настоящее время в Республике Беларусь действует два десятка малых ГЭС, большая часть из которых восстановлена, начиная с 1992 года, из числа ранее заброшенных.

Исходя из прошлого опыта строительства сельских гидроэлектростанций в Беларуси целесообразно вернуться к созданию на малых водотоках микроГЭС (мощностью менее 100 кВт) для локального электроснабжения ближайших населенных пунктов. На небольших водотоках возможно создание таких установок, экономическая эффективность которых может быть обеспечена на основе применения современных типов гидросилового оборудования и рациональных конструкций гидросооружений.

По Программе строительства и восстановления объектов гидроэнергетики на период до 2020 г. предусмотрено строительство ГЭС на основных реках Беларуси общей установленной мощностью 200 МВт и ряд малых ГЭС на их притоках мощностью каждой не менее 100 кВт с удельными затратами не более 2000 долл./кВт. Разработаны архитектурные проекты первых двух ГЭС средней мощности на Западной Двине и Немане — Полоцкой (28 МВт) и Гродненской (17 МВт). Начато строительство ГЭС на Немане. Реализация принятой Программы развития гидроэнергетики будет способствовать более благоприятному режиму работы Белорусской энергосистемы, уменьшению зависимости республики от импорта топлива.

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ГЕОХИМИЧЕСКАЯ ХАРАКТЕРИСТИКА ПОЧВ ГОРОДА БАРАНОВИЧИ

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Оценка содержания химических элементов в почвах проводилась на территории города Барановичи (Беларусь). Фактическим материалом работы послужили результаты приближенно-количественного спектрального анализа проб почв, отобранных в 2012 г. Для геохимического анализа отбиралась проба массой около 200 г. из гумусового горизонта почвы. Геохимический анализ кернов почв был произведён в аналитической лаборатории ОАО «Магадангеология» г. Магадан.

Анализ данных показал, что содержание W, V, Sn, Sr, Bi, Mn, Ba, Be, P, Mo, Sn, Ag, Cd, Li, Y, Yb не превышает допустимые нормы. Превышение ПДК получено по Pb, Cr, Cu и Zn.

Повышенная концентрация свинца, превышающая или близкая к уровню ПДК (6,0 мг/кг), выявлена в большинстве проб. Среднее содержание свинца Pb в почвах на территории города Барановичи — 7,6 мг/кг. Содержание хрома Cr превышает ПДК в 6,5 раз. Средний показатель меди Cu превысил допустимую норму (3 мг/кг) в почвах городов Барановичи (4,4 мг/кг). Среднее содержание цинка Zn не превышает ПДК (23 мг/кг), однако в отдельных пробах наблюдаются значительные количества, что является свидетельством его техногенного происхождения. Среднее содержание Zn в почвах Баранович — 16,8 мг/кг.

Таким образом, геохимическое изучение почв Барановичи выявило следующую ожидаемую тенденцию — загрязняющими элементами почв являются лишь тяжелые металлы. Эти элементы вместе с их соединениями характеризуются высокой токсичностью, многие из них — также способностью к накоплению в живых организмах. Они широко применяются в различных промышленных производствах городов, поэтому, несмотря на природоохранные мероприятия, содержание соединения тяжелых металлов в почвах довольно высокое. Содержание микроэлементов в почвах городов, в основном, находится в рамках норм, определенных ПДК.

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ТАКСОНОМИЧЕСКИЙ СОСТАВ ПТИЦ-ЗООФАГОВ ФАУНЫ БЕЛАРУСИ

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Зоофагия — межвидовые отношения, при которых один вид организмов живет за счет другого вида, убивая и используя его в пищу [1]. Птицы-зоофаги — птицы, питающиеся животными других или своих видов (каннибализм). Для хозяйственной деятельности человека, птицы-зоофаги играют как положительную, так и отрицательную роль. Положительная роль заключается в истреблении вредных для сельского и лесного хозяйства животных, например насекомых и мышевидных грызунов; отрицательная роль — в нанесении некоторыми видами птиц незначительного (из-за своей малой численности) ущерба промысловым животным и рыболовным хозяйствам.

Основываясь на литературных данных и собственных наблюдений, нами были выделены следующие трофические группы птиц: 1. зоофаги (плотоядные); 2. фитофаги (растительные); 3. полифаги (со смешанным типом питания). В литературе, можно встретить разделение птиц на бентофагов, энтомофагов, ихтиофагов и других [2], без выделения самостоятельной группы зоофаги, что на наш взгляд не совсем корректно исходя из самого определения термина зоофаг. Вышеприведенные трофические группы необходимо рассматривать как составляющие зоофагов, а не как самостоятельные группы.

Согласно собственным наблюдениям и литературным данным, на территории Беларуси отмечен 181 вид птиц-зоофагов, относящихся к 16 отрядам и 42 семействам. Наибольшим количеством видов представлены отряды ржанкообразные (*Charadriiformes*) — 52 вида и воробьинообразные (*Passeriformes*) — 41 вид, что составляет 28,7 % и 22,7 % (от общего числа птиц-зоофагов Беларуси, соответственно).

Таким образом, среди птиц-зоофагов Республики Беларусь наибольшим разнообразием отличается отряд ржанкообразные (*Charadriiformes*), который включает в себя 9 семейств и 52 вида, и представлен главным образом водно-болотными птицами.

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ПЕРСПЕКТИВЫ ПРОИЗВОДСТВА ФУНКЦИОНАЛЬНЫХ ДЖЕМОВ ИЗ ВОДРОСЛЕЙ

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Согласно статистике ВОЗ, более 2 млрд. человек проживают в условиях йодного дефицита. Одним из методов профилактики заболеваний щитовидной железы является употребление богатых йодом продуктов. Морские водоросли являются прекрасным источником данного микроэлемента. Для этих целей учеными ВНИРО была разработана рецептура джема из ламинарии с добавлением селена и хрома. Данная рецептура была взята за основу при разработке новой композиции на основе ламинарии с добавлением дикорастущих и других растений региона.

Исходя из ресурсной базы Калининградской области, целесообразно использование корней *Arctium lappa* (лопух большой) в технологии функционального джема, в состав которого входят инулин (45% от общего количества углеводов), сесквитерпены, пиразины, фенолкарбоновые кислоты, танины, байкалин, витамин С (23 мг%). Инулин в процессе термообработки гидролизует до фруктозы, что обуславливает сладость композиционного состава джема без добавления сахарного сиропа. Также целесообразно внесение в состав джема *Helianthus tuberosus* (топинамбур), который содержит 14-19% инулина (в пересчете на сухое вещество). Внесение его в виде пюре в состав джема значительно повышает пищевые характеристики готового продукта. Приготовление джема по рецептуре, сочетающей выше перечисленные компоненты с ламинарией, обеспечивает создание функционального продукта пониженной калорийности, предназначенного для диетического питания людей, больных сахарным диабетом. Данный продукт обеспечивает необходимый уровень потребления йода при употреблении 20 г.

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СОКОСОДЕРЖАЩИЕ НАПИТКИ НА ОСНОВЕ ТВОРОЖНОЙ СЫВОРОТКИ

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Создание безотходных технологий переработки молока позволит увеличить объёмы производства продуктов питания, а также сократить сбросы в окружающую среду [1]. Творожная сыворотка — побочный продукт переработки молока, получаемый при производстве творога. Сыворотка содержит жизненно важные белки, минеральные соединения и витамины. Лактоза сыворотки в связи с замедленным, в сравнении с другими углеводами, гидролизом в кишечнике ограничивает процессы брожения и нормализует жизнедеятельность микрофлоры. Сывороточные белки оптимально сбалансированы по аминокислотному составу. В сыворотке содержится меньше жира, чем в цельном молоке, что позволяет применять её в целях предупреждения развития избыточной массы тела. Во многих странах большой популярностью пользуются напитки с использованием сыворотки. В зависимости от вида выпускаемых напитков, используют осветлённую и натуральную сыворотку, а также сгущённые или сухие концентраты. Большую биологическую ценность представляют напитки на основе натуральной сыворотки. Для производства этих напитков могут применяться соки фруктовые (яблочный, грейпфрутовый, апельсиновый) и овощные (свекольный, огуречный), экстракты трав (хвощ полевой, пустырник, мята) и растений (боярышник, цветки гибискуса) [2]. Введение полисахаридов (пектин, хитозан) тоже положительно влияет на структурно-механические свойства напитков. Биополимеры оказывают антиокислительное и бактерицидное действие, что позволяет увеличить сроки хранения напитков. Соки и экстракты улучшают органолептические характеристики напитков из творожной сыворотки, обогащают их макро- и микроэлементами, витаминами, усвояемыми белками и углеводами [1]. Следовательно, творожная сыворотка является важным и перспективным сырьём для производства сокосодержащих напитков функционального назначения.

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РАМСАРСКИЕ УГОДЬЯ РЕСПУБЛИКИ БЕЛАРУСЬ КАК МЕСТА КОНЦЕНТРАЦИИ РЕДКИХ И ОХРАНЯЕМЫХ ВИДОВ ПТИЦ

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Рамсарские угодья — это водно-болотные территории, имеющие международное значение как места обитания водоплавающих и околоводных птиц. Водно-болотные угодья Беларуси охраняются согласно Рамсарской конвенции с 1999 года.

Первой Рамсарской территорией в Беларуси стал заказник «Споровский». В настоящее время в Республике имеется 9 Рамсарских угодий. Из них в Брестской области расположены «Простырь», крупнейшие в Европе низинные болота «Споровский» и «Званец», комплекс переходных и низинных болот Полесской низменности «Ольманские болота», а также сложный комплекс болот и лесов в пойме реки Припять — «Средняя Припять»; в Витебской области — «Березинский биосферный заповедник», крупные и типичные верховые болота Белорусского Поозерья «Ельня» и «Освейский» и в Гродненской области — «Котра» [1].

Общая площадь Рамсарских угодий составляет 366 561 га. На данных территориях произрастает ряд редких растений, обитает большое число редких и охраняемых видов животных, имеющих охранный статус не только в Беларуси, но и в Европе. В частности, на территории Рамсарских угодий гнездится около 65 видов птиц [2], занесенных в Красную книгу Беларуси, таких как большой подорлик (*Aquila clanga*), коростель (*Crex crex*), дупель (*Gallinago media*), вертлявая камышевка (*Acrocephalus paludicola*), черный аист (*Ciconia nigra*), болотная сова (*Asio flammeus*) и др. Кроме того, данные территории являются важным местом концентрации птиц (гуменник (*Anser fabalis*), серый журавль (*Grus grus*) и др.) в период сезонных миграций.

Сохранение в естественном состоянии и расширение сети Рамсарских территорий в Беларуси позволят сохранять популяции не только водоплавающих и околоводных птиц, но другие редкие и охраняемые виды флоры и фауны.

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ЭКОЛОГИЧЕСКАЯ ОЦЕНКА РАСТИТЕЛЬНОСТИ ЛЕСНОГО МАССИВА РАФ В ГОРОДЕ ЕЛГАВА

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В мире резко возрос интерес к городским лесам, учитывая их неопределимую роль в обеспечении экологических функций и благоприятной среды обитания. Процесс урбанизации создает дополнительную нагрузку на городские леса. Наиболее актуальной проблемой городской среды является сохранение лесной экосистемы и устойчивое управление лесами [1]. Отсутствие знаний о городской лесной растительности приводит к несоответствующему управлению городскими лесами, вызывая уменьшение видов характерных лесной среде. Для обеспечения экологических, экономических и социальных функций городских лесов, и для предотвращения уменьшения характерной лесной растительности, необходимо их исследовать и разработать соответствующие принципы лесного хозяйства.

В лесном массиве РАФ, находящемся в городе Елгава, наиболее распространёнными видами растений являются сосна обыкновенная (*Pinus sylvestris* L.) и чувствительный к вытаптыванию плевроциум Шребера (*Pleurozium schreberi* (Brid.) Mitt.) (встречаемость 97%; показатель постоянства V). В городских лесах плевроциум Шребера (*Pleurozium schreberi*) и черника (*Vaccinium myrtillus* L.) встречаются реже, и их проективное покрытие меньше, чем в сельских лесах [2]. В Елгаве наибольшую часть проективного покрытия лесов составляют широколиственные леса [3]. В массиве РАФ доминируют виды хвойных лесов, составляющие наибольшую долю проективного покрытия (67%).

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ЭСТЕТИЧЕСКОЕ ВОСПИТАНИЕ ШКОЛЬНИКОВ НА УРОКАХ ЛИТЕРАТУРЫ

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Ведущей целью современного образования является формирование всесторонне развитой личности. В этом процессе велика роль эстетического воспитания. Эстетика входит во все сферы деятельности, она формирует в человеке творческое начало и способность воспринимать красоту, ценить и понимать искусство. Искусство способствует развитию сознания и чувств личности, ее взглядов и убеждений.

Среди всех предметов школьного преподавания формировать правильные эстетические и художественные вкусы в первую очередь призвана литература. Через литературу познается прошлое, жизнь, устои, традиции собственного народа и народов всего мира. Большое место в содержании эстетического воспитания занимает формирование у школьников художественного вкуса, связанного с восприятием и переживанием прекрасного, что невозможно без приобщения к художественному творчеству.

Очень важно обогащать школьников представлениями о художественных средствах передачи настроения человека, которые используются в литературе. Для развития эстетических взглядов школьникам предлагается написание сочинений, отзывов на прочитанные литературные произведения. Необходимо задействовать детей в различных формах внеклассной работы: участии в творческих конкурсах, кружках, олимпиадах по литературе. Художественная литература помогает формировать лучшие нравственные качества в человеке.

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ТВОРЧЕСТВО КАК СПОСОБ РАЗВИТИЯ ЛИЧНОСТИ

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Творчество является атрибутом человеческой деятельности, высшей формой активности и самостоятельной деятельности человека и общества. Оно содержит элемент нового, предполагает оригинальную деятельность.

Творчество — процесс деятельности, создающий качественно новые материальные и духовные ценности или итог создания объективно нового. Основным критерий, отличающий творчество от изготовления (производства) — уникальность его результата [3].

В основе творчества лежит принцип деятельности. Процесс практического преобразования человеком окружающего мира обуславливает и формирование самого человека. В процессе творчества автор вкладывает в материал несводимые к трудовым операциям или логическому выводу возможности, выражает в конечном результате аспекты своей личности. Именно этот факт придаёт продуктам творчества дополнительную ценность. Творчество играет важную роль в профессионализме педагога, но в педагогике так же существует определение «педагогического творчества». Педагогическое творчество — оригинальный и высокоэффективный поход учителя к учебно-воспитательным задачам, обогащению теории и практики воспитания и обучения [1]. Первой предпосылкой педагогического творчества является научная эрудиция. Второй — практическая деятельность учебно-воспитательного характера. Успех такой деятельности зависит от догадок, находок, выводов на основе собственных наблюдений учителя [2].

Творчество является неотъемлемой частью деятельности человека и педагогического процесса. Творчество проявляется не только в деятельности учеников, а и в деятельности учителя. Причем именно творчество учителя играет более важную роль, поэтому именно от творческого труда учителя зависит творческое развитие его учеников.

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ИССЛЕДОВАТЕЛЬСКОЕ ПОВЕДЕНИЕ МЛАДШИХ ШКОЛЬНИКОВ

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Исследовательское поведение — один из важнейших источников получения ребенком представлений о мире; под ним понимается подход к обучению, построенный на основе естественного стремления ребенка к самостоятельному изучению окружающего мира. Его главная цель — формирование способности самостоятельно, творчески осваивать и перестраивать новые способы деятельности в любой сфере человеческой культуры.

В начальной школе уже много лет продолжается противодействие традиционного и исследовательского обучения. По-прежнему традиционное обучение строится не на методах самостоятельного, творческого исследовательского поиска, а на репродуктивной деятельности, направленной на усвоение уже готовых, кем-то добытых истин. Благодаря этому обучению у ребенка в значительной мере утрачивается главная черта исследовательского поведения — поисковая активность. Итогом становится потеря любознательности, способности самостоятельно мыслить, делая в итоге практически невозможными процессы самообучения, самовоспитания, саморазвития. Именно поэтому подготовка ребенка к исследовательской деятельности, обучение его умениям и навыкам исследовательского поиска становится важнейшей задачей образования и современного учителя.

Нами была поставлена задача — выявление условий организации исследовательской деятельности младших школьников.

В ходе педагогического эксперимента было установлено, что исследовательская деятельность младших школьников будет успешной при соблюдении следующих педагогических условий: 1) ознакомление младших школьников с содержанием и техникой выполнения исследований; 2) формирование у учащихся умений самостоятельной работы; 3) формирование умений самоконтроля; 4) развитие творческих способностей и инициативы учащихся.

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РОЛЬ ХУДОЖЕСТВЕННОЙ ЛИТЕРАТУРЫ В ВОСПИТАНИИ ШКОЛЬНИКОВ

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Развитие эстетической культуры — сложный и многогранный процесс, который включает в себя следующие компоненты: умение целостно воспринимать произведения искусства, общественной жизни, природы; развитие эмоционально-мировоззренческого отношения молодежи к окружающему миру; улучшение моральных и эстетических потребностей молодежи, ее эстетических ориентаций, анализа произведений искусства. Как известно, художественная литература способна формировать общественную и личную позицию человека. Поэтому литературные произведения используются педагогами с целью формирования личности ребенка.

Во время прохождения педагогической практики в Горловской ОШ № 16 в 10А классе был проведен классный час на предмет выявления уровня литературной компетенции у старшеклассников. Как выяснилось, дети в недостаточной мере заинтересованы поэзией. А, как известно, поэзия способствует развитию личности человека, в полной мере раскрывает важность таких доминирующих общечеловеческих ценностей как доброта, искренность, гуманность. Подростки, читая поэтическое произведение, испытывают эмоциональные переживания и сопоставляют авторские переживания со своим жизненным опытом. Поэтому было решено провести воспитательное мероприятие, посвященное творчеству Горловских поэтов с тем, чтобы вызвать интерес школьников к современной поэзии и при помощи художественного слова, дать возможность задуматься над вечными вопросами бытия и осмыслить общечеловеческие ценности. Таким образом, изучение художественной литературы, в особенности поэзии, способствует развитию эмоционально-интеллектуальной сферы школьника, воспитывает его.

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СОСТОЯНИЕ МОЛОЧНОГО СКОТОВОДСТВА РЕСПУБЛИКИ БЕЛАРУСЬ

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Молочное скотоводство является важнейшей отраслью животноводства Беларуси. На долю скотоводства приходится почти 2/3 стоимости валовой продукции животноводства общественного сектора (СПК). Удельный вес отрасли в товарной продукции сельского хозяйства составляет 22—27%. В отрасли занято около 55% трудовых и потребляется 38% кормовых ресурсов, сконцентрировано 20% основных производственных фондов сельскохозяйственного назначения и 1/3 фондов животноводства. На современном этапе техническая и организационная структура животноводства Беларуси в силу ряда причин не вполне отвечает требованиям индустриального развития производства. Процесс снижения эффективности производства молока обусловлен как экономическими причинами (ухудшение конъюнктуры рынков молочной продукции и материально-технических ресурсов, опережение темпов роста цен на продукцию промышленности и услуги, потребляемыми в сельскохозяйственном производстве), так и нарушениями технологии производства (низким уровнем кормления и качества кормов, несоблюдением требований технологии доения, содержания и др.). В Беларуси преобладает высокочрезмерно затратная и низкоэффективная технология с большой долей ручного труда.

Основная часть молока производится в специализированных хозяйствах трех типов: 1) хозяйства молочного направления с высоким удельным весом коров в структуре стада (60—70%) и реализацией сверхремонтного молодняка в возрасте 15—20 дней; 2) хозяйства молочно-мясного направления с удельным весом коров в структуре стада в 45—55% и реализацией сверхремонтного молодняка в 18-месячном возрасте; 3) хозяйства мясомолочного направления с удельным весом коров в 35-40% и реализацией сверхремонтного молодняка в возрасте 1,5—2 лет и старше.

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