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**International scientific
conference of young
scientists and students**

**"Youth Scientific
Achievements to the 21st
Century Nutrition
Problem Solution"**

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The publication contains English language abstracts of 86 International scientific conference of young scientists and students "Youth scientific achievements to the 21st century Nutrition problem solution".

It was considered the problems of improving existing and creating new energy and resource saving technologies for food production based on modern physical and chemical methods, the use of unconventional raw materials, modern technological and energy saving equipment, improve of efficiency of the enterprises, and also the students research work results for improve quality training of future professionals of the food industry.

The publication is intended for young scientists and researchers who are engaged in definite problems in the food science and industry.

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Food and Chemical Technology

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1. Baking quality evaluation of winter wheat cultivars with the application of the chemometric technique principal component analysis (PCA)

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Introduction. In human diet wheat (*Triticum aestivum* L.) holds major part up to 44%, that makes it higher rank than other cereals. Numerous factors like, protein content, hardness, cultivar type, season, and growing conditions are linked to the functionality of flour obtained from wheat varieties. The aim of this study was to investigate the correlation of quality parameters of different wheat cultivars using the principal components analysis method (PCA) and to identify the most important parameters for wheat quality assessment.

Materials and methods. The variations in physicochemical properties of grain and flour, and rheological properties of flour were studied for 54 winter wheat cultivars harvested in 2017 in the locations of Osijek and Zagreb. To obtain an overview of the main properties of the wheat samples PCA was used, where each principal component is a linear combination of the original variables, and so it is often possible to ascribe the meaning to what the components represent. The quality of wheat samples was analyzed by measuring the *physicochemical properties* of grain and flour (grain mineral content (PeZ); grain protein content (P); Zelleny sedimentation value (S); thousand-grain weight (AM); grain hectoliter mass (HM); milling yield (PI); flour mineral content (PeB); flour wet gluten content (VG); flour dry gluten content (VG)), and the *rheological properties* of flour (water absorption (UV); dough development time (RT), dough stability (ST); dough resistance (Re); degree of softening (SO); quality number (KB); energy (E); extensibility (R), resistance (O) and O/R).

Results. PCA method seems to be an efficient tool for selection of wheat varieties with specific properties. Reduction of several analyzed wheat characteristics to some PCAs makes it possible to explain about 78% of the total input data variability. Physicochemical and extensographic wheat quality properties have the greatest impact on the first component F1, which accounts for about 62% of sample variability. The second component contributes with 16.02% clarification of variance in the observed data set, dominated by extensographic wheat quality parameters (O and O/R).

Conclusions. Based on the obtained results, statistically significant difference were observed for samples from different locations. Samples from the Osijek location showed higher quality values for most of the analyzed parameters. The PCA analysis performed explains 78% variations in the observed data set, which was explained by two components F1 and F2.

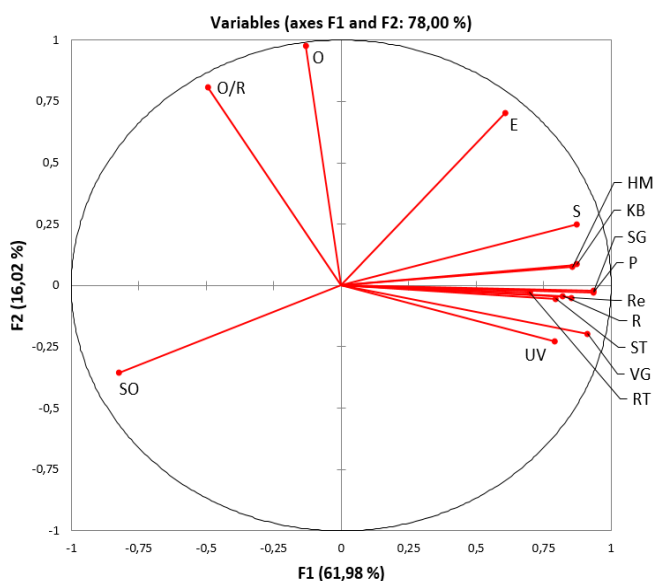


Fig. 1. Biplot of PCA based on 15 wheat quality parameters measured in 54 winter wheat cultivars

2. Tomato pomace as raw material for developing functional products: microstructure, rheological and physicochemical properties

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Introduction. Tomato pomace represent a by-product of tomato industrial processing which is a rich source of dietary fiber, lycopene, lipids and protein. The fine powders of tomato pomace can be used as raw material for developing functional products. The aim of this study was to investigate the microstructure, rheological and physicochemical properties of tomato pomace dispersions that could be used as the base for novel value-added products.

Materials and methods. Tomato pomace powder with a particle size $< 120\mu\text{m}$ was used in this study. The functional properties of the powder, such as water activity (a_w), water absorption index (WAI), water retention capacity (WRC) and pectin content were determined. Tomato pomace suspensions with different concentrations (15%, 20% and 25%) were prepared, and were treated at two different temperatures (60°C and 95°C) that correspond to the “cold-break” and “hot-break”, the most commonly used at the industrial scale for tomato processing. The microstructure of the samples was analyzed visually using the stereo microscope Motic. The color of the formulated tomato pomace dispersions was measured using the Konica Minolta CR-400 colorimeter using the CIELab system. The titratable acidity was determined using the official method 942.15 described by the Association of Official Analytical Chemists (AOAC). By using an HQ30d Portable pH Meter, the pH measurements were made. The soluble solid content was determined with the Abbe refractometer. Rheological measurements were done at 25°C with a Haake MARS dynamic-rheometer.

Results and discussion. The results obtained revealed that different concentrations and temperatures influence the quality parameters of the tomato pomace suspensions. The maximum pH value (4.23) was observed for the samples with a concentration of 15%, followed by samples with a concentration of 20%. Heat treatment did not significantly affect the pH and the titratable acidity. The soluble solids content has the highest value in samples with a concentration of 25%. Color parameters highlight changes in brightness after the heat treatment. Tomato pomace suspensions processing at different temperatures and concentrations caused significant changes in microstructure and rheological behavior.

Conclusion. The tomato pomace powder could be used as raw material for new functional products development. Heat treatment at 60 and 95°C and different concentrations of the tomato suspensions had a significant effect on most of the rheological and physicochemical properties. These characteristics can be indicators for choosing the best concentrations and processing temperatures according to the desired type of product.

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3. Fermentation of semi-finished products of crackers based on spelt flour

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Introduction. Nowadays the consumer demand for crackers is increasing, due to the popularity of these products, as universal “food-to-go” with sustainable quality during long term. Thus there is much interest in developing such products with high nutritional value.

Materials and methods. This study investigated the influence of whole grain spelt flour on the cracker’s sourdough and dough’s fermentation process. The control samples were based on whole grain flour of modern cultivated wheat. In conducting the research, common methods for determining the quality of flour semi-finished products were used. The changes in cracker’s sourdough/dough specific volume and carbon dioxide production, as the major characteristics of fermentation process, were evaluated.

Results. The literature review has shown that spelt wheat is the perspective ingredient for the low-moisture flour products (crackers) production. It is known that spelt wheat is suitable for growing without the use of pesticides, which is challenging for the modern species of wheat, and it possesses valuable nutritional potential due to its chemical content [2]. At the same time food scientists suggested only partial replacement of modern wheat flour with spelt for bread and pastry production. The possibility of modern wheat flour full replacement with spelt flour in the crackers technology is investigated for the first time.

During this study the effect of whole grain spelt flour on the carbon dioxide production process of the dough was evaluated. Obtained results showed that this indicator decreased for the sourdough by 7,5% compared to the control sample and by 21,1%, respectively, for the dough sample. This occurred for the reduced gas-forming ability of spelt flour and its lower amylolytic enzymes activities. Also, one of the main indicators, which characterize the quality of semi-finished flour products, is the specific volume. The changes in the specific volume during fermentation process significantly influence on the porous structure formation of yeast-based flour products. Thus, after 60 minutes of fermentation, the specific volume for this sample increased by 45,2% compared with the control, and by 2,6 times for the dough despite of the decreased carbon dioxide production for these samples. This tendency is probably due to the spelt weak gluten [3], which is easily stretched by gas fermentation products.

Conclusions. Thus, the full replacement of the modern cultivated wheat flour with spelt provides the porous structure formation of the cracker’s semi-finished products and the expansion of the baked goods with low moisture content and high nutritional value assortment.

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4. APBSFC CEEPUS Network Sustainability Strategies

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Introduction. European heritage and identity are strongly associated with food, health and wellbeing of EU citizens. Moreover, food brings people together, thus promoting an active dialogue between people and cultures in a globalized world. Nowadays the EU food sector unites centuries of know-how in the area of food production, acting as a global benchmark. The importance of ensuring food production and the need for global action was highlighted when the world's Heads of State and Governments adopted the 2030 Agenda for Sustainable Development and at least nine of sustainable development goals are of direct food relevance.

Network aim. The main goal of the CEEPUS network "Adriatic-Pannonian-Black Sea Food Connect" (APBSFC) is to improve the international cooperation in education and research between CEEPUS partners in Central and South-Eastern Europe who conduct study programs in the fields of food technology, biotechnology and nutrition.

Network partners: In academic year 2019/2020 eight partner institutions from seven different countries are active participating units of the CEEPUS network: Bosnia and Hercegovina, Bulgaria, Croatia, Republic of Moldova, Republic of Macedonia, Romania, Serbia.

Network objectives. Establishment of sustainable mobility system for students and teachers among partners in the region of Central and South-Eastern Europe; Preparing students for a global food industry labour market; Providing possibilities for exchange and transfer of teaching and research experience; Fostering the cooperation between education, science and industry to improve and expand the content and structure of existing study programmes at all partner universities; Improvement of relations between the partners through various types of mobility; Developing the official joint thesis supervision program (Thèse en cotutelle) between partners and establishing formal agreements to suit the needs and interests of participating institutions.

Methodology. APBSFC network serves as a tool to assure cross-border cooperation and contribute to overall excellence and visibility of partner's institutions in Europe and lead to utilization of its academic potentials and establishment of efficient funding mechanisms. Students and teachers involved in the CEEPUS mobility exchange program within APBSFC network benefit from association of the educational and research techniques, equipment, and resources available in partner's institutions, as well as from local industrial/public sector contribution in partner countries. Network also serves as a creative forum for discussion and recognition of common problems in education, research and management at partner's institutions.

Network results. APBSFC network has many advantages. Since there are offered different types of students and teachers mobilities, the partner universities pool their resources, thus improving network sustainability. Teaching, research and professional activities in cross-border cooperation provides significant results, which will be implemented in the food industry sector, thus contributing to economy growth with social and regional benefits. The success of CEEPUS networks has been already documented in Europe.

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5. Methods of nutrition in the hydrocephalus of the corpus callosum (brain lipomas)

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Introduction. In addition to treatment and monitoring of the patient's health, hydrocephaly of the brain also requires proper nutrition and a healthy lifestyle. Patients with this disease are advised to recommend certain requirements in the wish. The main therapeutic method is diet and it is it that gives the best effect.

Materials and methods. Hydrocephaly is a disease characterized by excessive accumulation of cerebrospinal fluid in the ventricular system of the brain as a result of complication of its movement from the site of secretion to the site of absorption to the circulatory system as a result of impaired absorption. Patients with this disease are recommended simple food for digestion. Most of the diet should be vegetarian food. Before you make a diet, you need to know exactly the causes of hydrocephalus. And proceeding from them, it is already necessary to make a menu. With rapidly progressive swelling of the head, diuretic products are better. The necessary amount of vitamins, amino acids, proteins, carbohydrates must enter the patient's body.

Results. The development of the disease is due to high pressure in certain parts of the brain. The factors causing this condition can be serious head injuries, infectious diseases, strokes, poisoning, brain tumors, chronic disturbance of blood circulation in brain tissues. Doctors recommend a salt-free diet. This is done so that the water-salt balance is not disturbed. Most of the diet should be vegetarian. From the products it is better to use raw pumpkin, cucumbers, lemons, honey, parsley, zucchini, cabbage, celery, black currant, watermelon, grapes, black radish. In order for diets to be improved in the course of the disease, proper nutrition should be provided, that is, all foods that, to varying degrees, cause damage to the body must be excluded from the diet. Such products include the following: salt and all products containing an increased amount thereof, such as salted or dried fish; it is recommended that you refuse or minimize the consumption of fatty, smoked, fried or spicy foods; under no circumstances should very strong coffee or tea be consumed, and alcohol and carbonated water with dyes should also be avoided; meat and fish should be monitored to ensure that they are not of the fat variety; fast food and fast food should be completely eliminated from the diet; it is necessary to minimize the amount of food, which contains synthetic elements that enhance the taste and smell, as well as dyes; taboos are also imposed on canned fish sold in a sausage and sausage store, as well as various salad dressings and sauces, such as ketchup and mayonnaise[1]. If you follow all the rules of nutrition and go on a diet, then hydrocephalus will slow down its effect and drugs will be able to more effectively influence the source of the disease. The menu for the described disease can be developed independently, having studied the information about the allowed and forbidden products, but if earlier there was no experience in this case, it is recommended to consult a professional. The specialist, when familiarized with the patient's condition, will prepare for him an individual menu. If desired, the patient can even control the process of creating a future diet, while studying the features of the presented process [2]. With hydrocephalus, it is meaningless to be treated with folk remedies. Herbal recipes can be used at an early stage of the disease only as a means to strengthen the body overall. During the period of therapy and dieting, a sick person should not smoke or drink alcohol. Bad habits must be discarded. Drug treatment of hydrocephalus involves taking diuretic drugs. They inhibit the synthesis of cerebrospinal fluid and stimulate its circulation. In a disease that does not have severe symptoms, usually only drug therapy is carried out, no surgical intervention is required. But diuretic drugs have one significant drawback - they quickly remove potassium from the body, which is important for the proper functioning of many organs and systems. Therefore, when taking diuretics, it is important to include foods saturated with potassium in the diet. To compensate for the deficiency of potassium, people taking diuretic drugs are recommended to include potatoes, apples, dried fruits, beets, green peas, leafy greens, and onions in the daily menu. It is strictly forbidden to combine taking diuretic drugs and antitussive drugs based on licorice root. With this combination, a sick person will have a stronger output of fluid and potassium from the body, which will cause dehydration, and muscle tissue will begin to break down. The dietary menu for hydrocephalus is inexpensive, as it includes common and affordable products. Diet with hydrocephalus lasts two weeks, and then repeats after a certain period. Products for the diet menu are selected individually for each patient, taking into account the factor that caused the pathological process, and the characteristics of the course of the disease [3].

Conclusions. Hydrocephaly is a complex and widespread disease. In order for the patient to feel fit, he needs proper nutrition. In order to lay down a menu, one must consult a physician and clearly comply with his requirements. When hydrocephalus should be a diet that will positively affect the body and enrich it with vitamins. Enrich your diet with vegetables and fruits. If to all the criteria of the diet can produce a positive effect.

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6. Features of modification of traditional food products for giving them health properties

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Introduction. The production of modern food industry has become an important component of maintaining and preserving human health. It can be argued that it determines her intellectual and production activities, health and quality of life. From this point of view, foods that are modified in a certain way should become a special component in diets that differ from traditional products by focusing on improving the functioning of individual organs and systems of the human body.

Results. The simplest and most cost-effective way of solving these problems is the modification of traditional foods, that is, a deliberate change in their chemical composition and organoleptic properties, taking into account the specific characteristics that modified foods acquire.

In practical terms, the following types of modification are used: sensory, structural-aggregate, genetic, chemical, biological, physiological, multifunctional. The results of our research have shown that it is advisable to include in this list another, most modern type of modification - mechanical activation [2].

The most simple and common type of modification is a touch, designed to give the finished products attractive taste, color, smell, texture. However, it should be borne in mind that modifying components can have toxic properties and adversely affect the human body, so it is advisable to use only natural compounds for this type of modification.

Since ancient times, even in the handicraft conditions, people used and yet will use structural and aggregate modification of raw materials, whose feature is the production of food in liquid, solid, powder, dehydrated states and the like.

The most controversial among consumers and some scientists is the following kind of modification of agricultural raw materials, which is genetic modification. However, there are serious objections to the development of this modification area, especially in the food sector. The main areas of chemical modification are the introduction of artificial fertilizers in the process of growing agricultural raw materials; treatment with fruits and vegetables to prolong their shelf life. Chemical modification does not cause such fears as genetic modification. However, the resulting products also need to be carefully monitored for safety. Biological modification is one of the oldest in use in food production.

Physiological and multifunctional modification is a new and extremely promising scientific and practical area. Therefore, it is of the greatest interest both within this topic and in general in modern food technology.

Finally, the last type of food modification is mechano-activation, which is being worked on by scientists at the Problem Research Laboratory and the Department of Wellness Products of NUFT.

Conclusions. The products, as a result of the modification acquire a certain functional direction, are characterized by their specificity, their own model of the life cycle, and their circle of admirers.

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7. Researching the dietary supplements in the content of dairy drinks

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Introduction. Today, the use of food additives in food recipes products received a significant spread. They are also part of the dairy drinks, giving them certain desired properties – color, texture, taste and aroma. Some nutritional supplements can have a positive influence on the body. For example, natural dyes or organic acids, which in addition to color and taste, can serve as antioxidants. To detect the presence of food additives and establishment of their nature in the composition of fermented milk beverages was studied products such as yogurt, kefir, ayran and tan.

Materials and methods. The research method was selected information the monitoring which was carried out by collecting information about the chemical composition a fermented beverage that is specified by the manufacturer. For this the work was created the monitoring group of 4th year students of direction of training programme "Food technologies and engineering". Information selection was conducted in shopping network.

Results. Yoghurt is a popular fermented milk drink that contains protein and is a source biologically active substances, has anti-inflammatory properties and normalizes digestion. Yoghurt contains probiotics, so it is useful to normalize the work gastrointestinal tract, reduces the risk of osteoporosis, cancer, reduces allergies and asthma, a positive effect on the cardiovascular system. Tan is a protein drink containing b vitamins, D and K, minerals, strengthens the immune system. Ayran is the source of vitamins A, C, PP, N, minerals, beneficial bacteria and antibiotics, and organic acids.

We examined 147 samples of drinks sold at six largest stores in Kyiv, which were "Auchan", "FURSHET", "METRO", "Silpo", "Velyka Kyshenya", and "NOVUS". Among these products we identified 74 samples without additives (50,3 %), 16 samples of natural food additives (10,9%), 4 samples with synthetic food additives (2,8%) and 53 samples contain a mixture of synthetic and natural food additives (36%).

Among these on the packaging of food additives, there had been discovered such natural dyes as annatto (E 160b), carotenes (E 160A), macromole paprika (E 160C), Carmine (E120), curcumin (E 100), Riboflavin (E 101), chlorophyll (E 140), lycopene (E 160d), caramel color (E 150), anthocyanins (E 163) as well as the structure-forming: gum carob (E 410), guar gum (E 412), xanthan gum (E 415), pectins (E 440). The most common synthetic additives are: potassium sorbate (E202), lemon acid (E330), sodium citrate (E331), calcium citrate (E333), potassium acesulfame (E950), aspartame (E951), dichromaladipate acetylated (E1422).

Conclusion. Our studies have displayed that the vast majority of these fermented beverages like kefir, ayran and tan from different dairy producers did not contain food additives. Only three kefir beverage samples and two samples of beverages (ayran and tan) had flavors and stabilizers in their composition. As for chemical composition of yogurts, the vast majority of them contain fruit fillers and food additives of different functional groups (flavors, stabilizers, flavor enhancers, preservatives, emulsifiers and dyes) and origin (synthetic and natural).

8. Development of organoleptic assessment criteria for analyzing the quality of healthy food snacks

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Introduction. Organoleptic assessment can serve as the basis for quality control of healthy snacks. It allows to combine the features of nutritional status and the nutrition structure of individual population groups with consumer properties of products.

Materials and methods. The materials of research were healthy food snacks obtained by combining grain raw materials (rice flour, oat flour and corn starch) and vegetable powder from carrots and pumpkins. During the developing recipes, the principles of food combinatorics and mathematical modeling methods were used. Organoleptic assessment criteria were developed on the basis of a point scale (scoring) taking into account weighting coefficient according to ISO 6658-2016.

Results. To assess the quality of snacks, the following features were selected: crunch, surface condition, taste, smell, appearance, shape. While evaluating a crunch, its severity and uniformity of distribution over the entire mass of the sample were taken into account. For the surface condition, the degree of its smoothness, as well as the presence of tuberosity, and the presence of inclusions of vegetable powder were taken into account. Taste and smell were evaluated according to the degree of severity and compliance with the applied vegetable powders. Appearance and shape - according to the selected technology without defects and destruction. For determining the weighting coefficient, the ranking method was used, where the attribute was assigned a score from 0 to 5 depending on its significance. The definition of organoleptic quality indicators of finished products was carried out by 20 experts, lecturer and students of the university using the developed point scales. The analysis results were recorded, then they were processed. While determining the weighting coefficients, the main indicators were identified that more completely reflect the ability of the product to fulfill its main purpose. To determine the specific values of this coefficient for each feature, the results were mathematically processed: sample characteristics of the series were calculated they show the uniformity of the series; a frequency table was constructed which visually represented the information contained in the sample; the histogram, polygon, and cumulative line are a graphical representation of the series; gross errors were eliminated for a given series of values; after screening, recalculation of sample characteristics were performed according to the reduced sample. As a result of mathematical processing, the following indicators of the weight coefficient were obtained. crunch 4, surface condition 3, taste 5, smell 4, appearance and form 4.

Conclusions: Thus, the methodology for point evaluation of healthy food snacks was selected, the weighting (significance) coefficients of each indicator were calculated, which make it possible objectively assess the quality of the developed snacks, and taking into account these results, adjust the formulations to obtain products that are in demand among

9. Improvement of the technology of sunflower halva with the use grape seeds powder

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Introduction. The aim of this work is to study the influence of grape seeds powder on the organoleptic and physico-chemical properties of the quality of sunflower halva, as well as on the processes, which are released during storage.

Materials and methods. We used grape seeds powder (GSP) produced by Orion TOB (limited liability company) in Odesa under the trademark OleoVita, which was added in the amount of 3.0, 5.0 and 7.0% to the protein mass at the stage of halva mixing of sunflower. The level of fat deterioration during storage of halva was determined by peroxide and acid numbers, the amount of separated oil was obtained by ratio between the weight of the sample at the beginning and weight of the sample of a specific period.

Results and discussion. Adding grape seeds powder slightly reduces the moisture of halva: from 3.26% (control) to 3.19%, 3.04%, 3.02% (the test samples containing 3.0, 5.0 and 7.0% additives, respectively); the mass fraction of total sugar, fat and reducing substances are reduced by the addition of dietary fiber, which are contained in this additive.

Researches of the fat have shown that at the end of the standard storage period (60 days), the acid number of fat in the control sample is 1.9 mg KOH/g, and the samples with the addition of GSP – 1.73, 1.65 and 1.7 mg KOH/g (3.0, 5.0 and 7.0% respectively). The test sample of halva containing 5.0% of grape seeds powder have a reference value only at 78 days of storage, that is it grows 1.3 times slower. At 80 days of storage, this figure becomes 2.3 mg KOH/g in the control sample, and in products with the addition of the choose additive in the amount of 3.0, 5.0 and 7.0% – 2.1, 1.95, 1.84 mg KOH/g.

The sunflower halva with the addition of 3.0, 5.0 and 7.0% of the grape seeds powder to the protein mass has had a peroxide value for 80 days of storage of 3.52, 2.94 and 2.06 mmol $\frac{1}{2}$ O/kg, respectively, whereas the control sample for 60 days' storage this value has been 4.1 mmol $\frac{1}{2}$ O kg.

On the 80 days' storage the amount of separated oil for samples with the addition 3.0, 5.0 and 7.0% is 0.19, 0.03 and 0.01%, while in the control sample – 7.41%.

Adding no more than 5.0% GSP the sunflower halva has become brown shade, retaining a fibrous layered structure, friable texture, as in the control sample. Increasing the dosage of the powder have led to a compaction of the consistency of the product, as a result the quality indicators have deteriorated

In our view, the optimal percentage of dosage of grape seeds powder is 5% to protein mass

Conclusions. Adding grape seeds powder in a quantity of 5.0% to the sunflower halva technology improves product quality, slows down hydrolysis and fat oxidation processes, prevents separated oil during storage

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10. Chemical composition of durum wheat grown in Republic Belarus

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Introduction. The chemical composition of grain significantly affects the nutritional value and consumer properties of finished products. Grain has a complex chemical composition.

Materials and methods. Durum wheat varieties (Valenta, Vladlena, Tolesa, Dunyasha, Rosalia) of the 2018 and 2019 crops grown in different regions of the Republic of Belarus were studied. The work used standard and generally accepted methods of analysis. The results of the analysis of the chemical composition of the grains are presented in terms of dry matter.

Results. Durum wheat is valued for its high protein content and high-quality starch, which has low bioavailability and is not destroyed by heat treatment. Therefore, durum wheat products have a low glycemic index and can act as products for dietary and healthy nutrition.

Grain proteins are important components of nutrition. In the human diet, plant protein makes up one third of the protein consumed. Studies of the chemical composition showed that the protein in the studied grain varies from 14,2 to 15,8 %, depending on the variety and growing conditions, which corresponds to the average values for this culture. Growing conditions have a significant effect on protein content.

The carbohydrate complex of durum grain is represented by starch, sugars and fiber. Starch makes up the bulk of the grain. It is the main energy material of grain. The results showed that durum grain contains the average amount of starch for a given crop (64–67%).

The amount of fiber in the studied grain samples contains from 2,3 to 2,80 %, the amount of sugars at the level of 2,10 -2,70 %, which corresponds to the average content of these components for durum wheat.

Fats (free lipids) are reserve substances and represent the energy reserve of grain. There is little fat in the studied varieties, and depending on the variety, the range varies from 2,15 to 2,39 %, which corresponds to the average values for durum wheat.

Ash content characterizes the ratio of the anatomical parts of the grain, indirectly indicates the content of minerals in the grain. The ash content of the studied grain is at the level of 1,92 – 2,36 %, which corresponds to the average values for this indicator for durum wheat. Ash content significantly depends on varietal characteristics and conditions of grain growth.

Conclusions. Analysis of the results of a study of the chemical composition of durum wheat grown in Belarus in 2018 and 2019 showed that grain is characterized by a large amount of protein, an average amount of starch, fiber, sugars, fats, and a low ash content.

11. Popping characteristics of different sorghum varieties

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Introduction. Sorghum is a very promising gluten-free culture to produce ready-to-eat snacks. But varietal characteristics of sorghum play an essential role in the grain ability to be popped. Taking into account the quality of popped grain, microwave popping seems to be one of the most effective way to produce the snacks, which was used during this study. Efficiency of the popping can be estimated from different points of view but one the most important property of grain is popping yield. Popping yield is known to show the amount of popped grain during the treatment.

Materials and methods. Different varieties of *Sorghum bicolor* (L.) were studied to compare their popping characteristics. These 11 varieties were grown at Synelnykove Crop Breeding Experimental Station, Institute of Grain Crops of the National Academy of Agrarian Sciences of Ukraine, Dnipropetrovsk region, Ukraine, and harvested in 2018 and 2019. Microwave popping experiments were performed in a microwave oven (Samsung, Korea) at the operating frequency of 2450 MHz set at 700 W for 150 s. The cooking chamber was cooled for 3 min between popping the samples. After popping, the unpopped grains were handpicked, and the amount of total popped grains was recorded.

Results and discussion. Figure depicts the obtain results for different sorghum varieties after microwave treatment at the adjusted parameters.

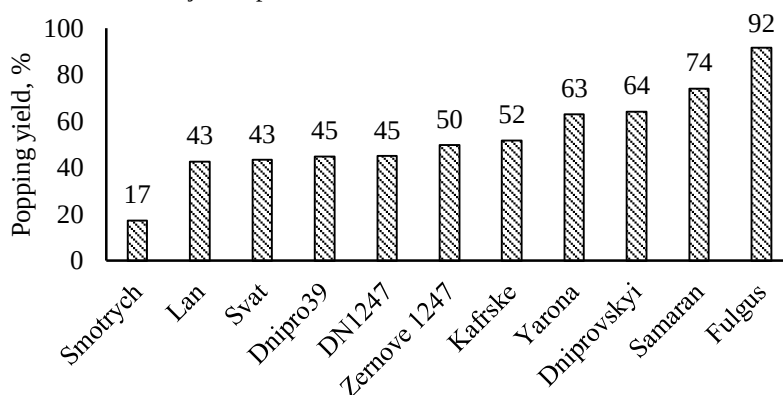


Figure 1. Popping yield of different varieties of *Sorghum bicolor* (L)

During the microwave treatment of sorghum grain popping yield might reach 63,0-91,6% for some varieties such as Yarona, Dnirovskyi and Fulgus. It should be noted that after the treatment the other varieties of sorghum resulted approximately the same popping yield at range of 42.6-52.8%. The poorest popping characteristics belonged to Smotrych variety which showed only 17.4% of popped grain, which do not meet the requirement of technological feasibility.

Conclusion. Some Ukrainian varieties of *Sorghum bicolor* (L) showed an appropriate popping yield. Therefore, sorghum varieties such as Yarona, Dnirovskyi and Fulgus can be recommended for production ready-to-eat snacks because they ensure high yield of the finished product and allow to avoid food losses.

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12. Research on the use of unconventional raw materials in the production of beer

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Introduction. Beer is one of the oldest known beverages in the world and at present the main alcoholic beverage consumed worldwide [1]. The conventional raw materials for making beer are malt, hops, water and brewer's yeast. It is estimated that about 85-90% of world-produced beer that is currently produced from other raw materials, besides the traditional ones: barley malt or wheat malt [2, 3]. The main objective of this study was to use the unconventional raw materials that have been previously developed to brew a beverage similar in aroma, taste and mouthfeel to black beer.

Materials and methods. Black beer was obtained according to a conventional method of obtaining beer with following main operations: mashing, filtration, boiling, cooling, fermentation, maturation, pasteurization and bottling. In the manufacturing recipe, brown malt has been replaced with acorn flour and Jerusalem artichoke flour. It is also used a molasses content of 50% sucrose to increase the raw beer extract. For fermentation is used a bottom-fermenting yeast of *Saccharomyces carlsbergensis* species. The fermentation temperature was maintained at 10°C for 6 days. Then, after cooling down to 2° C, the yeast was discharged from the bottom of the vessel. The maturation lasted for 10 days. At the end of maturation, the beer was analyzed from the sensorial and physicochemical point of view in accordance with EBC-methods: colour, pH, total acidity, foam stability, content in CO₂, apparent fermentability and alcohol concentration. For the analysis of beer - finished product was used the apparatus Anton Paar. The physico-chemical indicators of the black beer obtained were compared with those of a black beer on the Romanian market.

Results and discussion. Four variants of the finished product have been developed to optimize sensory and physico-chemical characteristics. Thus, the ratio between acorn flour, Jerusalem artichoke flour and molasses was: variant 1 - 0.5: 1.5: 1; variant 2 - 1: 1: 1; variant 3- 1: 1.5: 0.5; variant 4 - 1.25: 1.25: 0.5. The black beer obtained in all 4 experimental versions is a beer with an alcoholic concentration between 7.08% and 8.17%, with a high degree of final fermentation, with values between 73.35% for variant 2 and 85.92 % for variant 4. The variant that met from the point of view of sensory analysis the highest score was variant 4.

Conclusions. The new assortment of beer proposed is a black beer, obtained on the basis of an innovative manufacturing recipe, which uses as alternative raw materials to malt of barley or wheat, acorn flour, Jerusalem artichoke flour and molasses. The finished product presents great sensorial qualities, a freshly roasted coffee flavor, a fruity taste, bittersweet, with shades of green nuts and an unmistakable freshness. The analytical data obtained with the acorn and Jerusalem artichoke flour were comparable to conventional black beer, which acted as a control.

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13. Study of the composition of spent grains, depending on the composition of grain products

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Introduction. Spent grains is the largest and most valuable waste in brewing, since it contains many nutrients. so today the important question is the possibility of its processing and use in various industries.

Materials and methods. The objects of the study were samples of raw and dried spent grains. For the analysis of samples, the following experimental methods were chosen: determination of the mass fraction of moisture by means of a drying cabinet, determination of leachate, total and unleachate extract.

Results. Three samples of spent grains with different grain composition were selected for the study: sample No. 1 - 100% light barley malt, sample No. 2 - 100% light caramel malt, sample No. 3 - 50% barley malt, 50% wheat malt.

The highest content of dry matters after pressing was in the sample with 100% barley caramel malt and exceeded 15% and immediately after the first washing decreased to 1.8% and after the third washing was within the normal range to 0.5% DM. A sample of 100% light barley malt had the lowest DM content in the pressed water, and after the first washing it decreased to 0.1% DM, which is within the normal range. For the third sample of spent grains, two washes were required to obtain the required percentage of dry matters in the wash water and then the index was 0.3% DM.

When determining the humidity, the original samples had a significant difference in indications, indicating incorrect filtration modes for mini breweries. The highest moisture content has the second sample of spent grains consisting of 100% barley caramel malt. If the lowest humidity of the first sample is taken as 100%, then the humidity of the second sample is higher by 38%.

In terms of leachate extract, the first sample has the lowest percentage - 4.9%, sample № 3 exceeds the figure by almost 2 times, and the sample of 100% barley caramel malt has the highest value - 15.3% DM.

These figures are not within the normal range, as the mass fraction of dry matters after the filtration process on the filter apparatus should not exceed 0.5%. Exceeding this value may indicate loss of the extract during brewing and improper technological operations. At such ranges, the brewery loses extractive substances that could be used in beer production by adding it to the wort.

Conclusions. From the obtained samples of the spent grains, it is possible to additionally remove valuable brewing extract for brewing wort. It is also necessary to thoroughly rinse the spent grains to reduce extract loss and save money of the factory.

14. Use of quince for the production of snacks

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Introduction. The purpose of the study was to investigate the use of quince for the production of fruit snacks.

Materials and methods. Quince fruits were used for research. Research methods are standard, generally accepted.

Results. Mature quince fruits contain fructose, glucose and sucrose, organic acids - malic, citric, tartaric, fumaric, chlorogenic, traces of quinine, neochlorogenic, coffee and coumaric. The amount of acids depends on the variety of fruits and the time of their collection. In the pulp of quince fruits contains a large number of vitamins - vitamin C (up to 25,9 mg%), vitamins B1 B2, tannids, eptatechin, flavonol quercetin, anthocyanins, carotene. The fruits contain a significant amount of potassium (0,17...0,20 %), as well as iron, cobalt, boron, nickel, titanium, copper, aluminum, manganese. The peel of the fruit contains enanth-ethyl and pellargon-ethyl esters, which give the fruit a specific odor.

Unlike other seed fruits, quince contains a large amount of dietary fiber, primarily fiber and protopectin. These substances provide the necessary elastic structure throughout the process, both during blanching and drying.

The technological indicators of raw materials were determined by organoleptic (blanch color, consistency, medium size, taste, aroma) and physico-chemical, the most important of which were the content of solids, reducing sugars, organic acids, ascorbic acid and minerals.

To establish optimal organoleptic characteristics of snacks, after slicing, blanching was carried out in different concentrations of sugar syrup from 10 % to 70 % with the addition of ascorbic acid.

After blanching, the quince slices were dried to a moisture content of 8...10 %, cooled and packed. The resulting product had a crisp consistency, pleasant taste and aroma.

Conclusions. The data obtained indicate that the fruits of quince are rich in biologically active substances. As a result, the optimal conditions for quenching and drying of quince slides were selected. The use of quince fruits for the production of snacks allows to obtain products with high organoleptic characteristics and high nutritional value.

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15. Seasonal changes in the accumulation prunasin in peach (*Persica vulgaris* Mill.)

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Introduction. The role of prunasin, characteristic of the Rosaceae family, and its derivatives is not fully understood. But most researchers believe that the main function of these compounds is protective. *Persica vulgaris* Mill. as a representative of this family, has a significant amount of cyanogenic glycoside - prunasin. In our work, we studied seasonal changes in cyanogenesis in different cultivars of peaches.

Materials and methods. To determine the quantity of cyanogenic glycosides used the method of its hydrolysis to cyanide, which is then distilled with steam and has caught a certain amount of nitrate of mercury (II). The excess of nitrate of mercury (II) titrate with ammonium thiocyanate. For the complete hydrolysis of cyanogenic glycosides, the crushed sample was filled with water for 1 day in the presence of a small amount of thymol as a fixing means and diethyl ether to separate the organic phase from the inorganic.

Results. One of the main elements of the metabolism of peach is the accumulation prunasin. It is itself a non- toxic compound, but when it is hydrolyzed by a specific enzyme α -glucosidase, an intermediate product is formed cyanohydrin, which decomposes to form benzaldehyde and prussic acid.

We studied 16 varieties of peaches, including 2 wild species: Mao-tha-or and *Persica davidiana*, cultivars of selection of M.M. Gryshko National Botanical Garden of NAS of Ukraine: Sputnik, Inzhirny belomyasyj, Osennij syurpriz, Slavutich, Antocianovyj, Kyivskij zheltoplodnyj, Inzhirny zheltoplodnyj, Nektarin kyivskij, Poleskij, Druzhba, Dneprovskij, as well as cultivars introduced Svetozar and Redhaven, Kyivskij rannij - as a standard.

In the period of late autumn and winter period in all varieties content of prunasin increases. This can be explained by lowering the temperature and preparing plants for winter, which for southern plants is a severe test and prunazine in this case plays a protective role. The synthesis of these compounds can be attributed to secondary metabolites that are involved in the biochemical adaptation of plants.

It is significant that the peaks of prunasin accumulation occur at critical moments in the life of peach plants: April - May – the active beginning of vegetation; June – July – the first wave of growth (the largest increase in sprouts); August - September – the second wave of growth; November – preparation for winter, and in winter there is a slight decrease in prunasin, which corresponds to December. At the same time, it should be noted that the peach as a species, while maintaining the General trend of prunasin accumulation dynamics, has significant differences in cultivars.

Conclusion. Deciphering the adaptive potential of a species can provide environmental forecasting and planning, development of new cultivation technologies, explanation of the causes and prerequisites for crisis situations .

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16. Modification properties of whey proteins

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Introduction. Whey isolate is a widely used functional additive to improve the gel-forming, structural properties of food products, mainly meat, dairy and bakery. Gels, that are obtained from isolates, can be used as carriers of bioactive substances or flavorings. The additional use of individual amino acids in a mixture with whey isolate will affect on their functional properties and bioavailability, due to the effect on protein molecules and the receipt of an additional number of positively and negatively charged sites [1].

Materials and methods. A number of amino acids (histidine, lysine and arginine) were used to determine changes in the ability of whey isolates to interact with water molecules. These mixtures can be used as alternative methods of manipulating the properties of whey gels providing their stability in various pH ranges. Studies were carried out at various pH values: 2.0; 5.0; 7.59; 9.74; 10.76 - to study how a change in the charge of protein molecules will affect the efficiency of basic amino acids and check the universality of their use. In research systems, the quality indicators of the formed gel and the water-holding ability were determined.

Results. The determination of the moisture-holding capacity of whey isolates indicates that the lowest values are characteristic of samples at pH 5.2, while the gels formed in this case showed the effect of syneresis. The introduction of selected amino acids increases the moisture content at all pH values, except 5.2. For this pH, the introduction of 0.5% lysine was effective.

A possible mechanism for changing these properties is considered to be caused by the introduction of amino acids, an increase in the solubility and hydration of whey proteins, inhibition of the processes of aggregation of protein molecules, a decrease in the mobility of water molecules and the formation of thin gel structures [2, 3].

Adding basic amino acids modifies the texture of the resulting gel. This is due to the binding of amino acids to charged protein residues under the action of electrostatic interactions, which change the structure and thermal properties of proteins and accordingly affect the gel-forming properties. It was found that the strength of the gels formed by the whey protein maximally increased when using 0.5% arginine.

Conclusions. The results of the studies showed that the basic amino acids modified the gels of whey isolates depending on the pH and amino acids. This is achieved by changing the surface charge and structure of whey protein. This suggests that the introduction of whey with modified properties (due to the introduction of amino acids) in the composition of meat products will also in turn affect their properties and it is a promising area of research.

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17. Use of flax flour as a superfood in pâté production

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Introduction. Today there is only one plant, 100 g of which is enough to provide a person with full nutrition for the whole day. These are flax seeds. That is why flax seeds and its beneficial properties are so widely used in medicine - in both traditional and folk.

Most often, flax seeds for gastritis are a protective and anti-inflammatory agent. Such action is explained by the high content of mucus: it as a film covers the affected mucous membrane and prevents its irritation. Therefore, the pain is reduced, the mucosa without constant mechanical effects on it calms down, the healing process begins.

Materials and methods. Flax seeds in their properties and size were similar to the overseas Chia seeds. The beneficial properties of the seeds are due to the fact that it contains all the necessary plant proteins and trace elements for humans. The trend today is superfoods. Superfoods are called plant products in which the concentration of vitamins and nutrients exceeds all previously known indicators. Superfoods include berries, leaves, roots, algae and other parts of some plants that have a positive effect on the human body.

It is especially important that in its composition there are a lot of unsaturated fatty acids: Omega-3 (linolenic acid), Omega-6 (linoleic acid) - their combination is also called vitamin F, Omega 9 (oleic acid), folic acid, vitamin E, phytohormones and fiber.

Research results. The analysis of the literature has shown the feasibility and perspective of using non-traditional raw materials - native flax seeds to enhance the energy and biological value of the finished product.

The main advantages of flax seeds have been found to be a high content of biologically valuable protein, with a high content of easily digestible fractions and fat with a high content of essential fatty acids, which provide products with its increased biological value. However, the presence in the flax seeds of nutrients indicates the need to use additional methods of heat treatment (including extrusion).

The chemical composition and biological value of flax seed protein of different varieties grown on the territory of Ukraine were determined and their comparative characteristics were conducted. It has been found that all the tested flax seed samples have a high biological value and are a promising raw material in the production of meat additives. For further research, the flaxseed "Magic" is selected because it has the highest amount of protein (25%), which is crucial when choosing raw materials and the least amount of fat (20,7%).

Conclusions. Based on the above data, we are working on the development of sausage-based food products with the addition of flax seed additives to improve the health of the state's population.

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18. Canned meat market analysis for baby food

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Introduction. The baby food market is complex and at the same time extremely important because the quality and safety of its products depend on the harmonious development of the baby, human health and the future of the nation. According to experts, the Ukrainian baby food market is at the stage of its development. Despite the history and the availability of long-functioning domestic enterprises specializing in the production of baby food on the market, consumption as such has been forming for the last 2-3 years.

Results. Canned food is one of the food options for children in the form of feed and the market offers baby canned meat from rabbits, chickens, turkeys, beef, by-products. According to the Institute of Pediatrics, Obstetrics and Gynecology, the annual need for canned meat (including fish) for children from birth to 18 years is 140 thousand tons.

The market is mostly formed by domestic production by domestic enterprises. From 2015 to 1 half of 2017, production volumes on the market fell, which led to a fall in the market capacity not only for baby canned meat, but also for meat cans in general.

The main causes of the fall in baby canned meat production in 2015-17 were largely related to trends in the market for raw materials itself (meat). A decrease was observed due to the influence of negative internal factors, as well as the loss of a significant market in the Russian Federation. Also in the Ukrainian meat market there was an increase in prices, the main reasons for which were a decrease in the number of cattle and pigs due to the increased cost of feed, as well as frequent outbreaks of ASF. This, in turn, affected the increase in the cost of production of canned meat, and therefore their implementation.

However, since the end of 2017 and the beginning of 2018, there have been slight positive trends in the production and sale of canned meat for baby food, as well as in a relatively small percentage, but still expanding their offer segment. During the specified period the growth rates of production of these products increased, so at the beginning of 2018 this increase was 16.9%, compared to 2017 - 16.4%. In 2019 is also seeing an improvement in the production of baby meat cans, but at a rather slow pace.

Canned meat for baby food on the Ukrainian market are represented by the following brands: «Croha», «Semper», «Teoma», «Agusha», «Hame», «Gerber», «Hipp», «Milupa» and are exclusively foreign.

Conclusion. The Ukrainian baby food market is growing mainly due to the increase in the production of quality baby food and the factories' investment in baby food production. And this has the chance to win at least an inexpensive and medium-sized segment from foreign manufacturers.

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19. Identification and quantification of valuable compounds from native products used in obtaining innovative dairy products

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Introduction. The present research aims to identify and quantify valuable compounds from native products such as honey, walnut and sea buckthorn in order to produce an innovative fermented product from cow's milk.

Materials and methods. Honey bees of native production polyphora from the Drăgășani area were used, and for the identification and quantification of the volatile compounds a GC-MS system was used. Qualitative and quantitative analyzes of the polyphenols were performed using the Agilent 1200 HPLC system consisting of a photodiode array (PDA) detector and an electrospray ionization mass detector.

Results and discussion. In poliflora honey bees, phenolic acids reach 79.284 mg/100 g sample, isoprenoids reach 127.449 mg/100 g sample, and flavonoids at 168.475 mg/100 g sample, and the results obtained by chromatographic analysis of honey. Bees have been found in this product a wide range of aroma compounds, namely: terpenic compounds, higher alcohols, aldehydes and ketones, esters, so that the aldehydes reach values of 7.889 mg/100g, ketones at 2.337 mg/100g, alcohols higher ones accumulate at amounts of 3.212 mg/100g, and the esters reach values of 8.993 mg/100g. Following the chromatograms obtained, the content of polyphenols in the walnut kernel was established at an amount of 786.553 mgGAE/100 g, and for the berries the content in polyphenols was 343.229 mgGAE/100 g. Also the highest concentration significant of tocopherols is found in the form of alpha tocopherol, with 33.245 mg/100g, followed by beta tocopherol with an amount of 12.723 mg/100 g of oil. Values lower than 4.553 mg/ 100g and 1.286 mg/100g respectively are visible in the case of the tocopherol gamma and the tocopherol delta.

Conclusions. The compounds identified and quantified from the three indigenous products such as polyflora honey, walnut and sea buckthorn will lead to the achievement of a harmonious aromatic profile and with certain taste qualities of the innovative fermented dairy product that you processed.

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Mihaela Adriana Tița, Cristina, Popovici, Loreta Tamošaitienė, Vijole Bradauskiene (2020), Identification and quantification of valuable compounds from native products used in obtaining innovative dairy products, Ukrainian Food Journal, 9(1).

20. Investigation of antioxidant properties of cereals CF

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Introduction. The development of foods with desirable nutritional and physical properties depends on improving their oxidative stability, which in turn is based on a deep understanding of the mechanisms of lipid oxidation.

Materials and methods. The study used high-oleic (Dan) sunflower oil and CF feedstock. Research Methods are standardized methods that contain physico-chemicals that have a peroxide index (PI).

Results. Lipid oxidation is a generic term used to describe a complex sequence of chemical changes that results from the interaction of lipids with active oxygen. Knowledge of the mechanism by which lipid oxidation occurs can develop effective strategies to slow its progress. One step (or several steps) can be identified in the reaction sequence that determines the overall reaction rate; for example, the initiation stage or one of the early stages of distribution. By controlling this step, one can effectively slow down the process of lipid oxidation.

One of the most effective means of slowing lipid oxidation in fatty foods is to include antioxidants. In the present study, CF grain material is proposed as an antioxidant. Determination of antioxidant properties of the additive was carried out under conditions of thermal oxidation.

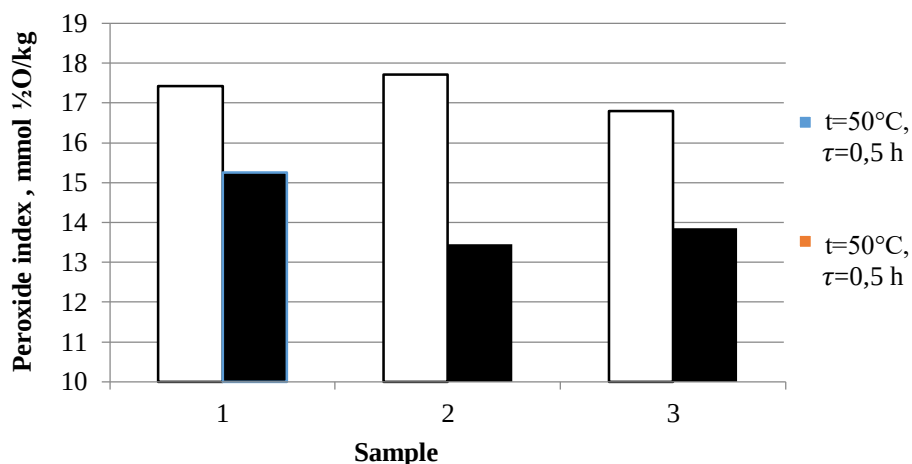


Fig. 2. The change in peroxide number from the processing conditions
 1) Dan + 0,5% CF; 2) Dan +1%CF; 3) Dan+3%CF.

From the data of the figure it can be seen that the CF raw material more actively exhibits antioxidant properties under higher temperature conditions ($t = 90^{\circ}\text{C}$). Under these conditions, the use of CF additives within 2%... 3% is rationally used for thermal oxidation.

At lower temperatures ($t = 50^{\circ}\text{C}$), with the introduction of 3% of the raw material of the SF activates the antioxidant properties.

Conclusions. It was found that the additive CF exhibits antioxidant properties at high temperature oxidation.

21. Wastewater treatment of a cheese-making plant using a UASB reactor

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Introduction. The upflow anaerobic sludge blanket reactor (UASB) is a methanogenic digester, which is characterized by high removal of organic pollutants. It can withstand high organic and hydraulic loading rates. The aim of this work was to evaluate the efficiency of wastewater treatment of a cheese-making plant using this apparatus.

Materials and methods. The research was carried out using the laboratory setup shown in the figure.

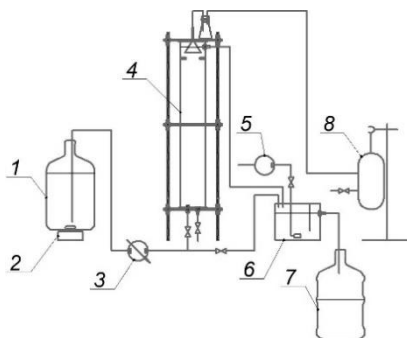


Fig. Laboratory setup. 1 – feed tank, 2 – magnetic stirrer, 3 – peristaltic pump, 4 – UASB reactor, 5 – air pump, 6 – AS system, 7 – effluent tank, 8 – gas bag

In the experiment, synthetic wastewater was used, the composition of which was in accordance with the losses of milk and whey at different stages of the technological process. The concentration of COD in wastewater was $2000 \text{ mg O}_2/\text{dm}^3$. Later, this value was increased to $3000 \text{ mg O}_2/\text{dm}^3$. The reactor was operated at a hydraulic retention time of 1.44 days and the upflow velocity of 0.0289 m/h . As an inoculum, anaerobic activated sludge was used from a full scale IC reactor in which wastewater from a yeast plant was purified. Its volume fraction was 0.22%. The reactor was operated in the mesophilic mode at ambient temperature, which was $28\text{--}30^\circ\text{C}$.

Results and discussion. At a COD concentration of $2000 \text{ mg O}_2/\text{dm}^3$ in the UASB reactor influent, the COD concentration in the effluent of the UASB reactor was $120 \text{ mg O}_2/\text{dm}^3$. In this case, the wastewater treatment efficiency was 94%. With an increase in the concentration of COD in the UASB reactor influent to $3000 \text{ mg O}_2/\text{dm}^3$, the concentration of COD in the effluent of the UASB reactor did not change and was at the same level of $120 \text{ mg O}_2/\text{dm}^3$. The wastewater treatment efficiency was 96%. Thus, with an increase in the concentration of COD in wastewater, the cleaning efficiency in the UASB reactor increased. Biogas yield after increasing the concentration of COD in the effluent of the UASB reactor was 1.2 dm^3 per dm^3 of wastewater (0.83 dm^3 per dm^3 of UASB reactor volume). Concentration of methane in the biogas was greater than or equal to 60%.

Conclusions.

1. The wastewater treatment of the cheese-making plant, based on the degree of COD reduction of 96%, using the UASB reactor is quite effective.
2. The anaerobic activated sludge from the IC reactor, in which the wastewater of a yeast plant is purified, is well suited as an inoculum for a UASB reactor, in which it is supposed to treat the wastewater of a cheese-making plant.

22. New trends in food packaging research: bio-based edible films incorporated with Stevia Rebaudiana.
Physical and texture profile characterization

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Introduction. Nowadays the problems caused by environmental pollution due to the disposable packaging imposed the urgent finding of new solutions. A successful alternative is the edible packaging obtained entirely from polysaccharides.

Materials and methods. Biofilms were made from agar, sodium alginate, glycerol, stevia and water. 30 samples were obtained by casting method. The physical characteristics, as well as their hardness, elasticity and adhesiveness were tested (determinations made with the Perten Instruments TVT 6700 texture analyzer). The color was evaluated by the CieLab system using the Chroma Meter CR 400 colorimeter (Konika Minolta). To obtain the membranes, agar, sodium alginate, glycerol and stevia, totaling 4 g, were solubilized in 150 ml of water. The stevia mass was constant (0.050 g and 1.24% of the total amount of ingredients).

All samples were dried within about 48 hours at ambient temperature ($21 \pm 2^\circ\text{C}$).

Results and discussion. Stevia leaves are an excellent source of diterpene glycosides stevioside, rebaudioside A-F, dulcoside, and steviolbioside, which are responsible for sweetness and have been utilized commercially for sugar substitution in foods, beverages, and medicines. To the best of our knowledge, a large number of studies have been carried out on composition, health implications, and safety of steviol glycosides. However, commercial production of stevia-incorporated food products needs further research in order to meet the huge global demand. Stevia-incorporated products possess better sweetening potency and maximum consumer acceptability, when compared with other sugar substitutes. Hence, the current research attempts to review the health promoting effects of stevia with special emphasis on its application in the food system.

The films showed low adhesiveness to the silicone support used for drying, well-defined edges, were thin, homogeneous, flexible, with no odor and a slightly sweet taste. Samples showed high brightness values (L^* : 93.75-95.84); a^* values were between -7.340 and -6.240, and b^* values were 18.580-20.950. The high agar-containing films showed the highest value for the b^* parameter and the lowest for parameter a^* , normal aspect if we take into account the darker color of the agar powder. Even though sodium alginate powder has a similar color to that of agar, the films obtained with higher amount of alginate have higher luminosity values, lower of parameter a^* and greater of parameter b^* . Intermediate values were obtained with approximately equal amounts of biopolymers.

However, variations in color are reduced; at first glance, without being tested with laboratory equipment, the films do not show any noticeable color variations. According to the determinations made using the texturometer, the texture profile analysis indicated hardness values between 2482.250 – 6647 g, the elasticity between 7.576 – 16.500 %, and the adhesiveness -7182.591 g*s as minimum value and -34.692 g*s as maximum value, respectively.

The results allowed a connection between the ingredients used to obtain the films and the texture of these. Thus, samples with high agar content in the composition (2-2.95 g) and without sodium alginate exhibit high values of the rupture point, thus higher hardness. Samples with high alginate content (1.700 - 2.950 g) in the composition presented high elasticity. The negative values of the adhesiveness can be attributed to the sugar content. Adhesiveness decreased with the moisture loss, aspect that may indicate the availability of free water on the sample surface.

Conclusions. All films made from biopolymers and stevia can be used for food packaging. The addition of stevia has improved the flexibility, gloss and appearance of the membranes. Though added in small quantities, stevia has moved from the relatively sweetener threshold to the ingredient of materials that can be used successfully in the food industry and other adjacent industries. Depending on the characteristics to be achieved, high hardness or elasticity, precise amounts of biopolymers can be determined in order to obtain the desired material.

23. Dangers and benefits of food mold

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Introduction. If we compare the prevalence of various biological species in the biosphere, then mycoses (fungi, mold) will undoubtedly take first place. According to some estimates, this type of life is the oldest on Earth.

Materials and methods. A huge amount of both popular and specialized scientific literature is devoted to the issues of life features and the spread of mold. An analysis of materials was used that sanctified both the problem as a whole and its individual aspects.

Results. Everywhere in everyday life, it is widely believed that mold is always bad. This well-established public myth is due to a lack of understanding of the role of mushrooms in the natural world and in our life. However, it must be recognized that in many cases a negative attitude towards mold is justified.

Fungi (lat. Fungi or Mycota) are eukaryotic organisms that combine some of the characteristics of both plants and animals. Mold is a colony of a unicellular fungus that develops from spores that are in a "canned" state in huge quantities constantly present in the air. Spores "wake up" for intensive reproduction, as soon as favorable conditions appear for this: increased humidity and heat.

We call useful mold - noble. Varieties of useful fungal cultures *Penicillium*, *Botrytis cinerea*, which give a taste to cheeses, salami, wine and other products. Cheeses are characterized by 3 types of mold - blue, white and red. Such cheeses are rich in proteins, phosphorus, amino acids, and the calcium contained in cheese is better absorbed due to mold. However, it should be remembered that the mold that appeared on hard cheeses is most likely dangerous.

Do not eat mold products that have a soft and moist consistency. This is a wide range of products. These include the following products: meat (sausages, ham sausages); dairy; soft fruits, vegetables, berries; bread; jam. Even if a small area on the product is affected by mold, it must still be discarded. Since micelles, not visible to the naked eye, are very likely to have spread throughout the product.

Mold can cause weakness, seizures, headache, fever, and vomiting. Most mold toxins are not degraded by heat and therefore cooking mold products does not reduce their toxicity. Eating mold with livestock causes illness and can lead to death of dogs. Some types of mold toxins affect the liver and can even cause cancer.

Keep in mind that storing food in the refrigerator does not prevent mold growth. Mold is resistant to acidic, salty and sweet environments.

Conclusions. In addition to the rather narrow positive effect of mold on the human body, as with the use of soft cheeses and in a few more cases, mold on foods is dangerous for both people and animals.

24. Danger of Nutrition Myths

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Introduction. Each time has its own myths about healthy eating. In the middle Ages, they arose from existing dogmas and prejudices. Nowadays, again, dogmas and prejudices and erroneous representations of science.

Materials and methods. When considering this topic, structural analysis was used.

Results. If you look into the past, we will see that the food influence of various civilizations was small. However, everything changed with the discovery of America. Outlandish products not previously known began to appear in Europe. The history of the conquest of Europe and partly Asia shows how inert peoples are in accepting new products. But then people were faced with the unknown, and they naturally feared it.

Examining the myths about food and nutrition of the twentieth and the beginning of our twenty-first century, we will see waves of prejudice that lift one concept of nutrition to the top, then another. Moreover, necessarily, each concept has a scientific justification. Everyone is talking about cholesterol and products that have high cholesterol, and this is primarily eggs, are outlawed. Eating eggs is considered almost a crime against your health.

The next myth is fats. The myth that saturated fats are harmful and lead to premature death, originally from the 1970s. It was then that a large study conducted by scientists from several European countries showed that men who regularly consume saturated fats have a shorter life expectancy than those who restrict their consumption. More recent studies have shown that saturated fats, of course, in reasonable amounts and of organic origin, are good for your health.

The myth of our time is genetically modified foods. This revolutionary discovery opened up new perspectives in creating new varieties and even new products. Allowed to refuse, in many cases, from the time-consuming and lengthy selection of new varieties. However, pseudoscientific journalists are "protectors" of nature, some scientists have inflated the hysteria about the dangers of genetically modified foods. Politicians who play on the ignorance of voters have joined the law baiting campaign. In Ukraine, it took grotesque forms. Manufacturers are required to indicate whether there are GMO products in their products. In addition, salt appeared in Ukrainian stores, mineral water on the packaging of which appeared: without GMOs. Of course, if you eat only modified foods, then complications are possible.

Conclusions. We have to admit that at this stage of development, mankind has not yet come to a balanced attitude to products. A simple rule: all foods are useful if consumed in moderation, not too much and not completely excluded from the diet.

25. Peculiarities of the synthesis of biogenic silver nanoparticles by bacteria

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Introduction. The synthesis of nanoparticles (NPs) in a biological way is quite popular today. A number of studies focus on prokaryotic biosynthesis of nanoparticles, especially silver.

Materials and methods. A review of literature sources was carried out with the aim of analyzing the possibilities of synthesizing biogenic silver nanoparticles using some bacterial species, and studying their biological properties and prospects of use.

Results and Discussion. Classical chemical methods for the synthesis of silver NPs are based on the reduction of cations of metal salts. Bacteria synthesize a large number of low and high molecular weight compounds that have redox potential and are able to recover cations of the dissociating salt of silver. Also, these compounds can act as colloidal stabilizers of highly dispersed NP systems.

A number of studies have shown the formation of biogenic silver NPs by using *Bacillus subtilis* T-1 (spherical shape, 13-19 nm) [1], *Acinetobacter calcoaceticus* LRVP54 (spherical shape, 8-12 nm) [2], *Rhodococcus sp.* NCIM 2891 (spherical shape, 10 nm) [3]. Otari et al. investigated the synthesis of silver NPs using the supernatant of *Rhodococcus sp.* NCIM 2891. The authors also recorded the intracellular formation of NPs [3]. It should be noted that the synthesis of silver NPs by these bacteria depended on the following parameters: silver nitrate concentration, temperature, mixing, and exposure time. The optimal parameters when using *A. calcoaceticus* LRVP54 were: 0.7 mM AgNO₃, 70 °C, 24 h exposure [2], while using *Rhodococcus sp.* NCIM 2891 – 3 mM AgNO₃, 21-25 °C, 130 rpm, 18 h exposure [3]. In the process of biosynthesis of silver NPs using *Bacillus subtilis* T-1 supernatant, 1 mM AgNO₃ was used at 21-25 °C, 200 rpm, 48 h of exposure [1].

A study of the biological properties of synthesized silver NPs showed that they all have antibiotic activity. The NPs synthesized using *A. calcoaceticus* LRVP54 showed a synergistic effect when used with well-known antibiotics – vancomycin and penicillin. The authors showed that the introduction of a small amount of silver NPs in combination with antibiotics can reduce the required dose of antibiotics up to 1000 times.

Conclusions. Silver nanoparticles synthesized using bacteria showed significant antimicrobial activity. Further studies on the mechanism of biosynthesis of silver NPs and their biological activity are of great applied value.

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26. Optimization of Natamycin biosynthesis mediated by *Streptomyces natalensis* NRRL2651

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Introduction. Over the matter of Ukraine population's rising incidence of candidiasis and demand on domestic Natamycin preparations [1], a technology adoption of the Natamycin substance production on domestic biopharmaceutical entities remains pertinent.

Materials and methods. Literature data and statistics were submitted to thorough analysis and used for reference in the estimation of productive capacity and selection of optimal biosynthesis conditions for Natamycin production.

Results and discussion. Presently, the vast majority of Natamycin preparations available in the Ukrainian pharmaceutical market are foreign-made. According to our calculations, it is required to produce 129 kg of Natamycin substance or 72 m³ of cultural broth in a year for substituting a fourth of the imported Natamycin preparations with the domestic ones.

For Natamycin production on an industrial scale, it is critical to select a well-balanced and cost-effective culture medium content. The maximum Natamycin yield can be reached by cultivation in a broth medium composed of (g/l): glucose – 20.0, beef extract – 2.0, yeast extract – 2.0, asparagine – 0.5, KH₂PO₄ – 0.05. During the first 48 hours of cultivation, the cultivation broth is complementarily supplemented by carboxylic acid salts (g/l): C₃H₅NaO₂ – 0.25, C₂H₃NaO₂ – 1.75. The addition of short-chained carboxylic acid salts as the prosecutors of Natamycin biosynthesis to the cultural broth is a non-complicated and at the same time cost-effective solution for increasing antibiotic yield. The addition of acetate-propionate mixture at the 7:1 ratio at the total concentration of 2.0 g/l during the exponential phase of culture growth (during the first 24 hours) contributes to the increase in Natamycin yield to 3.0 g/l by *Streptomyces natalensis* NRRL2651 cultivation. It should be noted that Natamycin concentration in the cultural broth individually supplemented by sodium acetate or sodium propionate is significantly lower by 33% and 28% respectively. The addition of biosynthesis prosecutors during the first 12 hours of cultivation has a stimulatory effect on Natamycin yield but at the same time has a negative impact on biomass production. Supplementing the culture broth with the carboxylic salts in the stationary phase (after 72 hours) has no stimulatory effect on Natamycin production [2].

For transferring the aforementioned technology on the production scale, we suggest conducting biosynthesis in the bioreactor "Frings Proreact-8000B" at temperature – 30°C, pH – 7.0, agitation rate – to 300 rpm, aeration rate – 1.0 L/min for 84 hours. It was calculated that the adherence to the aforementioned cultivation conditions allows producing an annual quantity of Natamycin substance for 84 working days (12 weeks).

Conclusions. The introduction of the proposed technology of Natamycin biosynthesis offers a means of increasing an antibiotic yield for one working cycle and thereby decreasing the number of working days and total production operating expenses.

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27. Application features of HACCP-based food safety management system elements for shiitake mushrooms production in Ukraine

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Introduction. Nutritional value of mushrooms is due to the presence of specific amino acids and trace elements in them. In terms of economic and safety components, mushrooms cultivated artificially are preferred. Their productivity is constant and easily predicted. Though even when mushrooms are cultivated artificially, their safety remains subject to close scrutiny.

The purpose of the study was to establish critical control points that determine the safety of shiitake mushrooms grown on a wood substrate.

Materials and methods. The study analyzed the technological regulations of shiitake mushrooms cultivation of the SLC "ESMASH" (Kyiv), the sanitary condition of the production premises, the food legislative base of Ukraine, the basic principles of the HACCP system. The determination of toxic elements in the substrate, water and mushrooms shiitake was carried out by atomic adsorption spectroscopy. Samples of mushrooms and substrate after drying were obtained by acidification in the microwave device.

Results. The agricultural production, which includes the cultivation of shiitake mushrooms, in the HACCP system carried out in compliance with mandatory requirements of harmonious national standard of Ukraine DSTU ISO/TS 22002-3:2019 (ISO/TS 22002-3:2011, IDT) "Prerequisite programmes on food safety — Part 3: Farming".

They include control of production premises, process equipment, work area air, hygiene requirements for personnel. These factors are unchanged in mushrooms cultivation cycles. Before starting production, they are reduced to the necessary requirements and then subjected to continuous monitoring. Water enters the production cycle from outside. Its specific safety indicators can also be roughly considered unchanged and monitored periodically. The main parameter that is constantly changing with each cultivation cycle is the type of wood substrate. It affects the yield, nutritional value and safety of mushrooms. The chemical composition of the substrate is a critical control point in the shiitake mushrooms production and should be controlled before each production cycle.

The results of water, mushroom and substrate analysis showed the absence of toxic elements such as Pb, Cd. The content of Cu, Zn, Mn was much lower than the TLV, determined by the current sanitary and epidemiological legislation of Ukraine. There is a certain correlation between the content of these elements in the substrate and the mushrooms.

Conclusions. The use of a simplified approach to the application of the HACCP system for the shiitake mushrooms production establishes that the critical control point is the trace element composition of the substrate, which must be controlled with a certain periodicity.

28. Application of minerals in medicine

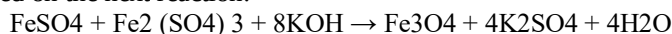
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Introduction. Magnetite nanopowders Fe₃O₄ are widespread in nature and are found in many biological objects. They are used as magnetic fluid fillers when designing electronics devices as well as in medicine.

Materials and methods. The method of copulation of Fe (II) and (III) sulfate salts was selected to obtain magnetite nanopowders. Styrene was used to make the polymer base. By the method of suspension polymerization of styrene with butyl ester of acrylic acid, the above suspension was obtained. Nanocomposite studies were carried out by electron scanning microscopy.

Results. The main objective of this study was to synthesize a nanocomposite that could deliver drugs in the human body to a diseased organ, with a minimal impact on the health of the patient and the physician. Schematically, the magnetite formation reaction can be written based on the next reaction:



The structure of magnetite is investigated by powder X-ray diffraction. X-ray diffraction measurements indicate that such powders are single-phase, which corresponds to the cubic phase of magnetite Fe₃O₄, spinel type.

Microstructural analysis can calculate the average grain size of Fe₃O₄ at 75.5 ± 7.3 Å. Electron microscopic studies indicate that the obtained powders consist of particles with sizes of 5 ~ 25 nm, which is optimal for the use of this material.

Hybrid nanocomposites of polystyrene - magnetite with different magnetite content were synthesized. The Hepler experiment examined microhardness. With 8% filler, the nanocomposite gains maximum hardness. As the selected material can be used as a magnetic sensor, the nanocomposite on its basis reveals the great interest of specialists of different profiles in such a system.

Conclusions. So we found out that a nanosystem consisting of a base - polystyrene and filled with magnetite by a magnetic field possessed by the synthesized magnetite, will be able to "attack" cancer cells and thus not affect the cells of a healthy organ, which will provide healing human. The results of this work confirm the opinion that this type of medication can be presented in the form of tablets, or injected suspensions through the blood, and subsequently, through medical management of the magnet, transferred to where the diseased cells are. This technique is quite promising in the treatment, because among all the methods of treatment of oncology - this method is the safest, but no less effective than others.

29. β -glucan as one of the promising ingredient in cosmetics

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Introduction. β -glucan is a valuable functional ingredient that has numerous industrial, nutritional and medical benefits. β -glucan is a polysaccharide which structural unit is a glucose molecule. It is found in cereals, yeast, algae, fungi and bacteria. Under industrial conditions, the walls of baker's yeast (*Saccharomyces Cerevisiae*), as well as cereals, including barley and oats, are the source of β -glucan production. Depending on the origin of β -glucan, it has excellent functional properties, which causes its use in various cosmetics.

The purpose was to study the properties of β -glucan depending on the origin and to consider the feasibility of their use in cosmetics of different directions.

Materials and methods. A literary search was conducted and generalization of information on the status and prospects of β -glucan use in cosmetics was performed.

Results. β -glucan, which is used in the cosmetic industry, has a number of functional properties that can differ significantly depending on the origin of the raw material. Thus, β -glucan obtained from oat grains is used in cosmetics as a component with anti-aging effect, and β -glucan is made from baker's yeast in UV-protected products. Comparative characteristics of the properties of β -glucan depending on the origin of the raw materials are given below.

So, comparative characteristics of the functions of β -glucan depending on the raw material:

- yeast of the genus *Saccharomyces cerevisiae*:

Structure: $(1\rightarrow3/1\rightarrow6)\text{-}\beta\text{-D-glucan}$.

Physical properties: White powder with a pleasant taste, odorless, can be soluble and insoluble.

Functions of the drug in cosmetics: Anti-inflammatory effect; sunscreen effect.

- of oat grains:

Structure: $(1\rightarrow4/1\rightarrow3)\text{-}\beta\text{-D-glucan}$;

Physical properties: White powder with a pleasant taste, odorless, soluble.

Functions of the drug in cosmetics: Anti-aging effect; moisturizing effect.

- from barley grains:

Structure: $(1\rightarrow4/1\rightarrow3)\text{-}\beta\text{-D-glucan}$.

Physical properties: White powder with a pleasant taste, odorless, soluble.

Functions of the drug in cosmetics: Antioxidant protection.

β -glucan is used as a cosmetics component such as: beach UV protective cosmetics; anti-stress cosmetics; anti-aging cosmetics; creams from wrinkles; serums, lotions; milk; tonics for the skin; hair care products; anti-edema under the eyes.

Conclusions. β -glucan is one of the promising cosmetic ingredients that has properties which have a positive effect on the skin. Namely, anti-inflammatory and sun protection effects (β -glucan obtained from baker's yeast), anti-aging and moisturizing effects (β -glucan derived from oats) and antioxidant protection.

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30. Determination of tannin in various tea varieties

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Introduction. Vitamin P (rutin) is the main vitamin of tea. It helps to absorb vitamin C, strengthens the walls of blood vessels (its main biological feature). Drinking 3-4 glasses of tea of good strength, we provide our body with a daily preventive dose of vitamin P. The need for vitamin P for humans has not been established. For the purpose of treatment, 100-200 mg of vitamin P is injected daily.

Materials and methods. Research methods that were used are the next: theoretical (analysis of educational and scientific literature on the topic of research), experimental (chemical experiment - iodometric titration), statistical (statistical processing of results and their interpretation), survey. We also used the reagents, which are: potassium permanganate (0.1N) solution, indigocarmine, sulfuric acid (1: 4), distilled water. The examples of tea that were taken for the experiments represent the different kinds and marks, such as Green Tea, Black Elite Tea "Da Hong Pao", White Tea, Black Elite Tea "Golden Mao Feng".



Fig. 1. Filtration



Fig. 2. Titration

During the titration, the color of the solution was observed. The bright blue color gradually changes from a blue-green tint to a dark and light green, then through the yellow-green tint the color of the solution changes to golden yellow. We conducted a social experiment which purpose was to find out what kinds of tea people use and which tea is better for drinking.

Results. Results are shown in the Table.

No Per/o	Tea variety	Vitamin content P (%)
1	Green tea	25,98
2	Black elite tea "Golden Mao Fang"	14,01
3	White tea	25,17
4	Black Elite Tea Da Hong Pao	14,01

Tea preferences were arranged in the next order: Green tea prefer 42% of respondents, Black tea 29%, White tea – 9 %, and 20% don't drink tee at all.

Conclusions. Analyzing the data obtained from the study of tannin samples, we can say that tannin is the largest in the green tea sample. We also can say that the green tea is consumed by 42% of our polled.

31. Trans Fats are the enemy of humanity of the 21st century

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Introduction. It's no secret that according to World Health Organization statistics, the highest mortality occurs due to diseases of the cardiovascular system. The causes cardiovascular diseases, including strokes, are trans fats. They begin to be deposited on the walls of arteries in the form of low density lipoproteins, gradually increasing the risk of clogging.

Materials and methods. Research methods which were used during the research: theoretical (analysis of educational and popular scientific literature on the topic of research), experimental (chemical experiment- determination of unsaturated acids and dissolution).

Experiment №1. Reagents: butter, margarine, potassium permanganate,

Potassium permanganate is added to the melted butter, which turns the solution pink. After some time of settling, the liquid becomes discolored and this suggests that the test samples contain unsaturated fatty acids. Sample 1 (butter) discolored immediately, indicating saturation with unsaturated acids and sample 2 (margarine) did not discolor at all. Conclusion: we can see that butter has unsaturated acids, but margarine has not. (Figure 1)



Figure 1

Experiment №2.

This experiment is based on the fact that, when dissolved, trans fats do not leave a greasy shell on the surface of the water, because there is no hydrophobic part like in butter (Figure 2).



Figure 2

Results. By doing these experiments, we can make sure that trans fats are found in all margarine-containing products. They are economically advantageous because they oxidize slowly and correspondingly high shelf life. Its trans-configuration is considered incorrect, because the human body is not able to perceive it at the cellular level and this leads to pathologies.

Conclusions. Therefore, our health directly depends on our nutrition. For the prevention of various diseases, we need to use healthy fats of plant and animal origin only, and avoid the "insidious" trans fats that look so "beautiful" and "tasty."

32. Preservation of biological value of blueberries depending on the method of freezing

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Introduction. Fresh fruits and berries, in particular wild flowers, are the source of vitamins, minerals, carotenoids, phenolic compounds, which are most antioxidants. Freezing is one of the most progressive ways of preserving fruits and vegetables, which maximally preserves the nutritional value of the plant material during storage. The aim of the work was to study the effect of freezing methods on the biological value of blueberries in the freezing and storage process.

Materials and methods. The research object was blueberry berries gathered in the Slavutsk district of Khmelnytskyi region. The studies were performed using standard methods of analysis. To study the effect of freezing on changes in the quality of blueberries during storage, fresh berries were pre-treated and subjected various freezing methods: quick freezing at minus 35°C in a GGM Gastro freezer (Germany) and slow freezing at 22 min.°C in the refrigerator. The frozen raw material was stored in the temperature of the range from minus 22 to minus 23°C and relative humidity of 90... 95%. The freezing of raw materials was carried out in the the production chemical laboratories of Khmelnitsky NPP

Results. The value of the raw material is due to its chemical composition, and above all the presence in its composition of very important from a biological point of view of the substances contained in blueberries (flavonoids, vitamins, etc.), which determines the nutritional and therapeutic and prophylactic value of raw materials.

Physico-chemical indicators of blueberries were investigated on the day of processing without pre-treatment with cold and after exposure to low temperatures.

The results of the experimental studies confirm (Tab. 1) that during the freezing of berries there occur changes in the chemical composition of blueberries: the content of vitamin C, flavonoids, biology-activity of berries. To a greater extent, the quality of blueberries is affected by slow freezing. The results show that blueberries have a high content of flavonoids that stimulate tissue respiration, capable of forming complexes with heavy metal ions, maintain normal state of the body, restore impaired capillary permeability, exhibit anti-edema and antispasmodic action, prevent sclerotic damage to the blood vessels. Vitamin C, which is also present in the chemical composition of blueberries, is involved in redox processes that take place in a living cell and is considered as a powerful stimulating factor for boosting the immune system. The data in the figure show that, been frozen, quantitative changes in vitamin C in blueberries compared with the original sample (fresh berry). Experimental studies have confirmed that low-temperature shock (minus 35°C) contributes more to the destruction of vitamin C - 13.2% versus 0.6% with slow freezing. The results of experimental studies also show that in both cases freezing of blueberries leads to a decrease in the content of solids, flavonoids and biological activity in the berries. Compared to the fresh sample, the solids content during freezing decreased by 7 and 1%; flavonoids by 5.6 and 2.1% respectively, biological activity by 9.1 and 2.2%, depending on the method of freezing.

Conclusions. The results obtained show that the low-temperature freezing of blueberries allows to preserve biologically active substances, in particular, flavonoids, which have antioxidant nature and determine the importance of raw material use in nutrition, compared to the slow freezing method.

33. Use of stem cells in medicine

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Introduction. One of the topical issues in current biotechnology research is the study of different types of stem cells, which opens up significant prospects for the treatment of serious incurable diseases such as diabetes, cardiovascular disease, neurodegenerative diseases, and others.

Materials and methods. During the research a number of scientific publications on the issues of scientific intelligence, materials of periodicals, Internet resources were used. In the work the complex research methodology is formed, which is based on the general principles and methods of system analysis. The analytical description of biotechnological aspects of the use of mesenchymal, embryonic, stromal and induced pluripotent stem cells is based on the methods of morphological analysis and synthesis of systems using elements of general scientific (abstraction, generalization, formalization) and empirical analysis.

Results of research: The first report on the presence of stem cells was brought to the scientific community by Russian histologist O.O. Maksimov, who in 1908 introduced the term "stem cell" to explain the mechanism of rapid self-healing of blood cells.

Naturally, embryonic stem cells are excreted from the embryo. The ability to isolate human embryonic cells from blastocysts and to grow them in culture depends largely on the integrity and condition of the blastocyst from which the cells are derived. Embryonic stem cells are obtained mainly in the form of a hollow ball from the internal cell mass of blastocysts, which are formed in a person three to five days after ovum fertilization with sperm. The blastocyst of a person is approximately the size of a dot. With the normal development of cells within the inner cell mass, more specialized cells are generated that give birth to the whole body - all our tissues and organs. However, when scientists isolate the internal cell mass and grow these cells in special laboratory conditions, they retain the properties of embryonic stem cells. Embryonic stem cells are pluripotent, that is, they can generate every cell type in a fully formed body except the placenta and umbilical cord. A special feature of these cells is that they do not express HLA (human leucocyte antigens), i.e. they do not produce tissue compatibility antigens. This makes it possible to transplant them with a low risk of rejection. These cells are incredibly valuable as they provide a renewable resource for disease study and development, as well as for drug testing and other treatments. Also note that the most important disadvantage of embryonic stem cells is the impossible autologous use in transplantation, as the selection of these cells is incompatible with its development in ontogeny.

Japanese scientists have proven that bone marrow stem cells have potential of oncogenic activity. In preparation for treatment, the patient is removed by a small puncture bone marrow bone volume that contains stem cells. The stem cell sampling procedure is absolutely safe for the patient. The physician then injects the solution into the treatment site. Cells multiply and take over the functions of diseased tissues, and the results are amazing!

Conclusions. Stem cells are already used for cancer, diabetes, Parkinson's disease and heart failure treatment. They are also increasingly used in the treatment of musculoskeletal system. The analysed data in this review indicate the need for more in-depth biotechnology research and the use of stem cells in biotechnology and regenerative medicine.

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34. Investigation of chemical transformations in corn oil during the heat treatment

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Introduction. Most vegetable fats (oils) are characterized by a high content of unsaturated fatty acid esters that causes their high ability to oxidize and polymerize. The speed of these processes increases significantly when the oils are heated. Oxidation of fats leads to their darkening and odor.

Materials and methods. Refined corn oil for the brand “Kama”, heat treatment of a sample of oil at a temperature of 235 °C. Monitoring of changes in chemical transformations in oil by the NMR ^1H spectroscopy.

Results. The effect of prolonged heat treatment at the temperature close to the smoke point on the chemical resistance of the “Kama” refined corn oil was studied. Heat treatment of the oil sample was carried out in a steel container for cooking at a temperature of 235 °C with continuous stirring for 2 hours and contact with air. ^1H NMR spectra of the sample were recorded at 30 min intervals from the beginning of the experiment. The fatty acid composition of corn oil is dominated by di-unsaturated acids (about 60%), which is consistent with the literature.

As evidenced by the gradual decrease in the area of CH_2 signal groups of the bis-allyl fragment of the carbonic skeleton (at 2.77 ppm) during the experiment, the residues of the unsaturated acids undergo the largest changes during heat treatment. Conversions involving the hydrogen atoms of vinyl and allyl groups occur to a lesser extent, as evidenced by a slower decrease in the integral intensities of the corresponding signals at 5.33 ppm and 2.31 ppm (Fig. 1).

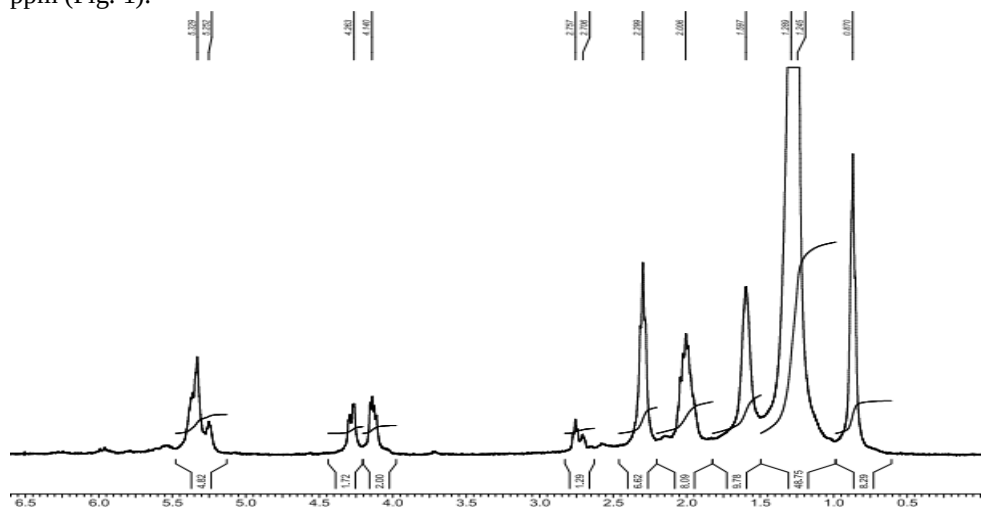


Fig. 1. NMR spectrum of ^1H corn oil sample after 120 min heating at 235 °C

Conclusions. During the heat treatment at 235 °C, the native structure of the corn oil triglycerides is destroyed. The rate of irreversible processes and the decomposition degree of triglycerides increase over time. The most sensitive moiety in corn oil triglyceride molecules is the bis-allyl group of $-\text{CH}_2-$ polyunsaturated fatty acids, represented mainly by linoleic esters.

35. Lycopene is a food supplement – powerful antioxidant

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Introduction. Lycopene is a naturally occurring organic compound that belongs to the carotenoid group whose compound has a high molecular weight, insoluble in water, well soluble in oils and alcohol. Lycopene determines the color of the fruits of some plants, such as tomatoes, guava, watermelon. Unfortunately, the human body cannot independently synthesize lycopene, it is formed in plants during photosynthesis.

Materials and methods. Study of literary sources on the topic "Lycopene - food additive", its vegetable sources and the effect of lycopene on the human body, namely its antioxidant effect and ability to prevent serious diseases.

Results and discussion. Currently, much attention is being paid to technology for producing lycopene from tomato raw materials. Lycopene has a special formula that gives it the ability to block the destructive effects of free radicals on the human body. The main function of lycopene in the human body is antioxidant. Reduction of oxidative stress slows the development of atherosclerosis and also protects DNA, which can prevent oncogenesis. Consumption of lycopene as well as lycopene-containing products leads to a significant decrease in the markers of oxidative stress in humans. Several studies suggest the signaling role of lycopene for some cell cultures. In particular, it is contemplated that lycopene may slow cell proliferation as a signal metabolite. About one hundred studies have been conducted on the prevention of cancer with the help of lycopene or lycopene-containing products. The data is controversial, which is due to the indirect nature of the experiments. It has been found that the risk of developing some cancers is inversely proportional to the blood (or daily intake) of lycopene. Such conclusions can be drawn with regard to cancer of the stomach, lungs and prostate (which is why lycopene is especially useful for men). In large doses, lycopene inhibits the growth of carcinoma (a malignant tumor in the kidney) and can potentially prevent this type of cancer.

Conclusions. Today, one of the most important tasks of the country is preserving the health and efficiency of its citizens, increasing its life expectancy and improving the quality of life of its population. Therefore, expanding the range of healthy nutritional supplements is a priority in the Ukrainian food industry. The solution to this problem requires the creation and introduction into the modern structure of nutrition of biologically active substances, such as lycopene, which has the ability to increase the level of adaptive protection of the organism to the effects of adverse environmental factors on the human body and reduce the risk of developing a number of dangerous diseases, including oncology.

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36. Synthesis and study of garnet ceramic pigments

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Introduction. Ceramic pigments are inorganic colored finely dispersed powders which, when added to a material, impart certain color and change some of its properties. Garnets are a group of minerals different by composition but with analogous chemical formulae and similar appearance of their crystals. The transparent saturated colored garnets are demanded precious stones. The name of the group comes from the Latin word *granatus* which stands for the seeds of the granate tree. Garnets have various colors: purple red - almandine, colorless of yellow - green - grossular, brown or black - melanite, green - uvarovite, red - pyrope and andradite, etc.

Materials and methods. For the preparation of garnet ceramic pigments in the system $\text{CaO} \cdot \text{Cr}_2\text{O}_3 \cdot \text{SiO}_2$, the blends were defined on the basis of the stoichiometry of the main mineral – uvarovite $\text{Ca}_3\text{Cr}_2(\text{SiO}_4)_3$. The following composition was selected for the pigments - $3\text{CaO} \cdot \text{Cr}_2\text{O}_3 \cdot 3\text{SiO}_2$. The mineralizer used in the synthesis to decrease the synthesis temperature and accelerate the processes of formation of the new phase was H_3BO_3 . The materials used for the synthesis were CaO , Cr_2O_3 , $\text{SiO}_2 \cdot n\text{H}_2\text{O}$ and H_3BO_3 . The substance used to introduce SiO_2 into the system - $\text{SiO}_2 \cdot n\text{H}_2\text{O}$, is much more reactive than the common quartz sand and the particle sizes were dispersed in the range 2-7 μm . The quantities of the materials from which 100 g blend is prepared were weighed with precision of 0,1 g, then they were mixed and homogenized in dry state in a planetary mill Pulverizete - 6, product of "Fritch". The sintering was carried out in a laboratory muffle oven at heating rate 300 - 400°C/h in air atmosphere; the blend was placed in a porcelain crucible with a lid. The isothermal period at the final temperature was 2 hours. The pigments were sintered at 800°C, 900°C, 1000°C, 1100°C and 1200°C.

Results and discussion. X-ray phase analysis as a direct method for identification of phases. It is based on the diffraction of X-rays. The main task of the X-ray analysis was to identify the different phases individually or aim blends using the diffraction pattern registered from the sample studied.

The basic method of the phase analysis is the powder method which is widely used due to its simplicity and ease of versatility. The X-ray studies were performed on an apparatus IRIS with Cu K_α radiation and nickel filter, in the range of angles from 2 to 80°. The interplanar distances (d , nm) were calculated by the formula of Wulf - Bragg: $n \cdot \lambda = 2d \cdot \sin \theta$, where: λ – X-ray wavelength, nm; n – diffraction order (n = positive integer); θ – Bragg's angle of diffraction, grad. X-ray patterns of the garnet ceramic pigments synthesized are presented in Fig. 1.

The pigments synthesized had stable green color and significant formation of the main phase - the mineral uvarovite $\text{Ca}_3\text{Cr}_2(\text{SiO}_4)_3$, was observed at 1100°C, although reflexes from wollastonite (CaSiO_3), cristobalite (SiO_2) Cr_2O_3 were also observed.

The colors of the pigments were determined spectrometrically with a Tintometer RT 100 Colour. The highest amount of green color $\pm a^*$ was found for the pigment synthesized at 1100°C.

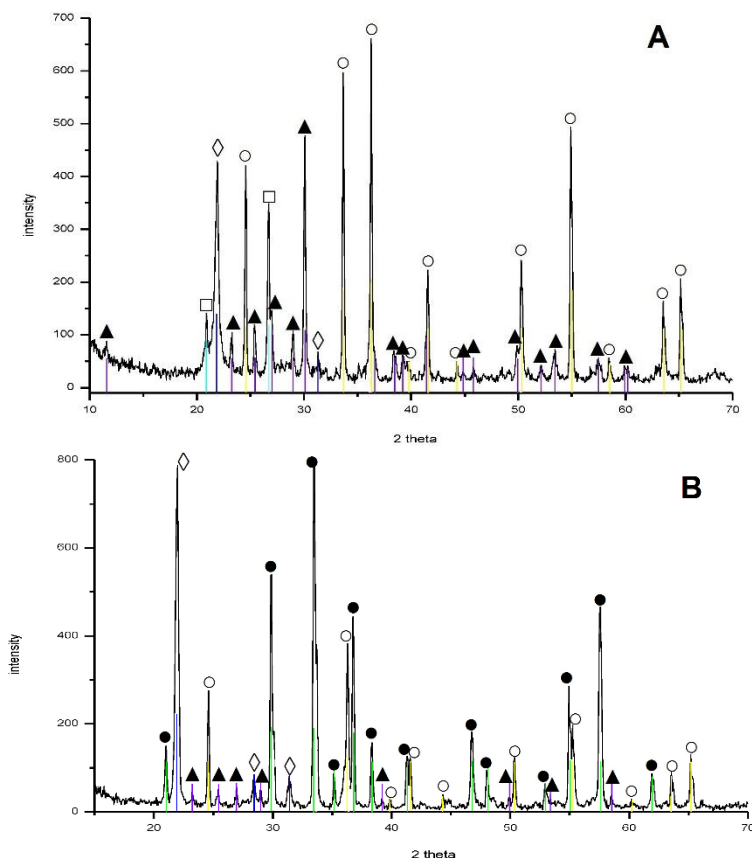


Fig.1 X-ray patterns of pigments in the system $3\text{CaO} \cdot \text{Cr}_2\text{O}_3 \cdot 3\text{SiO}_2$ taken at 900°C (A), 1100°C (B)

- - Uvarovite $\text{Ca}_3\text{Cr}_2\text{Si}_3\text{O}_{12}$ ▲ - Wollastonite CaSiO_3 ◇ - Cristobalite SiO_2
- - Quartz SiO_2 ○ - Chromium oxide Cr_2O_3

Conclusions. Green ceramic pigments were synthesized on the basis of the garnet uvarovite by the method of solid phase sintering. The optimal parameters of the process of synthesis were determined. The best results were obtained with the pigment synthesized at sintering temperature of 1100°C . The pigments obtained are suitable and can successfully be use in glazes for tiles and sanitary ceramics.

Acknowledgements:

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Spectrophotometric determination of starch components

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Introduction. Native starch is a natural vegetable polymer that consists of two components - amylose and amylopectin. Fractionation of starch allows to investigate its polydispersity for use in chemical technology.

Materials and methods. The material chosen for the experiment is potato starch. Spectrophotometric analysis was used for this analysis.

Results. The quantitative content of amylose in the iodine-amylose complex was determined by spectrophotometric method.

To determine the working wavelength, the spectral characteristic of the iodine-amylose starch complex was previously obtained (Fig. 1).

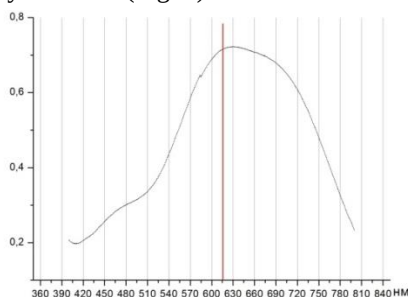


Figure 1 - Spectral characteristics of iodine-amylose starch complex

As can be seen from the graph, the maximum of light absorption is in the range of 615–630 nm, which coincides with the literature data. But depending on the type and characteristics of the raw material for starch, this maximum may shift towards smaller wavelengths. Therefore, a wavelength of 610 nm was chosen for the work.

Based on the obtained optical density values, a calibration graph was constructed to determine the concentration of amylose (Fig. 2).

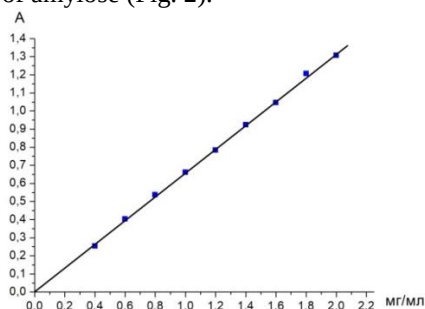


Figure 2 - Grading graph of amylose determination

The obtained data show that the graph of optical density versus the amount of amylose has a linear dependence, the equation has the form $y = ax + b$ and the approximation coefficient is 0.9998896.

Conclusions. The content of amylose in the iodine-amylose complex was determined using a spectrophotometric method and the linear dependence of the optical density on amylose was established.

37. Physiological properties of lycopene

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Introduction. Lycopene involved in many main plant development processes: in pigmentation of berries, in protection plants from unfavorable environment factors, in protection plants from oxidative stress, thanks to its antioxidant qualities [1]. Also lycopene E-160d carries out important functions in human body, namely promotes increased immunity, reduces the risk of cardiovascular disease, normalizes intercellular metabolism, reduces the negative impact of free radicals. Lycopene is especially used in therapeutic treatment of prostate cancer [2, 3].

Materials and methods. Based on an analytical review of scientific- technical literature, there was considered a research of antioxidant properties of lycopene – nutritional supplements E-160d.

Results. The analytical study identified a number of models that explain the antioxidant qualities of carotenoids:

- The interaction of carotenoids with peroxide radicals leads to the formation of products of oxidation, isomerization and decay, which can adversely affect biological systems.
- When it's high concentration, carotenoids can change qualities of biomembranes, that affects the permeability of toxic substances, molecular oxygen or radicals.
- The interaction of reactive oxygen-containing radicals with carotenoids may lead to the accumulation of carotenoid-peroxide radicals prone to initiate further lipid peroxidation [3].

Also one of the specialties of lycopene is its strong structure molecule, which is not destroyed by high-temperature processing and even contributes to an increase in the carotenoid content and its antioxidant activity, in particular in the processing of tomatoes for tomato paste. Concentration of lycopene in tomatoes is near 2 mg trans-isomer/g. Then tomatoes are processed at temperature 88° C and within 2, 15, 10 minutes the amount of bioavailable lycopene in them increases to 3.1; 5.4 and 5.3 mg/g. Antioxidant active increases from 4.13 mole of vitamin C equivalent/g of product to 5.3; 5.5 and 6.7 mole of vitamin C equivalent/g [3].

Conclusion. Lycopene is the strongest carotenoid – antioxidant, which is contained in human blood. Biochemists have confirmed that lycopene has more high antioxidant active than β -carotene [4]. Hygienists include tomatoes in the list of the healthiest products [2].

38. Control of component composition of food powders by infrared spectroscopy

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Introduction. Food manufacture is subject to many safety and quality regulations. Effective quality control is thus a preeminent consideration in the food industry in that it ensures customer satisfaction and safety are achieved as far as possible.

Materials and methods. This study aimed to establish a correlation between the obtained infrared spectra of diffuse reflection and powdered food mixtures. The subject of the study was selected dry powders of white sugar with impurities of cinnamon, bee pollen, mustard, pepper, ginger and the like.

Results. Nowadays, food nutrition and safety are gaining increasing public attention. Near-infrared spectroscopy, a rapid and nondestructive analysis technique with good reproducibility, has been widely applied for fast detection of food compositions and quality evaluation in food products to guarantee food safety and to provide technical support in food development.

Much of the primary studies of food powder mixtures were performed on an «Infrapid-61» infrared spectrometer. At the initial stage of the study, the reflection spectra of each component were obtained separately. Then the reflectance spectra of powders with different component composition were obtained. In the course of this study, the spectral features of the samples with different moisture content were also studied.

Infrared reflection spectra are determined by the chemical nature of the specimen and its morphology (dispersion). In this paper, it was shown that when the dispersion (crushing) of the sample changes, the profile of the spectrum is practically unchanged, the position of highs and lows is maintained, while the spectra change substantially in intensity.

This method also allows the detection and identification of the presence of foreign impurities in powdered food mixtures. Thus, it is possible to carry out current control directly at the production and to carry out quality control of ready-mixed powders in retail trade, as well as to check the conformity of marking. Sensitivity of infrared spectroscopy to the water content of the samples makes this method an indispensable tool for humidity control. The best results were obtained in the case of dry powders (dried to constant weight). In the presence of a large number of different components that were part of the food powder mixture, the interpretation of the results was somewhat complicated. In this case, additional instruments must be used to interpret the spectra accurately and uniquely.

Conclusions. The revealed spectral patterns make it possible to conclude that infrared spectroscopy can successfully control the component composition of food powders, control the moisture content and identify the foreign impurities.

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39. Quality control of honey using infrared spectrometer

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Introduction. These studies were conducted to test and improve the rapid methodology for determining the basic quality parameters of bee honey (sucrose, glucose, fructose, 5-HMF, moisture content).

Materials and methods. In this paper, honey quality control was performed using a Fourier Transform Near-Infrared (FT-NIR) Spectrometers. Samples of natural honey were taken from the apiary located in the Kyiv-Svyatoshinsky district, Kyiv region, after the acacia and linden blossoms.

Results. Honey has long been used as a food product that has healing and immunostimulating properties. It is a natural sweet food produced by the bees of *Apis mellifera*, which collects nectar from plants and then makes honey after a series of specific processes. Honey has different structural differences depending on the region where it is produced, the type of bees, climatic conditions, vegetation, storage conditions and the presence of any adulteration during its production.

Honey studies to date are mostly conducted using traditional methods, which are generally focused on defining geographical and botanical origin, quality control and counterfeit detection. At the same time, the analytical methods used in these studies are time-consuming and involve fairly complex procedures in the sample preparation process. Such methods require the use of toxic chemicals and require skilled work to perform the above analyzes. Consequently, standard methods of analysis may not always satisfy the ever-increasing demands on honey quality. Traditional methods of honey analysis can not implement relatively inexpensive, as a consequence, accessible to the public, ways to solve current problems of today.

Due to the potential risk of incorrect labeling of bee products and the presence of counterfeits in the retail industry, scientists are developing new research methods to find new, simple and cost-effective solutions to determine the parameters of honey quality indicators. One of the attractive options is infrared spectroscopy, as it provides fast information on the components of the food, but does not require a complicated sample preparation procedure.

The use of infrared spectroscopy makes it possible to successfully find solutions to problems related to quality control and food safety and to obtain unique information regarding their biochemical composition.

The obtained values of honey quality parameters in this experiment coincided within the margin of error with the results of studies obtained using traditional methods. This fact confirms the high reliability of the data obtained with FT-NIR Spectrometers.

Conclusions. Infrared spectroscopy has proven to be an effective, non-destructive (samples completely retain their properties) method of rapid analysis, which requires a relatively small amount of honey (about 15-20 g).

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40. Technological aspects of production of carnauba wax E-903

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Introduction. Carnauba wax use in food, perfumery and cosmetic, pharmaceutical industries. Unclean carnauba wax contains resins and other impurities that have negative affect on the human body.

Materials and methods. On the basis of the analytical review of the scientific and technical literature, technological aspects of production of carnauba wax E-903 were considered.

Results. Technology of carnauba wax has principal difference on the purification stage:

1. Purification of carnauba wax using method of extraction;
2. Technology of wax purification by thermal radiation.

The first modern method of purification of Carnauba wax was proposed in 2000 by Japanese scientists Fujisawa and Inata [2]. The sense of the method is that the wax is removed from the surface of the leaves and dried in the sun. The wax is melted and alkaline earth metal oxide is added to neutralize the free fatty acids. The extraction is carried out at the temperature of 75-100 °C with a polar solvent. Preferably alkaline earth metal oxide or carbonate is used and ethyl alcohol is the solvent. The resulting wax had an acid number 7 (before cleaning the acid number of the wax was 9.5) and a low content of resins. The latter were detected by TLC.

The disadvantage of this method is the use of ethyl alcohol in large quantities. This solvent is expensive. Another polar solvent can be toxic to the human body.

The second method of wax purification (Fidarov and Abaev - 2013) is purification by thermal radiation. The method involves boiling and filtration. The boiling is performed at 100 °C temperature with the simultaneous influence of ultrasonic vibrations, directed upwards at frequencies that cause a cavitation effect, which destroys all pathogenic microorganisms and creates a regime of flotation enrichment, brings all colloidal suspensions to the surface in the form of foam, which is continuously separated. An invention makes it possible to reduce costs when cleaning wax from mechanical impurities, colloidal suspension, as well as complete decontamination of the wax in one stage, keeping the structure of the wax in its native form.

The disadvantage of this method is that it is time consuming, structurally and technologically sophisticated. The sump or heat exchanger is provided with one or more layers of mesh filters, and in the wax raw material contains resins, impurities of pollen, forming different in size lumps, which at the same time clog the filters, so they must be constantly changed or cleaned.

Conclusion: The method of purification by extraction with ethyl alcohol (the first method) is less laborious, allows to obtain wax with high quality indicators, but requires the search for cheaper extractant.

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41. Identification of impurities in the production of beta-glucans from barley grains

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Introduction. β -glucan is a valuable functional ingredient that has numerous industrial, nutritional and medical benefits. The aim was to study and compare β -glucan from barley grains purchased and obtained under laboratory conditions.

Materials and methods. The β -glucan from barley grains was laboratory-obtained and purchased (Vilaruus Research and Production Company, LLC), which was examined by infrared spectroscopy. IR spectroscopic studies were performed on a FTIR-8301 PC spectrophotometer.

Results. In laboratory conditions, β -glucan from barley flour is obtained including the following stages: hydrolysis at various pH values, aqueous extraction, extraction at low temperatures, to remove starch and protein components, dialysis extract to remove starch and protein cleavage products, purification and drying of polysaccharides.

Samples for the spectrophotometer study were tablets containing 4 mg of β -glucan powder and 200 mg of potassium bromide. Quantitative analysis of the IR spectra of the analyzed products was performed according to the values of relative optical density, using the baseline method and the internal standard. Figure 1 shows the infrared spectra of extracted and commercial β -glucan [2].

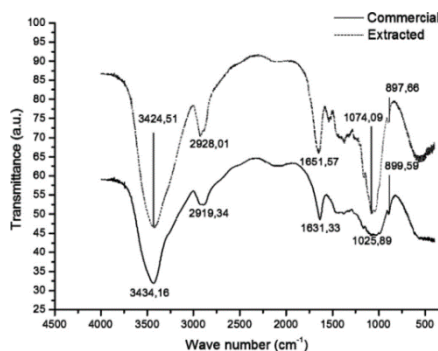


Figure 1. Infrared spectra of extracted and commercial β -glucan.

The starch is bound to the bonds at 930 cm^{-1} and at 1078 cm^{-1} ; a peak at 1074 cm^{-1} of extracted β -glucan indicates the presence of starch. Carbohydrates can be recognized by peaks at wave numbers of 1040 cm^{-1} (bonding of CO alcohol group), 2940 cm^{-1} (CH-stretching) and 3400 cm^{-1} (OH-stretching). It is also important to note that the spectra showed absorption peaks at 987 cm^{-1} are valid for the laboratory-obtained sample and 999 cm^{-1} for attached, indicating β -glycosidic anomeric bonds.

Conclusions. The IR spectra of β -glucan from barley grains extracted and purchased were obtained. A sample of laboratory-derived β -glucan showed a high content of this component, but it also contained starch and protein, while the purchased one had a higher degree of purification from the related impurities - starch and protein.

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Section 2

Processes, Equipment and Control Systems of Food Production

Chairpersons:

Dr. Liudmyla Kryvoplias-Volodina

Dr. Yurii Zmiievskii

1. Optimal structural and operational parameters of the operation of a vibropneumatic separator for the rapeseed by specific gravity

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Introduction. The efficiency of crop production depends on compliance with the technology of cultivation of the crop and the quality of the seeds used for sowing. Improving the quality of seed is one of the key issues in seed production. The most economical way to improve the quality of the seed at the pre-sowing stage is to sorting the seeds by specific gravity in the fluidized bed at the installations of the vibropneumatic principle of operation.

Materials and methods. In accordance with the purpose and objectives of the research, the research has been carried out in the following directions: development and creation of an experimental instalation for studying the process of separating (sorting) rapeseed by specific gravity; determination of the optimal operating-structural parameters of the developed vibropneumatic separator.

Results and discussion. On the basis of a graphical method for optimizing the structural and operational parameters of the developed vibropneumatic separator, the optimal parameters of the process of sorting rapeseed by specific gravity is determined from the point of view of ensuring the maximum process efficiency:

- the amplitude of oscillation of sieve 2.5 mm,
- sieve oscillation frequency 19.5 Hz,
- air velocity 1.2 m/s,
- sieve tilt angle 2.6 deg.

These operating and design parameters of the vibropneumatic separator are recommended for use in pre-sowing preparation of rapeseed with a high yield potential. This will increase the yield of rapeseed depending on the quality of the seeds by 10–15% (subject to a high level of cultivation technology).

Evaluation of the effectiveness of the refinement of rapeseed on a vibropneumatic separator was confirmed under production conditions on the experimental fields of the Belarussian agrarian enterprise “Radavoie gniazdo” (variety “Vadaliel”) and Scientific-practical center of Belarus for Agriculture (variety “Nioman”). Sowing with modified seeds allowed to increase the yield of rapeseed compared to the control batch by 16.5 (variety “Vadaliel”) and 13.4% (variety “Nioman”).

Conclusions. For the first time, optimal parameters of the developed vibropneumatic separator have been determined for rapeseed, providing the maximum technological efficiency of the process of sorting rapeseed by specific gravity: amplitude of the sieve vibration 2.5 mm; sieve oscillation frequency 19.5 Hz; air flow rate 1.2 m/s; sieve tilt angle of 2.6 degrees. The use of these parameters in the pre-sowing refinement of rapeseed will increase the productivity of the cultivated crop and, accordingly, economic indicators.

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2. Measuring complex of the temperature field of minced meat products

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Introduction. An urgent task is to study the process of heating minced meat in direct contact with the heating medium. In this connection, the shape and size of the product must correspond to a one-dimensional body.

Materials and methods. After carrying out theoretical calculations, it was decided to perform a cylindrical product with dimensions $d \times h = 57 \times 300$ mm. the ratio of the diameter to the length of the cassette is equal to or exceeds the multiplicity of 5. The calculations show that with this ratio, the heating from the ends will have almost no effect on the heating of the central layers and the resulting product can be considered as an infinite (unlimited) cylinder. In this connection, the product radius (28...29 mm) allows you to warm up the product for a long enough period to obtain correct data.

Results. For carrying experimental studies of the heating process of minced products, an experimental installation has been developed. The experimental setup is based on the UNOX-203G injection steam-convective furnace (Italy). This unit is a typical representative of modern steam convection furnaces. The obtained research results can be applied to the entire range of frying and baking machines with forced circulation of the heating medium.

Medical gauze with cell sizes of 2×1 mm and a tissue density of 35 g/m^2 is used for research. When stuffing with minced meat, the gauze was stretched, the size of the cells increased and exceeded the original ones. In the product obtained in this way, the minced meat is directly in contact with the heating medium, since the gauze cells are very large in relation to the threads.

The bag is placed in a special cassette, which is a welded frame structure made of thin metal rings connected on both sides by rods. The internal dimensions of the cassette are 57×300 mm, formed by a solid base, four rings with a cross section of 2.5 mm and connected by two rods with a cross section of 4 mm. Metal rings and rods occupy less than 3% of the cassette area and do not have a noticeable effect on the heating process of the workpiece.

For rigid fixation of thermocouples, ensuring accuracy of installation and eliminating knocking down of the head, a special design for mounting thermocouples has been developed. This thermocouple mounting design consists of a platform with welded thin rods. When mounting, the thermocouple head extends beyond the rods by 2...3 mm.

Experimental studies were conducted on the developed stand. Calculations of the heating process of a cylindrical workpiece were performed using mathematical regularities of non-stationary thermal conductivity for one-dimensional bodies. The results of the calculation were compared with the results of experimental studies. The deviation of the experimental results from the calculated data is from 1.49 to 4.44 % at different temperatures of the heating medium and does not exceed an error of 5 %.

Conclusions. The design of the measuring complex of the temperature field of minced meat products has been developed. Experimental studies with high convergence with the calculated data were carried out.

3. Energy characteristics of the ultrafine grinding process in a laboratory bead mill

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Introduction. The purpose of the study is to determine the excess energy consumption of the grinding process of the bead-product system.

Materials. Castor oil pharmaceutical – vegetable oil from the fruitage of castor ordinary. Pigment red 120 iron oxide (Fe_2O_3), powdery material of red-brown color, humidity less than 1%. Bulk density 1–1,1 g/cm³. Density of 5.0–5.1 g/cm³. The shape of the particles is spherical. The preferred particle size is 0.11 μm . Used laboratory bead mill. The working body consists of a shaft on which 4 disks with 4 symmetrically located slots with a diameter of 1 cm are fixed. Working bodies - glass beads with a diameter of 2 mm. Rotor speed 1350 rpm. The readings of the devices are removed for 62 minutes. The weight of the product was 250 grams (50 g pigment and 200 g oil), and the flow rate of cooling water was 0.0083 kg/s.

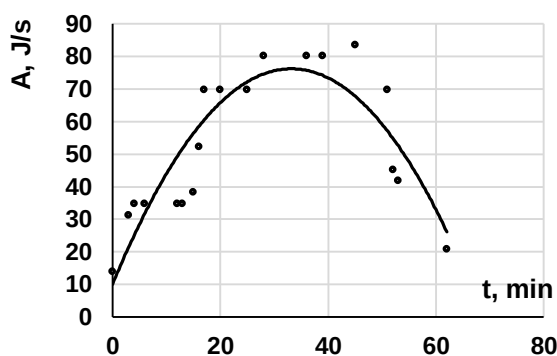


Fig. 1. Excessive energy consumption during the experiment

Results and discussion. At the beginning of the experiment, the temperature, and therefore the energy, increases smoothly as the primary agglomerates and large fractions of the solid fraction are destroyed. Further, there is an increase due to the increase in the surface area of the newly created surface, the increase in the viscosity of the system and, accordingly, the excess energy for grinding. At the end of the experiment, the energy consumption goes out, the

suspension is already crushed, and there remains constant energy released during the friction of the working bodies (beads) against the walls of the chamber and working bodies.

The specific energy of the whole experiment was calculated by the formula $\int_{t_0}^{t_k} q(t)dt$ and is numerically equal to $Q_{\text{specific}} = 1,615 \times 10^3 \text{ J}$.

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4. Research on the use of unconventional raw materials in the production of beer

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Introduction. Beer is one of the oldest known beverages in the world and at present the main alcoholic beverage consumed worldwide [1]. The conventional raw materials for making beer are malt, hops, water and brewer's yeast. It is estimated that about 85-90% of world-produced beer that is currently produced from other raw materials, besides the traditional ones: barley malt or wheat malt [2, 3]. The main objective of this study was to use the unconventional raw materials that have been previously developed to brew a beverage similar in aroma, taste and mouthfeel to black beer.

Materials and methods. Black beer was obtained according to a conventional method of obtaining beer with following main operations: mashing, filtration, boiling, cooling, fermentation, maturation, pasteurization and bottling. In the manufacturing recipe, brown malt has been replaced with acorn flour and Jerusalem artichoke flour. It is also used a molasses content of 50% sucrose to increase the raw beer extract. For fermentation is used a bottom-fermenting yeast of *Saccharomyces carlsbergensis* species. The fermentation temperature was maintained at 10 °C for 6 days. Then, after cooling down to 2° C, the yeast was discharged from the bottom of the vessel. The maturation lasted for 10 days. At the end of maturation, the beer was analyzed from the sensorial and physicochemical point of view in accordance with EBC-methods: colour, pH, total acidity, foam stability, content in CO₂, apparent fermentability and alcohol concentration. For the analysis of beer - finished product was used the apparatus Anton Paar. The physico-chemical indicators of the black beer obtained were compared with those of a black beer on the Romanian market.

Results and discussion. Four variants of the finished product have been developed to optimize sensory and physico-chemical characteristics. Thus, the ratio between acorn flour, Jerusalem artichoke flour and molasses was: variant 1 - 0.5:1.5:1; variant 2 - 1: 1: 1; variant 3- 1:1.5: 0.5; variant 4 - 1.25:1.25:0.5. The black beer obtained in all 4 experimental versions is a beer with an alcoholic concentration between 7.08% and 8.17%, with a high degree of final fermentation, with values between 73.35% for variant 2 and 85.92 % for variant 4. The variant that met from the point of view of sensory analysis the highest score was variant 4.

Conclusions. The new assortment of beer proposed is a black beer, obtained on the basis of an innovative manufacturing recipe, which uses as alternative raw materials to malt of barley or wheat, acorn flour, Jerusalem artichoke flour and molasses. The finished product presents great sensorial qualities, a freshly roasted coffee flavor, a fruity taste, bittersweet, with shades of green nuts and an unmistakable freshness. The analytical data obtained with the acorn and Jerusalem artichoke flour were comparable to conventional black beer, which acted as a control.

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5. Improvement of process and equipment for homogenization of ointments and pastes

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Introduction. Analytical and experimental studies have been conducted to improve the process of homogenization of the components of soft drugs and cosmetics.

Materials and methods. Analytical studies based on the analysis of modern scientific, information literature, patent bases, as well as public information of manufacturers of pharmaceutical and cosmetic products. The experimental studies consisted of determining the rheological parameters of soft drugs and cosmetics, in particular ointments and toothpaste, on a Reotest 2.0 viscometer. The energy parameters of the homogenization process are determined taking into account the results of studies based on known criteria.

Results and discussion. The main advantages and disadvantages of the available process theory and equipment for homogenization of emulsions - ointments, pastes and components of cosmetics are determined. The main disadvantages of the available equipment:

- Low efficiency of mixing and partitioning of the emulsion particles, and as a consequence - poor performance;
- Presence of stagnant areas where the product is not homogenized;
- Insufficient data on the rheological parameters of the investigated products and operating parameters of the equipment.

The rheological properties of liquid medicines and cosmetics were investigated. It was found that the shear stress with increasing shear rate initially increases, at high shear rates it increases more slowly, that is, the viscosity decreases. However, the viscosity of some gels in the studied range of shear rates decreases slightly. The viscosity of all tested products decreases with increasing temperature. The viscosity of toothpastes decreases slightly with increasing temperature, which is explained by their water base compared to oily for most ointments. The obtained data are confirmed by the results of other researchers on similar products, and allow to calculate the drive power of homogenizers at the design stage.

The modernization of the homogenizer consists in the installation of a turbine mixer and an external circulation circuit. This reduced the homogenization time from 4 to 1 hour and, accordingly, increased productivity.

Conclusion. The scientific novelty of the results is to obtain a number of dependences of the viscosity of ointments and pastes on the shear rate and temperature. The practical value is to improve the design of the homogenizer and, accordingly, to reduce the time of homogenization.

6. Using the method of gravitational penetration for determination of consistency of concentrated dispersed systems

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Introduction. Analytical and experimental studies consistency dispersion systems of the new method – gravitational penetration.

Materials and methods. Dispersion systems – pate meat products from mechanically separated poultry are being investigated. The consistency was determined by gravity penetration. Penetration indices are determined on the basis of mathematical modeling of indenter motion in the product layer based on second order differential equations of motion.

Results and discussion. The proposed method for determining consistency is easy to use. The presented calculus dependencies and mathematical models are based on physical constants, which makes the method of gravitational penetration versatile for wide practical application in estimating the quality of food by the express method. The presented mathematical model obtained based on the second-order differential equations, suitable for different research and use me different designs gravitational penetrometer.

To perform a comparative analysis of the consistency of food products obtained from different technological modes or formulations, it is proposed to use a comparative characteristic in the form of a coefficient K. Its value is calculated as the ratio of the depth of immersion of the needle into the product layer when falling penetrometer from one height.

The highest rates were pate sample containing 40% of mechanically separated poultry meat and 8% of rice flour, and the smallest, pate sample, containing 30% mechanically separated poultry meat and 10% of rice flour.

Conclusion. Defining the method of gravitational penetration extends the possibility of obtaining accurate results in comparison with the use of existing methods and a priori formulas.

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7. Original approaches for improving quality and safety characteristics of spirituous products

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Introduction. Ethanol is the kind of spirits that over two billion people use every day. This kind of spirits is produced by the fermentation of yeast, sugars, and starches. Ethanol is toxic. Many foods contain ethanol. Improving the safety and quality of such products is an important task.

Materials and methods. Aquatic solutions, aqua-ethanol mediums in a wide range of concentration were used for experimentation investigations. Percentage of ethanol in aqua-ethanol mediums was varied from 5 to 95%. Aquatic solutions gave in to processing by physical influence before the technological process of production aquatic solutions, aqua-ethanol mediums. Aqua treatment and obtaining process was spent in the condition of the physical influence. The analytical chemistry and chemical methods were used for the researches physical and chemical parameters of the aqua-ethanol mediums.

Results and discussion. The greatest significant variations in technology and equipment of food and processing manufactures it is possible to reach by application of new nonconventional and alternative methods and ways of physical influence for an intensification of technological processes.

The effects of analytical computation and mathematical modelling, statistical experiment have given the possibility to calculate basic design data of devices which influence on intensification of carrying out of obtaining processes for aqua-ethanol mediums, and also processing for the purpose of change of physical and chemical parameters and structural transformations.

On the received data experimental stands have been collected and ordinary investigations in laboratory and manufacturing conditions are conducted. Throughout processing of aquatic solutions and obtaining process of the aqua-ethanol mediums in the conditions of linear speeds of the first rotor is 21,5 m/s and the second rotor is 23,5 m/s.

The pressure of shift of a stream for the first rotor is 215 Pa and for the second rotor is 235 Pa. The speeds of shift of a stream for the first rotor is $2,0 \times 10^5 \text{ s}^{-1}$ and for the second rotor is $2,5 \times 10^5 \text{ s}^{-1}$. The speed of rotary motion of the rotors is $n = 50 \text{ sec}^{-1}$.

For carrying out of obtaining processes for aqua-ethanol mediums, give in to processing for the duration of singular time from 1second to 150 seconds.

Through researches the potential of hydrogen of the aquatic solutions prepared on standard technology of the distillery and treated by physical influence has raised on 15%. Employment the method of physical influence in technology of receiving of aqua-ethanol mediums allows receiving the activated aquatic solutions with the certain physical properties and parameters, assured value of a potential of hydrogen.

Carrying out of obtaining processes for aqua-ethanol mediums in continuous approach is giving the possibility to decrease reduction-oxidation potential on 25-55%. A value of reduction-oxidation potential is in the course of processing by physical influence in aqua-ethanol mediums depending on processing time.

Conclusions. The results of the experimental researches is established that using of no reagent methods of physical influence is of current interest and perspective for consciousness of control on physical and chemical parameters, properties and the structural organization for the purpose of an intensification of obtaining process of the aqua-ethanol mediums.

8. Improvement of process and equipment for long bread products cutting

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Introduction. The aim of research - to improve the process and equipment for cutting of long bread products with cutting elements, rotating around a fixed axis.

Materials and methods. Analytical research was conducted on the basis of analyzes of educational, scientific and reference literature and open information of leading baking equipment manufacturers. Experimental studies were performed on the installation with a disc knife at a constant speed of product feed. The friction stress was determined on an experimental installation with a moving disk at a sliding speed 1–6 m/s, using the plan of a full factorial experiment.

Results. Improving the design of the cutting mechanism is that the knife rotating around the fixed axis is made in the form of a spiral coil, which has a variable diameter. The minimum difference of diameter is equal to the height of the piece of the cut product, and the displacement of the spiral coil relative to the plane of rotation is equal the thickness of a piece of product.

The friction stress varies from 0.2 to 1 kPa, with the increase of the sliding speed and specific load the friction stress increases, and with the increase in the time of bread keeping - decreases.

With increasing the temperature of bread from 20 to 100°:

- The specific work of cutting with a flat disc knife varies from 1.7 to 3.8 kJ/m², with a notched disc knife – from 2.1 to 3.9 kJ/m²;
- The rational feed speed of bread when a flat disc knife is used varies from 60 to 35 mm/s, and when a notched disc knife is used - from 110 to 50 mm/s, while the good quality parameters of cutting is insured.

Conclusion. With certain rational values, and using the developed design of the cutting machine with a spiral knife, we can cut fresh long bread products with high productivity, quality, and low energy cost.

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9. Improvement of the process of water softening by the method of ion exchange and reconstruction of the water treatment section of the pharmaceutical enterprise

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Introduction. Research have been conducted to improve the process of water softening by the ion exchange method for the production of herbal medicinal product.

Materials and methods. The process of artesian water softening by ion exchange using ECOSOFT ECOLITE and HCR-S/S FF ion exchange resins is being investigated. An experimental stand with an ion exchange column was used. Water hardness analysis of water was performed in laboratory conditions of pharmaceutical enterprise "Pharmak". The justification and comparison of the obtained data is made on the basis of modern scientific articles presented in recognized scientometric databases.

Results and discussion. One volume of the ion exchange resins under study is capable of qualitatively purifying about 40–60 volumes of artesian water, which comes to softening with a total hardness of about 5.5 mg-eq/dm³, and after softening its stiffness was within the acceptable range of 0.5–1 mg-eq/dm³.

Approximately after the passage of 50 volumes of water, the quality of the process decreased immediately, and the initial rigidity was 5–6 mg-eq/dm³, which indicated the need for resin regeneration.

ECOSOFT ECOLITE resin showed a relatively longer inter-regeneration period compared to HCR-S/S FF resin.

Approximately, after 1600 regenerations (in production conditions — after 3–5 years of operation of the ion-exchange apparatus), the inter-regeneration cycle decreased by 2–2.5 times. This indicates the inappropriateness of further operation of the ion exchange resin, as the cost of salt increases and the time for regeneration increases. Artesian water has a higher rigidity compared to the water supply in the city network, so it is proposed to install a two-column ion-exchange apparatus in the initial stage of water purification for its softening. This will improve the operating conditions of the entire line, including the ultrafiltration and reverse osmosis section.

Existing ion-exchange devices have stagnant zones. During the replacement of the resin by its color, it is noticeable that in some areas it did not fully use its resource. It is proposed to upgrade the apparatus by installing a collector to evenly fill the entire volume of the resin.

Conclusion. The scientific value of the results is the obtained dependence of the water hardness on the duration of use of ion exchange resin and the dependence of the inter-regeneration cycle on the number of regenerations. Practical value is to improve the operation of the water treatment site, eliminate stagnant zones and rational use of resins in the ion exchange apparatus.

10. Effect of product structure on the energy consumption of the cutting process

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Introduction. The effect of product structure on cutting force was studied.

Materials and methods. Homogeneous products were studied – meat, vegetables (potatoes, beets, carrots), model bodies (foam), and non-uniform multilayer products (meat with shell) and model bodies – foam with PVC sheath. Cutting was carried out at a constant speed of 0.2 mm / s, with different orientation of the layers relative to the movement of the blade. Cutting force was determined on the pendulum-type experimental stand, and using mathematical models of blade motion in the product [1].

Results. For homogeneous products, the cutting force is approximately proportional to the speed of the knife, and for more multilayered products a more complex pattern is obtained (Fig. 1). If a thin strong layer of multilayer products (meat with wiry layers, model body – foam with a polymer film sheath) is cut with a blade at the beginning, then a thin strong layer does not significantly affect the cutting force, changing the force during the blade passing through the thin layer does not significant and not registered devices. If a thin solid layer is cut at the end of the cutting, there is a rapid increase in the cutting force at the time of approaching the shell (curves 1, 2).

The results are explained so – if a strong layer of other material is placed at the edge of the blade, it does not allow it to deform to the surrounding layers.

Since the blade still deforms the material by its thickness, the effort of compressing the blade at the interface of the layers increases significantly. Accordingly, the friction force and the overall resistance of the blade movement increase.

Therefore, when cutting multilayer products, it is advisable to first cut the shell, then the main part of the product. This is how we save energy for cutting and ensure the highest quality of the cut, without distortion and deformation.

Conclusion. The proper orientation of the layers of the multilayer product relative to the movement of the blade can reduce energy consumption and improve cutting quality.

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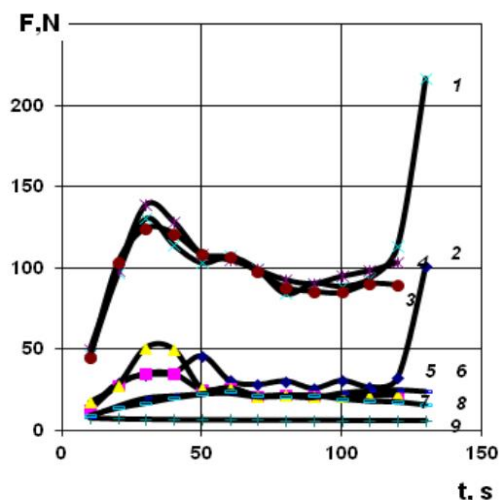


Fig. 1. Changing cutting effort in time. Products:
 1 – Meat with vein at the edge of the blade;
 2 – meat with vein at the entrance of the blade;
 3 – meat without vein; 4 – model body – foam with a shell at the edge of the blade; 5 – model body – foam with a shell at the blade entrance; 6 – foam without shell; 7 – potatoes; 8 – carrots; 9 – beet.

11. Household solid fuel boiler with vortex generator

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Introduction. Due to the increase in the price of natural gas, the problem of heating is getting more and more attention. It is economically feasible to use biofuels as an alternative to gas boilers. Research aimed at modernizing the structural and technological parameters of solid fuel pyrolysis boilers (SFPB) is an urgent problem. Pyrolysis boilers in today's heating equipment market have long ceased to be new.

Materials and methods. The authors have considered the designs and taken into account the basic design features of TPPK: gas-generating chamber, which is loaded into the fuel and where the pyrolysis process takes place, combustion chamber, where the pyrolysis gas combustion takes place, heat exchanger, gas burner.

Results. In order to improve and stabilize the combustion process, it is proposed to make a number of upgrades to the SFPB design, namely to install vortices, which are made in the form of a trapezoidal recess in the side walls of the burner and a stabilizing partition that promotes vortex formation.

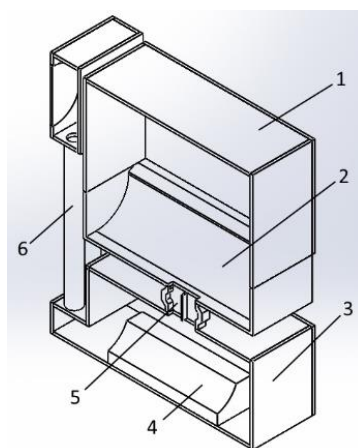


Figure 1. Household solid propellant pyrolysis boiler with vortex generator and stabilization partition.

In Fig. 1 depicts a household solid propellant pyrolysis boiler 1 with a pyrolysis chamber 2, a combustion chamber of a gas generator 3, a flame arrester 4, a heat exchanger 6 and a burner 5 with a vortex generator and a stabilizing partition.

Conclusions. Due to the presence of trapezoidal recesses, vortex formation occurs with the appearance of stable turbulent vortex structures of gas and secondary air flows, providing a qualitative mixture with the appropriate level of concentration of fuel and oxidant.

12. Computer simulation of the burner of a modernized household solid fuel boiler with a vortex generator

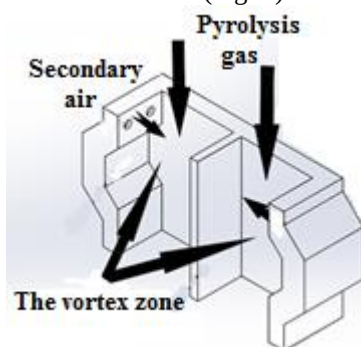
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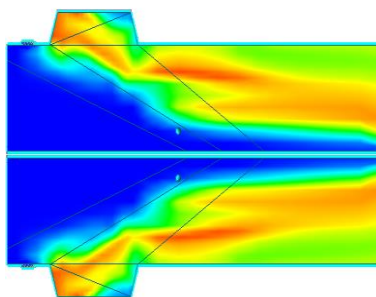
Introduction. The use of experimental physical models in the design practice is economically unprofitable, and the classical empirical dependencies and experimental experience traditionally used for design calculations do not allow to take full account of all technological and structural features of equipment and to quantify the mutual influence of structural and technological parameters of gases in the process of combustion.

Materials and methods. A simplified 3D model was created on the basis of the boiler Vissmann Vitolog 150. The basic design features of the burner with vortex builder and stabilization partition were taken into account (Fig. 1).



The simulation of the process of combustion of pyrolysis gas in the modernized burner of a household solid fuel pyrolysis boiler was carried out in the software program Flow Vision.

Results. Figure 2 presents the results of simulations into the types of temperature flux distribution, where vortex zones are clearly traced.



Conclusions. The obtained simulation results show the emergence of stable turbulent vortex flow structures that provide qualitative blend formation and hence stable combustion.

13. Intensification of separation by reverse osmosis and electrodialysis using ozone and sorption.

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Introduction. Organic compounds are the cause of the active growth of unwanted microflora, which speeds up the contamination of reverse osmotic and electrodialysis membranes and requires daily chemical cleaning of membranes, tanks for temporary storage of permeate and transport pipelines. To eliminate the negative effects of organic compounds, the authors propose to apply the ozonation process and subsequent sorption purification.

Materials and methods. The experimental installation consisted of a block of obtaining ozone (air dehumidifier, rotameters, ozonizer), ozonation unit (contact capacitance, foam traps, two glasses of Drexel with KI solution) and a pump for pumping the gas phase. Solution of nanofiltration permeate of milk whey was used for research. Experimental and theoretical studies have led to rational parameters of the nanofiltration permeate ozonation process: the rational duration of ozonation of nanofiltration permeate is 10 min, and the rate of the ozone gas mixture - 3 l/min [1]. The chemical oxygen demand that was used to determine the efficiency of the process was determined by the Kubel method. The amount of ozone was determined by the iodometric method [1].

Results and discussion. Organic compounds are oxidized during ozonation, which results in the formation of simpler compounds and the removal of a small amount of them in the form of carbon dioxide. However, the contact of ozone on the surface of polymer membranes is unacceptable, since it leads to damage of the selective layer and loss of their selective properties. Therefore, it is advisable for the nanofiltration permeate to pass through the activated carbon layer after ozonation. This will not only remove more organic matter but also degrade ozone. The solution thus treated can be concentrated by reverse osmosis at lower energy costs due to less contamination of the membranes and, accordingly, less resistance to mass transfer.

Further comparison of the performance of membranes when working with untreated whey nanofiltration permeate and after the ozonation and sorption purification showed a positive effect of the proposed intensification on the membrane separation. The productivity of reverse osmosis membranes when working with the treated solution increased by 25...30 %; the conductivity of the solution at the concentration of electrodialysis for the treated permeate decreased, on average, by 7...11 %. Thus, the efficiency of membrane separation of whey nanofiltration permeate was established.

Conclusions. The use of ozonation allowed to intensify the work of membrane plant, as a result, it was possible to achieve a productivity increase of reverse osmosis membranes by 25...30% and electrodialysis membranes by 7...11 %. Thus, the efficiency of membrane separation of whey nanofiltration permeate was established.

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14. Use of polymeric materials in food engineering

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Introduction. The review article discusses the main features and prospects of the use of polymeric materials in food engineering.

Materials and methods. Analysis of the influence of polymers on foodstuffs and equipment operation.

Results and discussion. Food engineering is a large consumer of polymeric materials. Their use shows a good technical and economic effect. The peculiarity of the applying of polymeric materials in the food industry and public catering, is that they come in contact with food and food raw materials. Polymers must not change the organoleptic product properties such as taste, smell, color and other. Toxic components are also unacceptable. Often technological operations are time limited; this can fetch it may cause defects. Therefore, specific requirements are imposed on polymeric materials which depend on the direction of their use.

Polymers are synthetic or natural. The second can be modified by chemical methods. The article will be discussed about synthetic polymers in food engineering. Polymeric materials can be used in pure form and various combinations. Also various additives are added to improve material properties.

The use of polymers in the food industry is possible only with the permission of the sanitary services. A series of tests must be carried out for each material or additive. According to the degree of suitability for contact with food, polymeric materials are divided into groups: allowed without restriction; approved for interaction with certain products and in certain conditions; not approved for use, as they change their properties in contact with products.

Polymers are widely used because of their lightness and ductility, they easily take the form of a product. The thermal conductivity of polymeric materials is lower than of metals, which allows you to save heat. The main disadvantage of polymers is the aging of the materials.

An example is the following equipment: grain augers; elements and bearings of transport belts which are used in fish processing, canning, dairy industry; fiberglass equipment is used in contact with products with high alkaline and acid aggressiveness; spacers for pasteurizers are made from special types of rubbers; spacers for tumble machines are made of heat-resistant rubber.

Often employ polymer release agent coatings. They are applied to metal structures to prevent product from sticking to the equipment surface. Coating is used for conveyor belts, molds and other equipment. Such coatings are also applied to the inner surface of the hoppers, from which the loose components enter the packaging machines. Release agents coating improves productivity and machine life. The use of coatings allows you to not lubricate details, which leads to lower costs and improves the sanitary condition of the workshops.

Polymeric materials are used for decorative protective coatings of machines. Polymers are often used for packaging various products, as well sealing pastes.

Conclusion. In recent years, the number of polymers used in the food industry has been increasing. First of all, polymeric materials were widely used in packaging products. To improve equipment in food engineering, polymer materials are used because of their corrosion resistance, frost and heat resistance.

15. Investigation of volumetric characteristics of mechatronic dosing modules for liquid food using pneumatic shut-off valves

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Introduction. The development of food dispensing methods is directly related with the improvement of production technology, with increasing requirements for dosing accuracy, reliability and speed of dispensers. Mechatronic dosing modules based on pneumatic pinch valves are one of the promising directions for the creation of new dispensers for liquid food products [1,2].

Materials and methods. The authors have developed an experimental installation according to the patent of Ukraine №139488 [3]. Variable nozzles with different taper angles and identical inlet and outlet diameters were used for the study. The volumetric flow rates of the liquid food product were determined by: $Q = \frac{Q_M}{\rho}$, where ρ is the density of the liquid food product, $\rho = 998 \text{ kg/m}^3$; Q_M is the mass flow of the liquid food product, kg / s .

Results. The analysis of the results of the experimental studies (Fig. 1) showed that the nozzle with a taper angle of 24° have the highest level of flow characteristics on condition the highest level of liquid food product, therefore, for the investigation of the flow characteristics of mechatronic dosing modules based on pneumatic pinch valves was selected the nozzle with taper angle 24° and the level of liquid food in the hopper $h = 1 \text{ m}$.

In subsequent studies, the change in the flow characteristics from the control pressure in the pneumatic pinch valves was defined (Fig. 2). Considering the fact that the operation of the pneumatic pinch valves is subject to the law of hysteresis, the study of the opening of the pneumatic pinch valves (from 0 to 6 bar) and closing pneumatic pinch valves (from 6 to 0 bar).

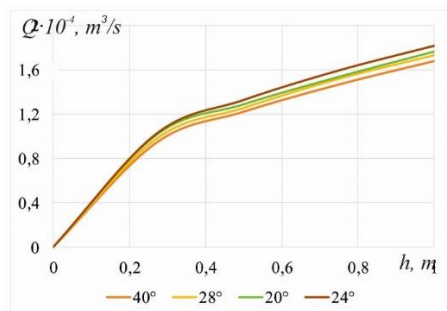


Fig. 1. Dependence on change of consumption characteristics of the dosing system on the level of liquid food product at different angle of nozzle cone.

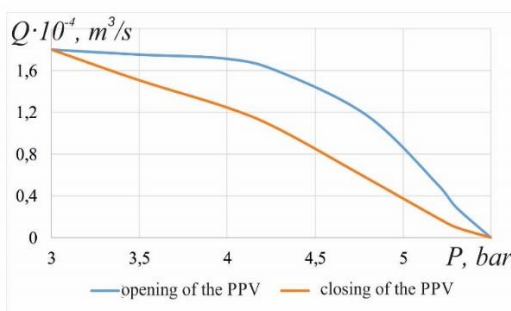


Fig. 2. The dependence of the change of the flow characteristics of the dosing system on the control pressure in the PPV for a nozzle with a cone angle of 24° considering hysteresis

Conclusions. The dependence of the change of the flow characteristics of the metering system on the control pressure in the pneumatic pinch valves is established, which allows to adjust the set law of motion of mechatronic dosing modules and to increase their accuracy.

16. Innovative contact for circuit breaker and magnetic starter

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Introduction. Contacts that are based on materials with shape memory effect (SME) allow to exclude silver from the construction of electrical apparatuses.

Materials and methods. Physical and mathematical modeling of working processes of high current contacts that are made from SME material in contact system of an electrical apparatus was used.

Results. In switching equipment, both high voltage and up to 1 kV, one of the main elements is contact system. Contact surface consists of separate points through which an electrical current flows. During operation, contact surface is covered with a film of oxides, which increases contact resistance. This causes the temperature to rise. If this process is not stopped, contact may fail and power delivering will be interrupted.

The high current contact can have a contact pad 3 (fig.1) made of any type of conductive material (e.g. copper).

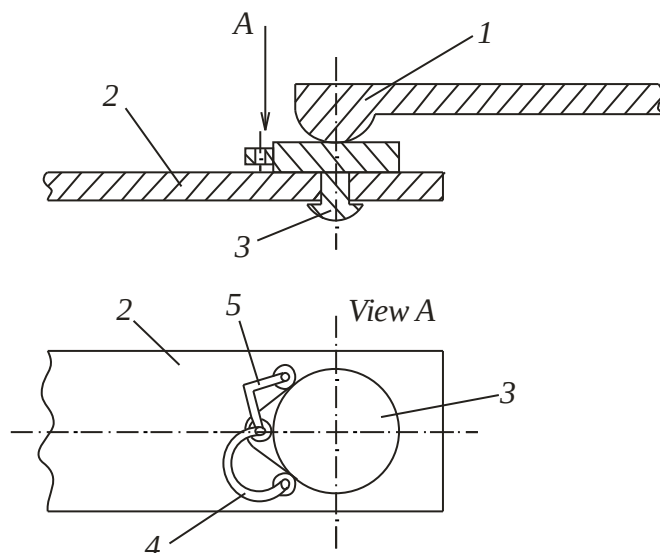


Fig.1. High current contact.

The pad is mounted on a fixed contact holder 2 in such a way that it can rotate around its axis. Contact heating causes a bent plate 4 that is made of SME material to straighten. While the plate is straightening, it is creating force up to 600 N/mm². The pad 3 rotates around its axis. This motion removes oxide films from contact surfaces. This motion also compresses a flat steel spring 5. The decrease in contact's temperature leads to loss of SME material its elastic properties, and the plate 4 becomes plastic. Under the action of the spring 5, the contact pad 3 returns to its original state, deforming the plate 4 to its original shape. This further cleans the contact surfaces.

Conclusions. The results of this research can be applied to optimize power systems.

17. Innovative relay contact

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Introduction. Contacts that are based on materials with shape memory effect (SME) allow to exclude precious metals (silver, gold, platinum) from the construction of relays.

Materials and methods. Physical and mathematical modeling of SME materials' working processes in contact system of a relay was used.

Results. During operation, contact surface is covered with a film of oxides, which increases contact resistance. There are two methods to eliminate this film. The most widespread method today is the use of precious metals, such as gold, silver, platinum. On surface of these metals oxides occur much slower than on copper, and the oxides themselves have small mechanical strength. Another method is to remove the oxide film during contact operation (under voltage and current) by moving the contact's elements in space. This method can be implemented using materials with SME, such as aluminium bronze.

Fig.1 shows the design of a contact system consisting of a movable contact holder 1 and a fixed contact holder 2, to which a contact pad 3 of a heat-sensitive material (alloy with SME) is attached. One end of the contact pad 3 is rigidly fixed to the contact holder, and the other end is freely placed in an opening of the contact holder 2.

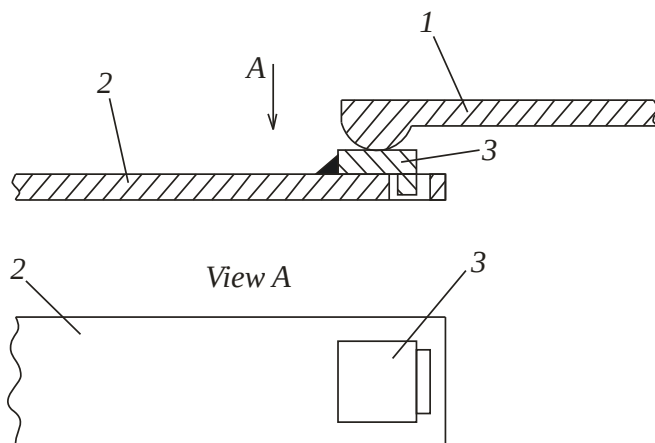


Fig.1. Relay contact.

Thus, when foreign films appear on the surface of the fixed contact or the contact pad, contact resistance of the contact system increases, its temperature rises and reaches the temperature of the martensitic transformation of the material with SME, which almost instantly "remembers" its initial shape. The pad restores its initial shape, which results in movement of the contact's surfaces and cleaning of the contacts. Contact resistance of the contact system decreases, its temperature decreases, the pad loses its elastic properties and returns to its original state under the action of the contact spring.

Boundaries within which the linear dimensions of the SME material change are 5...10% of the original dimensions. Such a contact can be recommended for an intermediate relay for currents up to 15 A.

Conclusions. The results of this research can be applied to optimize power systems.

18. Automated Waste Processing at the Enterprises by the Flow Method

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Introduction. Waste recycling is a rather complex process, which is not used by all enterprises due to its complex and high cost, and it has a rather strong environmental impact.

Materials and methods. The following research methods were used in writing the abstracts: comparative, synthesis, and analysis. The flow method was considered in the researching as a method of waste recycling.

Results. The flow method is a progressive, most efficient form of production process organization, based on rhythmic repetition and consistency over time of basic and auxiliary operations performed at specialized workplaces located in the process, where the transfer of work items from operation to operation minimal time spent on special vehicles. The streaming production method is the most sophisticated in terms of clarity and completeness, in which the workpiece in the process of processing moves along a fixed shortest route at a predetermined rate. At the same time, the basic principles of rational organization of the production process are maximally implemented: specialization, direct flow, parallelism, continuity, proportionality and rhythm. As a result, high productivity is achieved and the quality of manufacturing is ensured, with significant savings in labor, material and energy resources compared to non-flow production.

Automatic production lines are characterized by the unification into a single complex of technological and auxiliary equipment of vehicles, as well as automatic centralized control of processes of processing and moving of objects of work. On these lines, all technological, auxiliary and transport processes are fully synchronized and operate in a single beat (rhythm).

The most important condition for the flow organization of production is a stable concentration in a single production unit of large scale production of homogeneous or structurally and technologically similar products. In mass production, characterized by steady production of homogeneous products, flow is the main method of its organization. It is also used during many — and medium-scale production, especially at sites where assemblies and components are manufactured. In single production, the elements of flow production are used to produce unified parts and components.

When researching the current method of waste treatment at enterprises, it was found that this method is one of the most convenient and best methods of recycling compared to other known methods of recycling. Also, this method is quite advantageous from an economic point of view as well as from the point of view of time spent on processing waste.

Conclusions. Thus, it can be considered that the current method of waste treatment at the enterprise is one of the most convenient and fast methods of waste treatment at the enterprise. This method has a significant impact on the total amount of recycled waste in many countries around the world.

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Section 3

Economics and Management

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Dr. Mykhailo Arych
Dr. Yurii Kulynych

1. Data Security in Computer Networks

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Introduction. Data protection is one of the main problems of a computer network, since the advantage of the network is the access to shared data and devices, which causes the possibility of unauthorized access to the data.

Materials and methods. The presented research studies specialized techniques and types of network security.

Results. The most popular network security methods are access control, anti-malware, application security, behavioral analytics, data loss prevention, e-mail security, firewalls, intrusion detection and prevention, mobile device and wireless security, network segmentation, security information and event management (SIEM), Web security, VPN as a tool, typically based on IPsec or SSL, that authenticates the communication between a device and a secure network, creating a secure, encrypted “tunnel” across the open internet.

There is also some specific method which is called Ethical Hacking, also known as penetration testing or pen testing, is legally breaking into computers and devices to test an organization’s defenses.

At present, the mechanism of personal data protection is not sufficiently advanced and needs to be substantially refined. One of the most common practices of intruders on the networks is to intercept packets and replace them or forward them to another recipient. Therefore, all modern network protocols are usually equipped with recognition tools. Separate servers that issue electronic certificates are used for recognition. Certification servers are used on all sufficiently powerful operating systems.

One of the mechanisms of packet recognition is the placement of the same pseudorandom number generators from the sender and receiver. Each package is denoted by a pseudorandom number, which is compared with the same number of the recipient.

Two metrics are used to measure recognition accuracy: the False Acceptance Rate (FAR) and the False Rejection Rate (FRR). Data security is the protection of network resources from destruction and data protection from accidental or intentional disclosure, as well as from unauthorized changes. Therefore, information security is a complex system of measures to provide the necessary level of protection of personal information on computer networks.

It can be argued that the packet recognition system is quite effective in setting up this particular data protection system on computer networks fairly easily.

Conclusions. Thus, we can see that the application of the packet recognition method is one of the best and affordable methods for protecting personal information on the network.

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2. Reducing the Risks of Completing Tasks in IT Projects Through Personalized Distribution Among Participants

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Introduction. The implementation of IT projects is accompanied by risks in their implementation: deviations from the budget, implementation deadlines, changes in tasks and functionality. High-quality and timely implementation of project work depends on the distribution of tasks between project participants.

Materials and methods. The main executors of the project are participants who implement the entire body of work from the initialization process to the delivery and maintenance of the project. Therefore, it is the project participants that are the key factor in the implementation of the project in accordance with the plan.

Results. Risk management is carried out at all stages of the project life cycle using monitoring and adjustments to the implementation plan. The responsibility for the implementation of the project lies with the project manager, and it is precisely on his qualifications and the correct distribution of tasks between the participants that the overall project performance depends. For the correct appointment of executors for the project, the project manager must constantly monitor the qualifications and competencies of all participants in the project team.

When designing a project plan and allocating resources, it is necessary to take into account unforeseen risks and to plan manpower reserves, which will help offset the disruption of IT project. Each reserve must be planned taking into account the maintenance costs and the losses incurred in the event of deviation from the plan. For companies running multiple automation projects, it is necessary to create a reserve structure, determine the priorities and importance of the roles of participants in each of the projects.

Precautions should be taken to reduce the risks:

- Identify the most important risks (time, resources, financing) and qualify the plan accordingly with the chosen strategy.
- Determine the amount of expenses for risk prevention and loss from the occurrence of risk.
- Prioritize tasks and functions that are included in the project implementation process.
- Make a decision to prevent project disruption by leaving the project participant.
- When the implementation depends on the complexity of the implemented function and/or the number of participants implementing a specific task, each of the risks is determined, both qualitative and quantitative.

Conclusions. A clear distribution of tasks among the participants of the project team will reduce the risks of implementation and ensure compliance with the regulations of the project of implementation of the information system.

3. Typical Platform of a Decision Support System Software Complex in an Enterprise Management System

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Introduction. Decision support systems for planning the production activities of enterprises is an integral part of automated enterprise management systems, so that the development and testing of standard design solutions in this area is currently relevant.

Materials and methods. Modern decisions concerning properties and criteria for selection of platforms for software implementation of web-oriented client-server systems in application to design of decision support systems were studied.

Results. In the presented paper, a typical platform of a software complex of decision support systems in the enterprise management system is offered. The decision on set of typical program components of systems of support of decision-making and decisions on their joint application are based on classical multilayered architecture with distribution on following components:

- is a layer of controllers, through which the interaction with the client part is provided;
- adapters at the level of which data is converted from customer requests to the main business objects on which further processing is performed;
- classes checking the input data for compliance with established rules;
- business services that are directly responsible for executing business logic;
- auxiliary tool classes to which business services delegate the execution of individual transactions;
- repositories designed for direct handling of data.

The program system is designed to “thin client” and includes: software platform Spring Framework, which in general provides the construction of software infrastructure of the subsystem; means of Junit library and Mockito software platform for modular and integration testing of the code of the developed system; Hibernate object-relational mapping tools for working with data; HTTP Request-Response protocol as the basis for interaction between the server and the client side; Open API describing the interfaces between the server and client parts; means of forming web-pages for displaying them in the user’s browser; an approach and tools for continuous integration to the development of situation center code based on the Jenkins software product.

Conclusions. The given model of interoperable aggregate of program platforms provides performance of all basic stages on creation of a decision-making support subsystem — from construction of a program infrastructure of a subsystem to modular and integration testing of a program code. The basic advantage of the offered model is an easy application of protection systems — from standard alloying to introduction of electronic-digital signatures. The proposed software and technology solutions presented in the model have been successfully tested in the decision support system for the formation and operational reconfiguration of production plans for the implementation of enterprise contracts [1].

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4. Practice of inflation targeting in the world and in Ukraine

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Introduction. In order to achieve the ultimate goals of monetary policy in recent years, the government chooses a set of intermediate targets that are subject to the actions of the Central Bank of a particular country. One of these modes is inflation targeting, the essence of which is the public announcement of quantitative inflation targets and the central bank's commitment to achieving those targets over the medium term.

Materials and methods. During the study, such methods as observation, document analysis, synthesis, abstraction were used and were followed by an analysis of the work of governments of different countries.

Results. The Czech Republic, a transition country, is the first country to put inflation targeting into practice. The main lever for the transition to a new regime in the advanced economies was the desire to reduce inflation (US). In other countries, the stability of linking monetary aggregates to the target variables determined the nominal base that was used for a time to move towards a more effective monetary policy regime (Colombia, Indonesia). Some countries, such as the Czech Republic, Brazil, Indonesia, Thailand and Uruguay, have begun the process of transition to the new regime as a result of the currency or economic crisis. In the Philippines, for example, the link between money supply and inflation has collapsed. Monetary targeting was thought to have led to a deep recession in the economy. In others, this process was planned more carefully and specific steps were taken sequentially (Poland, Israel, Chile).

In Ukraine, the National Bank's policy is to bring inflation to 5% for annual CPI changes. The NBU Council considers this level of inflation to be optimal in the medium term, taking into account the peculiarities of the country's economic development. At the same time, this indicator is slightly higher than in the developed countries and reflects indicators of structural adjustment in the Ukrainian economy over the coming years. The National Bank has set short-term targets for the annual change in the consumer price index: December 2018: 6 +/- 2% percentage points; December 2019 onwards: 5 +/- 1% percentage points [1]. The NBU will achieve the inflation target, primarily by changing the interest rate on its liquidity transactions, which have the greatest impact on the monetary market. This mechanism is called the monetary transmission mechanism.

Conclusion. Inflation targeting is a pragmatic response to the failures of other monetary regimes. In the case of Ukraine, this is a response to the historical failure of the fixed-rate regime in the face of unruly fiscal government behavior and severe external economic shocks. As in the world practice, the introduction of inflation targeting by the National Bank of Ukraine is an effective tool for regulating inflationary processes, since it is the NBU that guarantees the stability of the monetary sector and the monetary unit [2]. Experience has shown that the benefits of setting an inflation targeting regime come more quickly where the transition to a new regime is well organized, so domestic monetarists should pay attention to this.

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Scientific supervisor: Svitlana Bebkо

5. Basic tools of internet marketing for industrial companies

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Introduction. Internet marketing in today's world is one of the main ways to promote products and increase customer loyalty. For modern industrial enterprises integration on the Internet is an important element of creating and maintaining the company image in a professional environment.

Materials and methods. Methods of analysis, comparison, synthesis, generalization are used in the research. Information base of the research is represented by the articles of domestic and foreign authors, materials published in periodicals, etc.

Results and discussion. Nowadays most of the businesses are mainly focused on independent sourcing of the required goods and primarily on the Internet. Therefore, proper incorporation of the tools of online marketing will allow companies to raise awareness of potential clients about the company and products, to form a primary interest in buying and encourage possible cooperation. Moreover, companies need to focus on online customer interactions, improve business processes and increase the level of convenience of service for customers. According to the survey of one thousand Internet users 45% of them believe that the website of the company is the best approach of promotion as it gives a unique opportunity for globalization and development of the enterprise, because it is the best way to provide good quantity and quality of information, to supplement it with photos, graphs and videos. Using the website allows you to improve the quality and availability of service: for example, materials on the web site of the company are available 24 hours a day, 7 days a week. But the most important advantage is that with proper formation it is possible to integrate all elements of the marketing mix (product and service policy, pricing, promotion and sales, as well as the work of the staff). In this regard, industrial companies need the Internet marketing to start with the website and to focus most of the resources and efforts on dealing with it but the presence of a website does not always allows businesses to solve problems of the company in terms of attracting new customers. In order to fully perform all marketing functions, the site needs a support from other tools of Internet marketing.

Conclusions. Internet marketing for industrial companies is one of the most powerful tools to attract new and increase loyalty of regular customers.

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6. Laissez-faire management as catalyst of new ideas

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Introduction. Modern society has many possibilities both for consumers and creators. Uneven development of countries leads to people's awareness of new technologies, which can't be used because of different reasons. This situation is actual for CIS countries.

Materials and methods. Methods of analysis, comparison, synthesis, generalization are used in the research. Information base of the research is represented by the articles of domestic and foreign authors, materials published in periodicals, etc.

Results and discussion. Creation of new ideas when producing will lead to growth of sales, state-owned company's image, standard of living and satisfaction of your workforce. Generating new ideas and products is salvation for countries with development stagnation, which is tangible in modern conditions of access to information.

Creators of European or American companies have rather free way of work style. Giving an opportunity to create more comfortable workplaces and suitable work time will help workers to concentrate on their tasks. Process of generating new ideas or products requires a lot of moral effort. Adding to this moral pressure from the authorities will lead to strong stress and creation of successful projects will be just a dream in this situation.

Laissez-faire style of management suggests giving a lot of freedom to your work team. Both theory and practice say that this management style is good for creative and high-skilled workers, who are professional in their spheres. Giving freedom empowers them to do their best. Too much control will make workers think that they are not confident in their responsibility or in their skills as professionals. These feelings will destroy your authority, teamwork and as the result, you can lose great specialists.

Laissez-faire management is a good variant for certain situations and type of specialists. Giving work process freedom is acceptable only to professionals and people with high consciousness and responsibility. Creative workers also can't be highly controlled. Their work is totally different from usual office work, which is done by certain points and steps. Way of work in laissez-faire style suggests specification goals at certain steps of creation process and free work style. The main goal of specialists is to make certain step of creation process before deadline. It doesn't matter if they spend a whole week finding inspiration. The only thing, which is needed to be under control, is the result.

As about cons of this management style, it's suitable for a fairly small group of employees. There are quite a few people, who are ready to take responsibility to solve emerging issues on their own. Hiring not right people will cost business a high price.

Conclusion. Laissez-faire management style makes you believe in your workforce, their experience and skills. This management style gives business many benefits and first of all competitive advantage among rivals.

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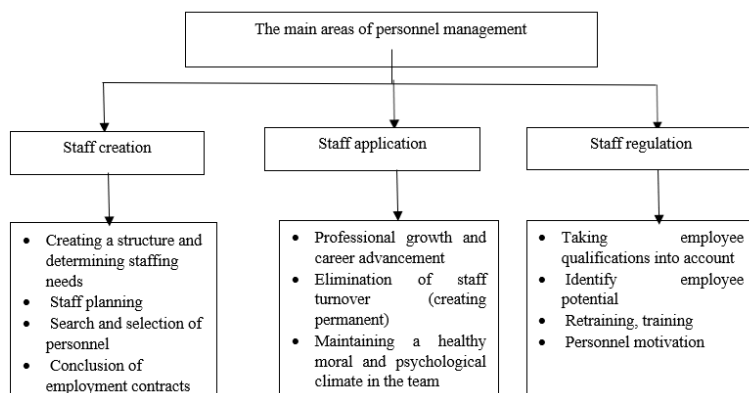
7. Development of a personnel management system for a beauty salon

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Introduction. The effectiveness of personnel management is one of the most important factors in business development both in Belarus and abroad. This is a powerful engine for increasing labor productivity and can increase the overall efficiency of production. Business revenue, company survival and competitiveness are directly dependent on how employees respond to the problems they face.

Materials and methods. The material for the study is the official statistics data of the Republic of Belarus on the development of small and medium businesses.

Results and discussion. Therefore, personnel management in a beauty salon should be a priority (according to forecasts, in 2020, 75% of Minsk residents will be employed in the service sector). Management has a number of directions of a different nature, but if you single out the main ones and systematize everything into one scheme, you get the following (Look at Picture 1):



Picture 1. Staff management scheme.

This scheme was made up of a number of basic working moments of a beauty salon, namely, on the example of the work of a hairdresser. A competent leader must understand that not one link from the diagram above should be “thrown out”.

I would especially like to focus on such an important aspect as motivation and its increase. Most managers of small and medium-sized businesses neglect this factor, but literate people know that this is an incredible engine that can generate income.

Consider the link motivation on the example of the above-mentioned stylist-hairdresser.

Conclusion. For each employee in the service sector, there is a personal, personal motivation: someone wants to become a top stylist, train their colleagues, participate in contests and receive customer recognition, while someone is stimulated by money – adding to your family, wanting to buy a new car and more. Therefore, in order to avoid staff turnover, it is necessary to provide employees with the opportunity for professional and material growth. You cannot build a single scheme and work on it. An individual approach to employees should be present, albeit to a small degree, and only then will the business work as an integral mechanism.

8. Influence of eco-trends on modern business

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Introduction. Eco-business is becoming more and more popular today. Environmental friendliness has become a global trend, which motivates people to pay several times more in order to get a product labeled "eco". How can companies use "eco-trends" to get benefits for business?

Materials and methods. Methods of analysis, comparison synthesis, generalization are used in the research. Information base of the research is represented by the articles of domestic and foreign authors, materials published in periodicals.

Results. Generation of Millennials are the first who seriously concern about ecology except of scientists of course. Millennials have become a main target audience for manufactures over the last decade. Today, according to Nielsen research, 81% of people around the world believe that business should take care of the environment [1].

Environmental friendliness has quickly become a marketing trend. Analysis of consumer behavior during 2013-2018 showed that "green" products are not only better sold but even the existence of such products has a positive effect on business. Therefore mark "eco" on package is not often an evidence of company's environmental friendliness.

Unfortunately, there can be a little real actions behind beautiful eco-campaigns and loud statements. This phenomenon is called "greenwashing" by environmentalists. Despite assurances that brands are ready for eco-friendly changes, they still generate tons of carbon emissions from transporting goods, contaminate soil and rivers with dangerous chemicals and create production in developing countries where workers are not paid a decent salary.

The only thing that can really reduce the amount of damage to the environment is the lowering consumption. The problem is that it contradicts the nature of economic model – endless profit increase [2].

Nevertheless, many companies make attempts to reduce their carbon footprint and establish more environmentally friendly business processes. Noticeable results are achieved in energy saving due the use of renewable sources, which have become more affordable. A lot is done in goods packaging, giving up disposable items and ensuring well-being for vulnerable social groups. Implementation of key business processes based not only on reputation will strengthen the business in the long term. More reasonable energy use as well as striving for localization can cut costs and reveal capital for necessary improvements and adaptation to changing living conditions.

Conclusions. New products created in balance with the environment will satisfy needs of more demanding customers who think about where, how and from what products are made. The amount of such consumers is still not enough for severe changes but their number is growing giving a chance to change before it's too late.

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9. Motivation as a form of management

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Introduction. Business is not only accounting, profit calculation, identification of profitable deals, but also active interaction with people using various forms of management, for example, motivation.

Materials and methods. Methods of analysis, synthesis, generalization are used in the research. Information base of the research is represented by the articles of domestic and foreign authors.

Results. In modern conditions, businessmen, in whose submission there are more than one employee, should be able to find a common language with employees and be a constant motivator and “call-to-action”. How does it work?

Motive is a set of internal motivations for activity based on conscious or unconscious needs. As a rule, a person performs actions under the influence of various motives, usually his own dominant motive. The nature of the main motive is influenced by environmental factors and personal characteristics of an individual. It is considered that achieving high motivation to complete a work assignment is associated with the presence of certain psychological states of the employee. Psychological states are determined by the main characteristics of the task: the diversity of the labor process, the significance of the task and feedback. To achieve sincere participation of employees in the development of the company, it is necessary for the interests and goals of the two parties to coincide.

Organization of management is the second most important criterion for effective motivation. It helps to achieve the highest productivity of labor. A significant role is played by the level of management and qualifications. Managers should be leaders of the company.

The concept of incentive for each employee is a personal desire, depending on his needs, it can be a material interest or career advancement. If the stimulus is relevant, then as a result of its action the employee's motivation increases, which usually leads to the planned result.

Based on this, we can conclude that the stimulus requires constant updating in order to maintain its current strength.

One of the mistakes in staff motivation may be the fact that the incentive is presented as a manipulation. A manipulative stimulus forces a person to act in a way that stimulating requires. This happens under psychological pressure. This incentive is not long, since the employee will not withstand the manipulation sooner or later.

Conclusion. Today, our country is in serious competition in the world market, despite the wide social orientation of Belarus, the issue of motivation remains relevant.

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10. Opinion leaders as an effective form of influence marketing

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Introduction. Every day it becomes more difficult to attract the attention of consumers. Many people are tired of traditional advertising methods. Therefore, companies are increasingly using a pioneering type of advertising - influence marketing.

Materials and methods. Methods of analysis, synthesis, generalization are used in the research. Information base of the research is represented by the articles of domestic and foreign authors.

Results. Influence marketing or is a way to promote products and services through opinion leaders. It has recently become popular to promote brands through bloggers. Previously, this method was used in advertising on television, attracting famous actors and musicians. The main thing is that the target audience trusts the opinion of the person you are advertising the product from. This can be a well-known blogger, an authoritative user of the forum, or a top recommender from the feedback platform.

Influence marketing often goes along with two other areas: social media marketing and content marketing. Most campaigns using influence marketing have a social media component, with the result that ads are expected to be distributed through personal social media accounts. Many Influencer campaigns also carry content marketing elements, because the advertiser also creates content.

Some people mistakenly believe that word of mouth and influence marketing are interchangeable, but there is a significant difference between the two. Influence marketing implies involving key individuals to increase influence among friends and family members, word of mouth is the place where this communication takes place. Thus, influence marketing includes word of mouth, but the latter does not control the former.

Why is it effective to use influence marketing?

- The opinion of the influencers plays a crucial role in making a decision about buying a product. 88% of customers consider online reviews "very influential" when they want to buy a product.
- 90% of consumers trust their peers. And only 33% trust ads.
- Users are tired of ads. According to the Yankelovich research company, the average American sees five thousand ads a day. A survey by the advertising platform showed that only 14% of respondents remembered the last ad they saw. Therefore, it is not surprising that almost everyone has AdBlock.
- According to a study by Tomoson, marketing is one of the most effective tools for Internet promotion along with email marketing.

Conclusion. Thus, using opinion leaders for advertising helps to attract consumers ' attention to the product, as well as increase their trust in the brand.

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11. Methods of promoting restaurant business

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Introduction. Today the restaurant business is characterized by active development and dynamism. The article is devoted to the marketing techniques aimed at attracting consumers to a restaurant to achieve competitive advantage in this sphere.

Materials and methods. Such methods as synthesis, analysis and comparison were used in the work. We analyzed advertisements for various restaurants in Belarus, the opinions of experts; and revealed affective tools in promoting restaurants.

Results and discussion. The first tool is direct advertising (billboards, advertising in the media, on the Internet, interactive maps). We have identified such advantages of direct advertising as a multiple repeat and specific instructions. But the downside is much more significant: a high price and there is no trust in advertising in society.

"Why is direct advertising so popular? Because advertising agencies are interested in it. It is easiest for them to sign a contract with you, then create an ad for \$ 100 and distribute it anywhere – in Newspapers, the Internet, on boards. At the same time, advertising agencies have large discounts on media - up to 70%. Therefore, they are interested in your using direct advertising, they earn already on their discounts "

The most effective tool for promoting restaurants is social networks. Social marketing works with minimal costs and maximum efficiency. If you create the right content, this is an effective and free way to promote. The point of social networks is to create a mood, find a common language with subscribers. The social networks should be developed by the restaurant. The author definitely recommends Instagram. It is used by consumers of restaurant services most of all.

The third method is foodbloggers. Restaurants can work effectively with bloggers and foodhunters. But at the same time, you need to build relationships correctly: *"Half of bloggers have hyped subscribers and offer nonsense for which they want money"*. A real restaurant critic is a person who has at least the following advantages: he is independent, goes to restaurants for his own money, he should describe everything in normal language so that it is interesting to read.

The fourth tool is Cross-marketing. It has not received widespread use in our country, although this is a very effective way. Cross-marketing involves conducting joint marketing activities with several firms or companies. For example, various perfume shops with a check issue discount coupon to certain restaurants. It is very important to choose the right stock partner who has a similar target audience in cross-marketing.

Conclusion. Thus, the main function of marketing research in the restaurant business is to help assess the situation, develop a good development strategy, and reduce the risk of making wrong decisions. The need for marketing research appears when opening a new restaurant, with the ineffective functioning of an existing institution or when replicating a successful concept.

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12. Cause marketing is an effective way to competitiveness

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Introduction. Cause marketing is a concept of partnering a brand's profitability with a charitable cause. According to the statistics of the last decade this approach has become widespread in Western Europe. It is an effective way for for-profit business to tailor marketing campaign to corporate social responsibility. You can both continue to increase sales and improve company's perception.

Materials and methods. Methods of analysis, comparison, synthesis, generalization are used in the research. Information base of the research is represented by the articles of domestic and foreign authors, materials published in periodicals, etc.

Results and discussion. The results of Cone Global Cause Evaluation Survey show that a half of customers are ready to refuse the product because of irresponsible business practices. Half of surveyed investors do not give financial support to a business that does not cooperate with non-profit organizations. Personal relevance of cause is the reason why 70% of participants choose product engaged in cause marketing instead of similar product which does not. And eventually more than 70% consider it is ok for brands to combine supporting good causes along with making money. The main benefit from cause marketing for business is creating a positive image and evoking respectable attitude for the brand. Traditionally-operated business can successfully introduce promo-action together with non-profit organization for mutual benefit. It gives opportunity to attract real percentage of loyal customers through the recognition of another brand or project. Sponsor or co-sponsor of a charitable event gives you possibility to exploit this fact by describing it on your social media and website, mentioning it elsewhere in your own email or store. The good example is cooperative project of Belarusian clothes brand MARK FORMELLE and charity organization KaliLaska. MARK FORMELLE provides their stores with special shelf where you can leave unnecessary clothes and get a discount. Afterwards KaliLaska sends your old things to people in need. It works because the majority of consumers prefer to use an intermediary instead of direct charitable activity. This also explains growing popularity of charity Christmas cards within supermarket chains. Annually Next Retail Ltd donates 15% of full price sales revenue of such cards for cancer and diabetes supporting organizations. However, the price on these cards is a lot higher, so that retailer takes benefit from "card season".

Conclusions. Nowadays, in Eastern Europe consumer's awareness about social and environmental issues is growing. In increasing frequency modern citizens aren't satisfied with making just a purchase, they care about their own reputation through loyalty to certain brand. It is a great solution for companies to turn round marketing policy by means of cause instead of wasting money on inefficient advertising.

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13. Digital advertising and prospects of using it in large cities

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Introduction. In this article the problem of information noise and the way to clear cities and the Internet of inappropriate advertising are considered. It is devoted to the development and implementation of an application that will allow us to transfer all advertisements to virtual reality.

Material and methods. Activities to achieve the goals of this work include: researching the behavior of users on the Internet and their perception of outdoor advertising in the city, developing the design of VR / AR advertising in the urban environment, visualizing the program on user gadgets, testing, re-researching consumer behavior, finalizing the product and launching it into mass use.

Result and discussion. In recent years, with an increasing amount of different content on the Internet and numerous advertisements, almost every person feels information noise – overload of information. Some people try to allocate their time correctly, restricting the viewing of websites and ads, while others block all ads on the Internet, using such services, as Ad Blocker. However, most of us can't get rid of endless information flow and, therefore, may suffer from various psychosomatic and neurological diseases, as migraines, depression and so on.

News and advertisement cover people like an avalanche. We stop trusting ads, as they begin to annoy, and under the information noise we can't recognize and understand the message of advertising. On the other hand, the world around us is too wide and not limited to internet space. Inappropriate advertising signs, banners, advertising on billboards, buildings and vehicles irritate people in their cities. It's time to get rid of advertising structures, installed on the roofs of buildings, because when architects create buildings, they hardly want to make them spoiled by advertising. Buildings represent historical and cultural value, therefore most of them, located in the historical centers and on the main avenues, should be cleared of advertising structures on the roofs.

Thus, the main goal of this work is to develop a strategy of implementation and transferring advertisements from the urban and online environment to virtual or augmented reality. It is assumed that a single citywide application for smartphones, smart glasses and other gadgets will be created, and it should collect all the necessary information about companies and project it on buildings, virtual advertising spots or a virtual city map, and also let us know where certain discounts or any marketing events are held – at a certain point in time and for a specific location.

Augmented (AR) and virtual (VR) reality technologies allow you to add or replace objects from the real world by connecting to the system. For example, using virtual reality glasses, you can conduct lessons at school, clearly demonstrating objects and processes. Moreover, if you install the AR application on your smartphone, you can easily “try on” the future interior and make a furniture selection.

To provide the preservation of architectural unity, increase the effectiveness of attracting the potential consumers and make the advertisements visible in the city, to eliminate overloading of information on the Internet, in particular, to reduce the percentage of advertisements per person, we should completely “unload” the sites on the Internet from advertising, as well as remove any outdoor advertising in large cities. So, we can do this by developing a single citywide application for smartphones. The implementation of the strategy of introducing and transferring advertisements from the urban and online environment to virtual or augmented reality also requires their correct location and graphic design with special attention to all the neurophysiological characteristics of human perception.

Conclusion. The development of the given application will protect people from information noise, preserve historical and architectural diversity of the city and reduce the cost of outdoor advertising.

14. Development of targeted advertising on Instagram

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Introduction. According to statistics, in the Republic of Belarus, 241.300 individual entrepreneurs are engaged in business. Any business exists thanks to customers. Nowadays the competition is high in all areas.

Materials and methods. The material for the study was taken from the statistical data on the development of targeted advertising on Instagram.

Results and discussion. The relevance of doing business through the Internet is growing annually. At the moment, most companies have their sites on the Internet, which allows them to display chats with the consumer in a format that is convenient for both parties. At the same time, the popularity of mobile platforms is only growing. And in a few years, using a smartphone to get information will become an integral part of running any business. Therefore, promoting any business on Instagram is relevant now. Firstly, advertising on Instagram allows the business to evoke an audience response and huge reach. Secondly, a potential customer's application is cheaper.

Advertising on Instagram is divided into paid and free. Messages to direct, mutual PR, chat activities are related to free advertising. Targeted advertising is a paid way to promote your profile, but at the same time one of the most effective. The most valuable person in the company is the one who knows how to attract customers. Therefore, more attention should be paid to targeted advertising, due to the changing information market.

Targeted advertising is a special type of ad that is aimed at people who are potentially interested in a product or service. The purpose of this type of advertising is to increase the number of applications and subscribers, to promote upcoming events and seminars.

Instagram refers to Facebook, which contains information about user activities. This helps to accurately select customers for the specified advertising parameters. Advertising appears in the user's stream among posts from accounts that interest him. Targeted Instagram ads appear in an image, a video, and a story format. Advertising with attractive photos is interesting for the consumer, since users pay more attention to visual design than to the text component. Video advertising provides more visual overview of a product or service. Advertising of a dance studio will interest the client with a video with examples of performances or training. Advertising in stories is most often used to announce events, blogs, and special offers. Publications that are promoted through targeted advertising are displayed as "advertising." In addition, they have different action buttons ("go", "more" and others), which are configured individually for each promo post.

When setting up targeted advertising, you need to pay attention to the uniqueness of the proposal and the simplicity of its perception by the audience. In today's world, not many people have time to read long posts. Therefore, a short and call-to-action advertising text is the best solution. Conducting an advertising campaign leads to an analysis of the results. Criteria for the assessment may include changes in reach, number of subscribers, and audience engagement. You can analyze the budget which has been invested in targeted advertising and conclude which audience gives more conversion.

Conclusion. The future of Internet marketing on Instagram is for the digitalization of advertising media. Improving advertising during the emergence of trends should be a strategic goal. And at this stage in the development of a social network, targeted advertising is a great way to promote business.

15. Overview of the World Beer Market

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Introduction. The beer industry occupies a significant niche in the processing industry of the world and Ukraine. It is profitable not only for investors and direct producers, but also for the state. The latter is due to the fact that breweries are large taxpayers, and, given the specifics of the product, are payers of local fees. This product is quite cost-effective and popular, so investing in its production provides a rather favorable financial perspective.

Materials and methods. Methods such as scientific abstraction, synthesis, analysis, extrapolation, comparison, and deductive methods were used. The analyses were used to determine the state of the global beer market and its development trends.

Results. The global beer market was worth US\$ 589.6 Billion in 2018. Beer is one of the highest consumed alcoholic beverages around the world and is largely produced using cereal grains, water, yeast, etc, that are fermented for a period of time.

China, The United States, Brazil, Mexico and Germany currently represent the top 5 producers of beer across the globe. Other major producers include Russia, Japan, United Kingdom, Vietnam and Poland.

The global beer market is projected to grow at a CAGR of 5.5% during the forecast period. Changing lifestyle, increasing consumption rate of alcoholic drinks, rapid urbanization, high disposable income, and popularity of beer among the young population are a few factors driving the global beer market. The introduction of new ingredients and innovative flavors, combining salty, fruity and tart flavors, by craft beers have found increasing appeal among the millennial crowd globally.

There has been a consistent growth in preference for low alcohol by volume beverages and the sales of no-alcohol and low-alcohol beers have been rising with the growing interest from health-conscious consumers and a wider choice of new ranges with improved taste. Another driving factor is that the low-alcohol beers are now cheaper than their high alcoholic equivalents, for those of 2.8% ABV and less. The cost reduction would drive the market for low-alcohol alcohols such as craft beer.

The global beer market has been segmented on the basis of type, packaging, distribution channels, and production. The market is classified based on type into lager, malt, ale, stout & porter, and others. The market by production includes, macro brewery, microbrewery, craft brewery, and others. The most common forms of packaging include, glass bottles, PET bottles, metal cans, and others. Based on the distribution channel, the market is segmented into hypermarket & supermarkets, liquor specialist stores, duty-free stores, online retailing, and other distribution channels.

Conclusions. Adoption of western culture and rapid modernization have resulted in an increased number of female drinkers. Low-alcoholic beer is becoming more popular among young consumers, owing to the prevalence of a healthier lifestyle. The online retailing or e-commerce segment is expected to be a prominent emerging distribution channel, and will increase its market share during the forecast period.

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16. Today's trends in advertising in beauty-industry

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Introduction. An advertising campaign plays an important role in the promotion of beauty products, which is why potential buyers are more likely to learn about and buy a new product. The specificity of the promotion of goods and services took many forms over time. Advertising professionals should keep abreast of the latest trends and take them into account in order to achieve their marketing goals. With the example of ad units for cosmetics, we will try to figure out what to consider in order to promote new products.

Materials and methods. During the study, theoretical and empirical research methods were used. The theoretical method has helped to analyze the placement of advertising through various means of its distribution, as well as to investigate the impact of communication on consumers. The empirical method, namely observation, has identified the latest trends in the promotion of beauty products. An explanation method was also used to understand which distribution channels were best to choose. The application of the deduction method helped to summarize the conclusions of the work performed. The main materials for the study were provided by L'Oreal Paris Ukraine.

Results and discussion. During the research, the market of decorative cosmetics of Ukraine and features of advertising of such products were analyzed. The activity of the company, as well as competing companies with similar products, is considered. The basic materials on the latest tendencies of advertising in this field are studied, as well as the information of recent years on the peculiarities of the choice and use of decorative cosmetics by consumers. Examples of advertising products on different platforms, as well as the launch of decorative cosmetics on the Ukrainian market and methods of its promotion are analyzed. Examples of creative advertising have been explored, material on the features of product promotion during the launch of products into existing and new markets has been considered. We study the strengths and weaknesses, as well as the threats and opportunities when launching new products in the domestic market. As part of the study, a promotion plan was created for L'Oreal Paris Ukraine, as well as the concept of a promotional message and finding the best channels for product promotion.

Conclusions. Research into the Ukrainian cosmetics market and L'Oreal Paris Ukraine's products has helped to understand the latest trends in advertising in the beauty industry and has made it possible to determine that modern advertising is more effective on the Internet than on television. Outdoor advertising, such as billboards and citylights, is also inferior to advertising on popular social networks. Recent advertising trends are closely related to technological advancement. When designing your advertising campaign, you need to consider the lifestyle of the target audience, where and how they spend their time. You also need to take a creative approach to engage the consumer, thus provoking the purchase of goods. Offered extraordinary solutions and non-standard approaches that focus on modern consumers and their lifestyles. These advertising approaches will help companies succeed, both with products already available in the market and in launching new products.

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17. Marketing in supermarkets

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Introduction. Every day we are faced with marketing, sometimes without even noticing it. According to statistics, most people do not even know that they are victims of marketing.

Methods and materials The main methods of this work are analysis and generalization of information. This work is based on electronic resources and written materials of foreign authors.

Results. Magic number 9 is the basics of marketing. Many customers have long known this method, but it still continues to affect their minds. The customers see a price tag of 49.99 rubles, and they know perfectly well that it is almost 50. On the subconscious mind there is a feeling that this price tends more to 40 rubles and looks cheaper.

The next technique is to arrange the food racks and display the goods in such a way that the most necessary items are as far away from each other as possible. In this case, marketers expect that in search of milk, the customer will first pass by other products, capturing something else along the way, with a large discount or a profitable promotion.

The method of "height matters" is another technique. The expensive goods are placed on the middle shelf of the counter, just at the height of the customers' eyes. This is done to attract customers' attention to the most expensive product.

Discount card. In fact, discount cards give customers very small discounts, especially in most cases, their effect begins after the buyer spends a specific amount in the supermarket.

Hunger. With the help of pleasant smells, a feeling of hunger is caused, so that the buyer purchases more goods than he needed.

Music. Almost all supermarkets play unobtrusive tunes or famous songs that are used to relax the customer and delay him. In addition, a person will walk more slowly, slow down their pace, and therefore consider the counters in more detail.

Conclusion. Thus, having considered the main and most effective methods of marketing in supermarkets, it is possible to say that they are effective marketing tools to attract customers' attention and increase sales.

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18. Marketing investigation of consumer preferences in wine market

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Introduction. Nowadays consumer requires an increase of not only quality, but also aesthetic properties, including the design of the wine label and bottle [1]. For this reason, the peculiarities of consumer behavior when choosing wine were investigated in current work, that had been dictated by the need to identify preferences for the implementation of effective product policy.

Materials and methods. The research is based on information of a survey conducted using the questionnaire, which consisted of two parts: the personality questions about participants, including their gender, age, income level, social status, and directly the questions about choice of a wine bottle with answer options. The conjunction tables and the χ^2 criterion were used to determine statistical correlations between factor and result parameters.

Results and discussion. The results of the statistical analysis show that, taking into account the various characteristics of the wine, including its economic, technological, ampelographic components, as well as the appearance of the bottle and the beverage label, significantly influence the consumers of different social statuses. Thus, women and men with diverse family status differ in the choice of wine, given the grape variety from which it was made, while other quality characteristics of wine is not critically influential. Therefore, consumers with various income levels choose wines of different price categories, the organoleptic properties of which they consider unique. However, the price of wine and its gastronomic attributes are statistically significant for people aged from 18 to 50 that prove the difference among preferences of generations. Also women aged from 25 to 35 with income level higher than 5 thousands UAH ready to buy souvenir wine bottle.

Regardless of marital status, survey participants buy wines at all proposed places of sale, but ones who have higher level of income prefer wine specialized stores. However, married people largely choose wines for holidays, gastronomic pleasure or for medicinal purposes, because wine is enriched by antioxidants, vitamins and has relatively low calorie content [2]. Respondents aged more 35 are also buy wine at the aforementioned shops or directly from the wineries, which may be related to greater experience when choosing alcoholic beverages.

Survey analysis shows that most respondents choose wines whose label is simple and understandable, especially with the image of the winery, a grape cluster, because it demonstrates the production of wine, its place of origin. Moreover, most consumers prefer to add information on the label about the combination of wine with certain products and tend to buy wine, the bottle of which is standard 0,75 dm³.

Conclusions. According to the results of this study the criteria of choosing a wine, its quality properties and the choice of purchase place differs among consumers with different personal characteristics, which has the practical importance in order to develop the effective marketing, taking into account the preferences of the population.

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19. Improving the efficiency of advertising activities at JSC «Zenit»

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Introduction. This article considers the components of the package of measures, the purpose of which is to increase the efficiency of advertising activities at the enterprise of JSC «Zenit».

Materials and methods. The material for the study was taken from the plan improving the process "Organization of interaction with the consumer and assessment of their satisfaction" for 2019 at the enterprise JSC "Zenit".

Results and discussion. The main production activity of JSC «Zenit» is the electrical products for elevator configuration. The second direction is the production of energy-saving lamps, as well as lights for agricultural, auto-tractor and off-road equipment. This direction is very promising and unique for the CIS countries, as LED lamps of passing, driving and working beams of various modifications for heavy operating conditions are the development of specialists of JSC «Zenit» and there are no structural analogues of lighting engineering of other manufacturers. In the world there is only one competitor of the specified lighting technology - the company HELLA, Germany.

The success of any enterprise depends also on the quality of advertising activities: exhibitions, seminars, presentations or conferences. Advertising is an effective tool for relationship between producers and consumers: attracting customers' attention, determining their behavior, and creating a positive image of the enterprise. One of the tools to increase the efficiency of advertising is to get feedback from consumers as the effect of advertising depends on analysis the needs and interests of the target audience: questionnaires by telephone, questionnaire in trading organizations and firms, communication during business trips, at exhibitions and seminars. Also a high-quality image and convincing text plays an important role in the success of the advertising campaign. The catalogue of LED lamps and lighting fixtures was repeatedly updated during 2019, new catalogs "Elevator equipment" and "LED lighting for transport" were produced, advertising booklet "LED lighting for forestry enterprises" was issued and translated into English. It should be noted that in 2020 the demand for electrical products for elevator configuration abroad increased compared to 2019, which is a consequence of the effective advertising activity of the enterprise for 2019.

JSC «Zenit» company is published in specialized radio technical magazines and newspapers: in December 2019, an advertising article on LED products was published in the printing body of the Ministry of Forestry of the Republic of Belarus "Belarusian Forest Newspaper" and in the republican newspaper "Belarus Today." In addition the broadcast of commercials on republican channels can give a positive result.

Today, one of the most effective ways to promote the products of JSC «Zenit» is to participate in international specialized exhibitions, as this is a great opportunity to increase the number of customers. Exhibition organizers offer enterprises a comprehensive advertising campaign, which includes posting detailed information about the participant on the website, in the catalogue, information materials of the exhibition, mention of the company in electronic and postal mail, articles in print publications and on Internet. In 2019. JSC «Zenith» participated in 9 exhibition events. One of the largest was the "LED Lighting Exhibition" in Istanbul, Turkey.

Conclusion. Thus, the set of mentioned advantages makes specialized exhibitions really the most effective tool for promotion of goods and services at the enterprise of OJSC "Zenith"

20. Influence of foreign investment on the development of national economy

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Introduction. Foreign investment takes an important place in the economic sphere of each modern state. This is a very important indicator that affects the development of the economy of the Republic of Belarus.

Materials and methods. The main material for the study is the statistical information of the Ministry of Economy of the Republic of Belarus and the National Statistical Committee of the Republic of Belarus. Methods of comparison, generalization, measurement and observation are used in the research.

Results. Foreign direct investment is a category of international investment that appears, when a resident of one country has control or a significant influence on the management of an organization that is a resident of another country. It is also a source of financing the activities of the enterprise.

At the end of 2019, 19 billion roubles were invested in fixed assets of the economy of the republic, which amounted to 104.3 percent compared to the period of 2018. The share of investments in fixed assets in Gross National Product amounted to 19.7 percent.

There is a positive increase in the cost of acquiring equipment, machinery and vehicles - 109.7 percent compared to the level of 2018. Their share of investments in fixed assets amounted to 39.2 percent. The growth rate of construction and installation works was 102.6 percent, and the specific gravity was 50.5 percent [1].

An investor company affects the level of development of a direct investment enterprise by making direct foreign investments. It expresses both negative and positive effects in the country's economy. In order to strengthen the positive effects and weaken the negative, a policy of attracting investments has been created that ensures the maximum positive impact of foreign direct investment on economic development.

Here are the main factors of the negative impact of companies with foreign investment on the country's economy:

1) there is the largest number of abuses by foreign companies in the extractive industries;
2) state examination of projects protects the economy from violations by foreign companies;

3) there are not many foreign companies in Belarus, so we cannot trace their activities in relation to abuse [2].

Conclusion. As a result, in the policy of the Republic of Belarus on attracting foreign investment, it is necessary to focus on stimulating the creation of branches of a transnational corporation in the form of new enterprises on a competitive basis.

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21. Electronic business in the era of digital transformation of the economy

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Introduction. The article is devoted to the analysis of the prospects of electronic business in the era of digital transformation of the economy. The article highlights trends that indicate the digitization of spheres of society, and also presents five steps of the digital transformation of companies identified by the International Research. It is considered the practical aspect of the impact of innovations and digital platforms on the development of e-business based on the use of Single Window systems.

Materials and methods. General scientific and special methods were used in the study. In particular, the method of analysis and synthesis, generalization and scientific abstraction. The information base of the research is the work of domestic and foreign scientists published in periodicals, etc.

Results and discussion. The active development of the field of engineering and technology, in particular information technologies, indicates the transition to the information age. In today's world, information becomes the most valuable, and those who can quickly use up-to-date data get special advantages. In this sense, the successful development of e-business and the competitiveness of its representatives are directly related to the use of innovative technologies. In this regard, the concepts of "digital economy", "digital transformation of the economy", "digital market", etc. have become relevant. They are used by government agencies in various countries, as well as by the business community. These concepts are also discussed in scientific circles, although there is still no General opinion, since we are talking about new modern processes that can only be evaluated after a certain time. For example, the Eurasian economic Union (EEU) has set itself the task of forming the digital space as the next stage in the development of an integration Association. Experts of the working group on the digital space of the EAEU offer the following definitions: Digital economy – economic activity based on digital processes, models, technologies, digital goods, including those produced by electronic business. The digital transformation of the economy is: 1) changing economic patterns, changing traditional markets, social relations, and public administration related to the penetration of digital technologies. 2) fundamentally changing the main source of added value and the structure of the economy by creating more efficient economic processes provided with digital infrastructures. 3) transition of the leading mechanism of economic development to institutions based on digital models and processes. From the presented definitions, it becomes obvious that such a phenomenon as digitalization has a direct impact on the development of e-business and imposes certain requirements on it. The existence of such a phenomenon as the digital transformation of the economy can be traced through trends that signal that society is really moving towards the digitalization of all areas and spheres of life. Thus, national programs such as "e-government", "e-customs", as well as state programs "digital economy" are accepted. Modern blockchain technology is used, starting from the financial sector for distributed data storage in a public database, which will allow to move to a new level of cybersecurity and reduce financial fraud, as well as provide an opportunity to completely revise the structure of banks' work, speed up payments, and ending with simple storage of archived data in the sphere of providing services to the population for providing data and issuing documents. Healthcare and pharmaceuticals are becoming fully digital thanks to modern information systems for controlling medicines.

Completely new training programs in the field of information technology are being developed and implemented to train specialists who are able to work in the conditions of digital transformation of all spheres of life. The widespread use and availability of the Internet has given rise to such a concept as the Internet of things, which forces modern businesses to provide services and offer products in a completely new way. These trends show, that the world is experiencing a change in the economic order due to the penetration of digital technologies in all spheres of human life, and that modern business is faced with new opportunities to improve its competitiveness on the world stage, which in turn presents new challenges for representatives of electronic business. In practice, we can already note a certain impact of innovative technologies on the development of e-business. For example, the "single window" system is being actively implemented all over the world, i.e. a mechanism that allows trade and transport companies to provide information and documents related to compliance with the requirements of all regulatory authorities regarding import, export and transit only once, to one Agency and in a standard format. Basically, we are talking about the ability to receive services from regulatory authorities online, which has a positive impact on the functioning of e-business, eliminating burdensome time and material costs.

Conclusions. Thus, the process of digital transformation of the economy obviously has an impact on the development of e-business, which, in turn, is an integral part of this process. Companies' competitiveness is increasingly dependent on embracing digital transformation and using innovation to improve the business environment. Those who do not use "digitalization" as a means to achieve certain advantages risk losing their place in the global market in the long run.

22. Using Logarithmic Derivative in Financial Mathematics

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Introduction. The derivative of a function is its velocity of change. Therefore, the logarithmic derivative is often called the relative velocity of change or rate of change. The logarithmic derivative finds numerous applications in the economy, in particular, to determine bank interest on deposits or to determine the return on assets. These two tasks will be the focus of our report.

Materials and methods. Using the logarithmic differentiation, we will find that bank interest coincides with the logarithmic derivative of the deposit amount as a function of time and also we will show how the use of the logarithmic derivative helps to decide on the purchase or sale of a bill to invest in a more profitable asset.

Results. Let $B(t)$ be the value of the bank deposit at time t . Let us determine the amount of bank interest by function $B(t)$. To do this, consider the time interval $[t, t + h]$, $h > 0$. Then the increment of the contribution in this interval is $B(t + h) - B(t)$. On the other hand, this increment is due to interest accrual. Therefore, assuming that h is small and the bank interest rate changes little over this period, then the deposit increment over this period is approximately equal $rhB(t)$. From here we get approximate equality

$$r(t) \approx \frac{B(t + h) - B(t)}{h} \cdot \frac{1}{B(t)}$$

Consider the limit of this expression for $h \rightarrow 0$ we obtain

$$r(t) = \frac{B'(t)}{B(t)}.$$

So, we have shown that bank interest coincides with the logarithmic derivative of the deposit amount as a function of time.

The above reasoning is suitable for the mathematical determination of the income of any financial asset, if its value is known as a function of time. The average profitability of a financial index over a certain period of time is usually called its relative increment over this period of time.

Therefore, arguing, as above, we can come to the definition of the profitability of the asset as its logarithmic derivative. Let $C(t)$ be the value of some asset at time t . Then its profitable at this moment is called

$$\rho(t) = (\ln C(t))' = \frac{C'(t)}{C(t)}$$

Conclusions. We have found that bank interest and profitability of the asset are logarithmic derivative of functions $B(t)$ and $C(t)$ accordingly.

23. Asset Price Model

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Introduction. The competitiveness and ability to pay of any modern business is determined by the rational organization of finance, therefore, the ability to conduct financial and commercial calculations is a necessary part of the training of a specialist in the field of management. Financial calculations are the basis of investment and managerial analysis. An investor has, for example, the problem of choosing the most rational decisions from the position of their profitability and risk level. A finance professional is required correctly assess the possible options for financial consequences when making any transaction and implementing any project and eliminate undesirable consequences.

Materials and methods. We consider an Asset Price Model. The asset prices move randomly because of the following efficient market hypothesis: 1. The past history is fully reflected in the present price, which does not hold any future information. This means the future price of the asset only depends on its current value and does not depends on its value one month ago, or one year ago. 2. Market responds immediately to any new information about an asset.

We shall introduce a discrete model and a continuous model.

Results. Let us consider the discrete price model.

$$\frac{S_{n+1}}{S_n} = \begin{cases} u & \text{with probability} = \frac{1}{2} \\ v & \text{with probability} = \frac{1}{2} \end{cases}.$$

A sequence of movements $\{S_0, S_1, \dots, S_n\}$ is called an n -step path. In such a path, it can consist of l times up movements and $n-l$ times down movements, where $0 \leq l \leq n$. The corresponding values of $S_n = S_0 u^l v^{n-l}$. Since the probability of each movement is independent, the probability of an n -step path with l up movements (and $n-l$ down movements) is $\left(\frac{1}{2}\right)^l \left(\frac{1}{2}\right)^{n-l} = \left(\frac{1}{2}\right)^n$.

There are $\binom{n}{l}$ paths with l up movements in n -step paths, we then obtain the transition

probability of the asset price to be: $P(S_n = S | S_0) = \binom{n}{l} \left(\frac{1}{2}\right)^n$ when $S = S_0 u^l v^{n-l}$. Such S_n

is called a (discrete) random walk.

Conclusions. Using definite substitutions we can find simplification of these formula for calculations.

24. Knowledge management policy as a key factor in improving company's effectiveness during the macroeconomic crisis

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Introduction. In the conditions of the macroeconomic crisis, it is very important to organize knowledge management of the company for the preservation and development of business. The effective use of the knowledge management will lead to increase of company's competitiveness, investment attractiveness and capitalization.

Materials and methods. To analyze the knowledge management policy of the company were considered the works of leading Western and domestic analysts, scientific achievements. Methods of analysis, comparison and forecasting were used.

Results. Corporate knowledge management is a technological process of use of enterprise information resources for work with corporate information, which gives users the opportunity to navigate this information and make faster decisions based on the gained knowledge. This process is aimed at improving the competitiveness of the enterprise, which is an important factor for ensuring resilience in a crisis. According to scientists, investments in this area will grow rapidly.

Corporate knowledge is intellectual equity or borrowed capital that should be converted into assets. The issue of their management is important for companies that focus on intellectual resources: banking, legal, consulting and others. In order to increase the efficiency and effectiveness of the knowledge management process, their systematization and minimization of time losses, it is necessary to create knowledge management system, which is built on the basis in which employees upload their knowledge and experience that form a unified system of knowledge. Employees use this system to accomplish their tasks. To find a new solution the use the Data mining tool.

Knowledge management systems are classified into enterprise systems (KM module in Microsoft Business Solutions-Axapta; Lotus Discovery Server and IBM Domino Extended Search; Oracle GlobalxChange Information System), personal systems (KB 908; SYNTEK-Inform), CRM-oriented systems (eServer; Kana IQ; e-FAQ; One Step; JeevesOne).

First, companies need to create an internal office intranet. In order to work with the corporate knowledge management system, several standard conditions are required: availability of e-mail and an Internet connection, registration in the system, familiarization with the work of the system, the presence of practical problems that need to be solved, ways to solve them and work in corporate units. The software, which is selected, should be simple, reliable and secure to address current needs and those that may arise in the future.

In the process of implementing the software, the company may face the following problems: analytical (technical) and organizational (lack of necessary knowledge of personnel regarding the use of the system, the problem of using the program on a daily basis). To prevent such problems it is necessary to follow the rules: define the purpose, plan, resources, principles of filling the database, conduct training of personnel, develop analytical agents of continuous search for information analysis, capitalize new knowledge, integrate the knowledge management system with other business support systems.

Conclusions. Thus, properly organized implementation of the knowledge management system contributes to the development of staff, knowledge sharing and accelerating their assimilation, timely made organizational changes, ensuring transparency of information, which allows planning and making right management decisions during the macroeconomic crisis.

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25. Prospects for effective application of Data Mining in the Ukrainian economy

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Introduction. In the modern Western scientific literature, the general questions of Data Mining (DM) methods and the evidence of the potential advantages of using this technology are widely studied, but the important pressing questions remain: prospects for further development of Data Mining; critical issues of Data Mining technology application; domestic specifics of the Data Mining market.

Materials and methods. For research were analyzed the basic algorithms of Data Mining, identified the main steps related to the practical application of Data Mining software both in Western countries and in Ukraine, analyzed the development prospects and methods of improving the practical application of Data Mining systems.

Results. Currently, future depends on improving the efficiency of the practical application of Data Mining systems. In this connection, it is necessary to pay attention on the following perspective trends in the Data Mining systems market:

- there is a clear tendency to move from the classical client-server architecture of DM systems to the web-architecture within the group access systems (for example, in the Lotus Notes environment);
- due to the rapid increase in the size of corporate databases and repositories (up to 100 terabytes), modern DM systems need to use scalable algorithms that allow for an increasing number of attributes and dimensions;
- DM systems should provide both a combination of methods and competition between them to build the most accurate models, allowing you to create a project that will offer the best solution;
- in order to get a positive economic effect from the implementation of scientifically created models and projects created by scientists with the help of highly specialized software, they must be integrated into the existing front and back-office systems;
- an important issue is the creation of a common DM standard that would allow both the seamless exchange of created DM models between different DM packages and their smooth implementation in corporate systems;
- for further improvement of productivity of using DM systems, it is advisable to integrate their core modules into the relational database kernel (for example, there is already a possibility of direct integration: Darwin in Oracle, Intellidgent Miner in DB2);
- there is also a clear trend towards multi-platform DM systems;
- it should be common practice to use DM in collaboration with enterprise CRM systems to support effective marketing decisions;

These issues should be taken into account in the future implementation of datamining in Ukraine. The use of DM in the Ukrainian economy is currently a pressing issue.

Conclusion. So the question is not whether new technologies are needed, but how to apply them in each case. The role of specialized consulting firms performing complex project support, including task diagnostics, analysis of decision methods, development of recommendations, implementation of the chosen approach, support, optimization, is growing.

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26. Ways to improve the investment climate in the agricultural sector of Ukraine

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Introduction. The demand for investment resources on the global market is constantly growing and at the same time it significantly exceeds the supply. That's why the countries aimed at the economic growth and development of society, raising of social standards and improving the quality of people's life are trying to create the most favourable conditions for the investment attracting both domestic and outward.

Materials and methods. The problem of improvement of the state regulation system of investment processes, encouraging of investment activity, formation of a favourable investment climate and other issues related to the investment are brought up in the works of a number of scientists, in particular: L.M. Rud', A. Halchynskyi, Yu.V. Karnasiuk, T.V. Matsybora, O.L. Musiienko, D.V. Pashko, S.O. Kushnir, E.V. Yakymenko, T.V. Mayorova, I.O. Blank, P.A. Stetsiuk, O.V. Nosova, and others.

Results. According to the analysis of data related to the capital investment in agriculture and the assessment of its dynamics in recent years we can see, that 2010-2017 have a positive tendency, but an increase of investment into this sector, that is the rate of growth of investment, shortened in 2014. This can be related to the economic and political situation in the country. But in the further years we observe a reactivation of the investments growth which will positively affect the agriculture development.

In general, the specialists mention the main drawbacks of an existing investment management system of agrarian enterprises in Ukraine as follows [1]:

- 1) insufficient development of the theoretic and methodological principles of investment under the conditions of the market transformation;
- 2) limitation of leverages to promote an activation of an investment activity, first of all, towards more expanded attracting of financial resources;
- 3) insufficient application of organization and planning controlling components in the management of the investment activity which must become one of the most important aspects to activate investments.

Conclusion. Having performed the research, we would like to define measures that can facilitate not only an intensive economic development of the domestic sector, but also a vertical integration, international cooperation and openness of the Ukrainian agro-industrial complex: promoting the transparency of the privatization; exemption from taxation of income to the business refinancing; development of the depository system; providing maximum level of the "official" salary payment; development and introduction of the code of business conduct or ethical code of corporate management for all market participants with emphasis on the priority of a long-term cooperation but not for a short-term benefit; state support of the crowdfunding mechanism for attracting public funds for investment transactions; restructuring of inefficient large enterprises and at the same time promotion of the development of small and medium business; prevention of discrimination of investors on the basis of the resident; introduction of the tools that will promote a greater crediting level by banks of the real sector of economy; etc.

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27. IPO as a source of financing for innovative companies

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Introduction. Any innovative project requires financing. But as soon as innovative projects are the ones with increased level of risk, it is pretty hard to find the sources to finance them.

Materials and methods. During the research, a wide range of methods, such as structuring, generalization and logical analysis were employed. The research is based on printed publications of domestic authors.

Results and discussion. High riskiness of an innovative company's project always makes it hard to find investors, who will be willing to invest in your idea. For example, banks may refuse to provide you with a loan due to absence of collateral, lack of credit history, negative cash inflows on the project. Venture funds and private equity funds put forward numerous restrictions on decision-making entering such projects. Taking all of this into consideration, one of the most promising ways to attract capital to your project is to enter the stock market – implement initial public offering (IPO).

There are some pros and cons of IPO. Firstly, it gives you access to a new, relatively cheap source of capital with a reduced level of risk and no obligation to return funds and interest on them. IPO allows you to improve company's current financial position, due to the income you receive from the circulation of shares on the stock market. Moreover, the company grows in popularity, what has an impact on raising funds in the future. Positive impact on employees takes place: employees are able to get options to buy shares of the company they work in, what means that now the results of their work have a direct impact on their own income, what is a strong motivator. And finally, company receives a new effective valuation tool – capitalization – company's value based on the number of shares issued multiplied by the value of one share [1, p. 28].

At the same time, IPO implementation makes you meet the transparency requirement: you need to disclose any information about the company's financial results, as well as its plans and goals, to the wild pool of users, what increases company's sensitivity to the external environment. IPO also requires high wastes of time and money, associated with attraction of a large number of specialists in different areas to implement it. But what is really important, is that IPO increases risk of the company to be taken over by competitors, what is especially relevant for small start-ups. Such problems take place because when company goes public, it loses a certain level of control over its investor base [1, p.30].

Conclusion. To make a conclusion, since attracting financing through the initial public offering is a very long and expensive process, it encompasses a very large number of advantages, including access to cheaper financing, larger investments, balanced capital structure and new systems of motivation and corporate management.

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28. Urgent problems of labor conditions in small household stores and their solutions

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Introduction. The experience of developed countries shows that small private businesses play a very important role in the economy of any country. Their further development affects economic growth, saturation of the market with goods, creates additional jobs, that is, it solves many economic, social and other problems. Nevertheless, here comes reasonable question if it solves efficiently the problems related to appropriate work environment, safety and health of employees.

Materials and methods. Some recent scientific surveys and articles in the magazines on economics clearly point out a number of health problems for staff, company's reputation and profitability, as human asset is one of the most valuable for any business.

Results and discussion. Probably, each of us, entering a small household store, the section of chemicals, felt a sharp chemical while choosing a washing powder, whitener or stain remover. Your hand reaches for the brightest box, however, under the eye catching packaging, in addition to other components, there are hidden harmful chemicals, which are listed in small print on the back. Most of the harm is caused by synthetic detergents and surfactants on a phosphate basis, there are also many other substances (chlorine, ammonia, flavorings, etc.) which cause such a smell. According to scientists, they represent a major threat to the health of the consumer, to say nothing about a salesperson who encounters with these harmful substances on daily basis. The components of these products have a high biological activity and even "aggressiveness" when they infiltrate through the package into the air. Air pollution in such stores cannot be neglected as they can often cause inflammation of the skin, of respiratory tract, and even serious allergic diseases, liver and kidney problems. Of course, there is always a choice-you can reduce contact with synthetic detergents, replace them with natural ones (soda, vinegar) or switch to safer forms of detergents. But for employees of numerous household chemical stores, this choice is not available. The staff of such stores are often young women in reproductive age who have to spend hours inhaling chemical odors from packages of detergents on racks, working in stuffy, poorly ventilated rooms and hoping that the damage to their health will be minimal.

Still it is hard to deny that for business owners such things as revenues, problems of shoplifting, and need to survive in tough competition are often given a priority in the first place. The ethical problems such as sales staff safety, healthy work environment take the second place. Small businesses sometimes are unable to install cameras to prevent trivial shoplifting, to say nothing of air conditioning. Accordingly, the costs associated with sick leaves and high staff turnover at such stores are increasing, damaging profitability. Each household chemicals store should have powerful ventilation systems installed that will reduce the concentration of chemicals in the air.

Conclusion. Providing sales staff with normal working conditions will be more promising solution for such companies if there are tax incentives for ethical small businesses. They can lobby for such government steps. Such small companies can use clever marketing strategy publicizing their efforts to support health and wellbeing of their sales staff on their website as many companies do in Europe. It's safer this way not only for people but for any small business survival in the market.

29. Methodological approaches for competition assessment of the life and health insurance market

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Introduction. The international practice and experience shows that there are many different methodological approaches for competition assessment of the life and health insurance market. Besides, it involves a lot of misunderstanding and difficulties for interpreting the results of calculations.

Materials and Methods. Our research methodology approaches are represented of a systematic and critical literature review of competitiveness assessment of the life and health insurance market. We have analyzed about 100 research papers and studies from PubMed, Google Scholar, ResearchGate, ScienceDirect, etc.

Results. According to our research results it was defined that the main instruments for life and health insurance market competitiveness assessment are as follows:

1) Herfindahl-Hirschman index (Alhassan & Biekpe, 2016; Gulumser et al., 2001; Kasman & Turgutlu, 2007; Marović et al., 2013; Stijn, 2009; Jaloudi & Bakir, 2019; Dimic et al., 2018; Skuflic et al., 2011; Novozhilova, 2012; Sukpaiboonwat et al., 2014; Sharku & Shehu, 2016; Lotti, 2017; Kramaric & Kitic, 2012; Maksimović & Kostic, 2012; Scanlon et al., 2007; Shirinyan, 2014);

2) insurance density (Shirinyan, 2014; Rakshit, 2017; Kaur, 2015);

3) insurance penetration (Shirinyan, 2014; Rakshit, 2017; Das & Shome, 2016; Chizoba et al., 2018);

4) concentration ratios (Kasman & Turgutlu, 2007; Marović et al., 2013; Jaloudi & Bakir, 2019; Dimic et al., 2018; Skuflic et al., 2011; Novozhilova, 2012; Sukpaiboonwat et al., 2014; Sharku & Shehu, 2016; Lotti, 2017; Kramaric & Kitic, 2012; Maksimović & Kostic, 2012; Shirinayn, 2014);

5) entropy concentration index (Dimic et al., 2018; Skuflic et al., 2011; Kramaric & Kitic, 2012; Maksimović & Kostic, 2012; Shirinyan, 2014);

6) Lorenz curve (Dimic et al., 2018; Skuflic et al., 2011; Maksimović & Kostic, 2012);

7) Gini coefficient (Dimic et al., 2018; Skuflic et al., 2011; Maksimović & Kostic, 2012; Shirinyan, 2014);

8) Tideman-Hall concentration index (HTI) (Skuflic et al., 2011; Shirinayn, 2014);

9) Rosenbluth index (RI),

10) Comprehensive Concentration Index (CCI),

11) Hanna and Key Index (HKI),

12) Haus index (H) (Skuflic et al., 2011);

13) Panzar-Rosse approach and H-statistic (Alhassan & Biekpe, 2016; Gulumser et al., 2001; Kasman & Turgutlu, 2007; Stijn, 2009; Todorov, 2016);

14) Performance-Conduct-Structure indicator (Bikker, 2012; Bikker & Popescu, 2014); price cost margin indicator (Boone, 2008);

15) Fuzzy Analytic Hierarchy Process (FAHP) and Technique for Order Performance by Similarity to Ideal Solution (TOPSIS) (Mandić et al., 2017).

Conclusions. Based on the literature review it was determined that there isn't one unique approach for life and health insurance market competitiveness assessment, but also each of these methods have both advantages and disadvantages.

30. Anarchy or the path to success

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Introduction. For the long time, the authoritarian management style was the most popular, wide used and familiar for the majority of companies no matter it was a huge corporation or local business. Authoritarian management based on a hierarchical principle still used everywhere in the companies and gives high results that helps them to grow, but due to certain changes in society and attitude to the workforce, the time requires new solutions and another way of leadership.

Materials and methods. Such methods as: scientific abstraction, synthesis, analysis, comparison and deductive method were used. Analysis were used for specification of the main gains and summarizing. Were defined the main ways of problem solvation.

Results and discussion. Once probably all business operated on a traditional control system of management. This system commonly known as the autocratic or authoritarian management style. companies usually had one or two owners who, regardless of the stage of development and success of this company, always led the process, dictated to their subordinates what to do and what strategy they should adhere to. Accordingly, the subordinates always expected instructions from above and did not have the opportunity to manifest their own ideas.

But modern society empowers people to be initiative, to take risk, to stand by their own opinion and they expect to act like this during the working process. full control over the actions of workers makes them feel apathy, depression and reduces the level of initiative and the desire to offer something new to solve work tasks.

Workers should not feel like small cogs inside of a large machine. They need to know that they are valuable, and their qualifications, skills and initiative can help in dealing with important issues for the company. So the question is where is the point of balance between the absolute freedom of the workforce and total control, where the employees can feel that they are supported by their managers, who trust them and allow them to take independent actions and decide how to do the particular tasks without any pressure or unnecessary advices.

Conclusions. The solution in this case may be constant communication between senior officials and employees, a flexible work schedule, seminars, discussions and various events, where people can interact and exchanging with ideas. Also reducing the overall level of control over employees will help to soften the working atmosphere, reduce stress and increase productivity.

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31. Features of students' independent work organization at NUFT

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Introduction. With an increase of information flows and the requirements for the professional skills the ability of specialists to independently improve their professional competence is a prerequisite for quality higher education

Materials and methods. The research was conducted on the basis of the analysis of the qualification requirements for the masters and curricula of the subjects, taught during their training at NUFT.

Results. Analysis of the curriculum showed that during their compiling the requirements for the hours' distribution for classroom and independent work of students had been fully taken into account. Independent work accounts for 50 to 70% of the curriculum hours. As noted in the introduction, this fact is due to necessity of learning the great amount of factual material and acquiring the skills to obtain new knowledge by students. Independent work forms of self-organization can be quite different. There are writing essays, preparing for speeches at conferences and other.

The major part of the independent work should be narrow down the analysis of professional and social cases. That allows the students to learn the lecture material, to find out the applicability of theoretical provisions in practice, to form students' ability to formulate and solve certain situational cases. So, the active teaching methods during independent work must be widely used.

The best option for independent work is an individual task for each student. Quality control of the individual task is possible at seminar-debate or seminar-conference.

As known, during the class the lecturer does not have the opportunity to personally communicate with each student and often in different academic groups does repeat the same material.

NUFT was one of the first institutions of higher education in our country which introduced a distance education in the educational process. That means that with its correct organization, the teacher does not repeat the same material many times. Thus, students can view the lecture record at a convenient time for them. Developed individual task packages allow real-time assessment of each student's level of training during personal communication.

The main advantage of distance education for students is the lack of geographical and temporal dependence for knowledge obtaining, and for the institution of higher education – the cost-effectiveness.

Conclusions. Modern higher education is impossible without the students' independent work. It gives the opportunity to read and learn a large amount of material, to update knowledge. Organized independent work can take different forms, among which distance education is one of the most modern and perspective.

32. Analysis of the Development of Global Agricultural Markets as an Opportunity to Consolidate Ukrainian position in the International Market

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Introduction. In the last 5-10 years, agriculture has become a very attractive and creditworthy industry in Ukraine. Its role in the international commodity market is constantly increasing, contributing to the economic uplift of the country and consolidation in the international arena.

Materials and methods. Economic-statistical methods, methods of analysis and synthesis, induction and deduction were used. The articles of scientists concerning the analysis of the agrarian sector of Ukraine and export of agricultural products were analyzed.

Results and discussion. The world is changing with extraordinary rapidity, driven by many influences, including shifts in production and consumption patterns, continuing technological innovation, new ways of doing business, etc. Relying on extrapolations of current trends, we can predict the future developments and identify challenges arising from changes that we are likely to face.

The World Trade Organization identified two stages in the development of world trade. The first one was the stage of rapid growth (1995-2008). During this period of time, total world trade flows rose rapidly and steadily, ensuring average annual growth rate of 10.3%. The second stage began in 2009 and it continues to this day. This stage was marked by steep fall in trade after the economic crisis of 2008 before rebounding strongly in 2010 and 2011. However, trade growth since then has been unusually weak: average annual percentage change in trade volumes was ~ 0.7%. Fortunately, in recent years starting from 2017, the trend has changed for the better, trade indicators improved. The global trade forecast for 2025 are shown in Figure 1.

Indicators	Average volumes (2015-2017)	Forecasts	
		provided existing structure of product flows is maintained	provided the projected growth of shares in the structure of global trade is maintained
global trade (USD trillion)	16.0	23.8	23.8
products of plant origin (USD trillion)	468.0	623.2	1240.0
products of animal origin (USD trillion)	334.0	497.6	759.2

Fig. 1. Forecast of global trade in products of plant and animal origin in 2025.

It is possible to expect that by 2025 aggregate Ukrainian agricultural exports will reach \$19.7 billion. The expected share of Ukraine in the world agrarian market will reach 1.43%.

Conclusion. The research revealed that the global agricultural market has a good growth potential. Under such conditions, Ukraine can strengthen its role in the world trade of agricultural products. However, it requires the development and implementation of the right strategy, building new processing plants, effective promotion of Ukrainian goods to enhance competitiveness in global agricultural markets.

33. Motivation by enriching jobs and importance of reward management

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Introduction. Reward management in a business organization is basically the way that this particular business shapes and implements strategies and policies to reward employees in accordance with a fair standard and in accordance with how the organization values them.

Materials and methods. Theoretical generalization for determining the essence and content of the concept of “reward management”; analysis of existing effective factors and ways to increase its effectiveness, the value of motivation by enriching jobs; analysis of works and articles of foreign scientists. In addition, the main approaches that reward management carries out are reviewed and analyzed.

Results. Job enrichment is a motivational technique that emphasizes the need for complex, interesting and encouraging work. This implies that jobs should be redesigned so that internal satisfaction is derived from the execution of the work.

Reward management in a business organization is basically the way that this particular business shapes and implements strategies and policies to reward employees in accordance with a fair standard and in accordance with how the organization values them.

The main goal of reward management in business organizations is the fair remuneration of employees for their work. Main reason of reward management exists in business organizations in order to motivate employees in this particular organization to work and try their best to achieve the goals set out in the business. Reward management in commercial organizations consists not only of financial rewards, such as remuneration, but also of non-financial rewards, such as employee's recognition, employee's training development and increased responsibility for work.

Job enrichment is a very useful method of motivating employees. The benefits of enrichment work are as follows:

1. In everyday work, workers find their work very boring and monotonous. The number of such employees is usually significant. The frustration of these employees can be eliminated by making the work interesting with its enrichment.
2. Job enrichment helps reduce employee turnover and absenteeism.
3. Work enrichment motivates employees internally, giving them opportunities for growth and self-realization.
4. Accomplishment of tasks is facilitated by enrichment of work and advanced training of employees.
5. Enriched jobs give workers more satisfaction.
6. The enrichment of jobs is beneficial for the organization, because there is a qualitative and quantitative improvement of products and increases employee satisfaction.
7. Employees tend to be more creative when they work in the enriching context of complex work.

Conclusion. The reward management elements within a business organization are used to attract potential employees to their business, including salaries, bonuses, incentive payments, benefits and opportunities for employee growth, such as professional development and training opportunities. The presence of a reward management system gives the business many advantages, especially in small and medium-sized organizations, where managers must have good relations with employees.

34. Corporate time management

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Introduction. At present, time management is increasingly important as time challenges affect the well-being of both average persons and companies. In recent years, an increasing number of organizations have become aware of the need for centralized corporate implementation of time management technologies.

Materials and methods. Methods of analysis, comparison, synthesis and generalization are used in the research. The information base of the research is represented by the articles of foreign authors that are published in periodicals, etc.

Results. Originally, time management means the entire set of scheduling technologies that are used by an employee of the organization to use the working time more effectively. However, the use of time management is optional.

TM profile organization is based on the data obtained from the questionnaire of a team of managers on three main directions of implementation of time management in the company: personal time management – an average measure of time management skills for this group of managers; team time management - the quality of TM interaction horizontally within the team; Corporate time management is how good the manager interacts with subordinates.

The analysis of the created TM-profile allows revealing the problematic TM-components of daily activity of each employee, division and the organization as a whole. Reinterview (once the training is completed) makes it possible to evaluate its effectiveness.

Diagnosis and certification of implementation of time management in the company should proceed. Corporate TM standards can be developed to improve time planning techniques:

1. Language, time management glossary. The words "urgency", "importance" and similar can be understood in completely different ways. For one unit, an "important" task is a task that has serious financial implications, for another one it is a task that is set by a high-level executive. In the ideal case, the terms that relate to scheduling should be introduced in the company.

2. Arrangements - general "rules of good faith" regarding time. Such rules may be presented in verbal or written form, as well as in the form of posters, plaques, etc.

3. Regulations - agreements, the fulfillment of which is supported by sanctions.

4. Things, Tools - Planning Boards, Ready-made Forms, etc. The most important tool for following corporate standards is the customized settings in a corporate personal and team planning system, usually MS Outlook or Lotus Notes [3].

Conclusion. In the course of formation of the system of corporate time management, the most subtle issue is keeping the balance between freedom and coercion, corporate interference with those aspects of the employee's personal work technique that are important for the efficiency of the firm.

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35. Issue of inflation in Ukraine in 2010-2019

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Introduction. Ukraine was plagued by high inflation since its independence in 1991. However, it became particularly acute problem in the twenty-first century when armed conflict in the Donbas region had taken place. Inflation has a destructive influence not only on the economy of the country, but also on the wellbeing of its citizens and the psychological security of many Ukrainians. Therefore, to reduce it in the future it is necessary to study the reasons and the state of inflation in Ukraine during the last decade.

Materials and methods. There are many theoretical studies focused on the reasons and results of inflation. To make the following analyses we will use the information from scientific papers of native and foreign scientists: R. Campbell, J. Keynes, S. Fisher, R. Kiyosaki, etc.

Results. Inflation is a decrease in the purchasing power of currency due to a rise in prices across the economy. Inflation has a negative impact on life in Ukraine:

- rising prices;
- reducing of the standards of living of the population;
- deprivation of incentives for entrepreneurs;
- disruption of economic ties.

When we want to analyze the level of inflation, we use the index of inflation. In 2012 the level of inflation was 99,8%, it means that there was deflation – reduction of the general level of prices in the economy. The main reasons were: high yields that have affected at price and a retention policy exchange rate. Peak inflation was in 2014-2015 (124.9% and 143.3% accordingly). The main reasons were hryvnia devaluation and instability in the country that was caused by military actions in the Donbas region. Due to the unstable situation in the country in 2016, the National Bank of Ukraine introduced inflation targeting (IT). Its goals were divided into three stages:

1. Rapid disinflation (2014-2016);
2. Unambiguous inflation rates (2016-2018);
3. 5% inflation support in the long run.

At the beginning of 2019 the index of inflation was 100.9% but at the end of 2019 index of inflation was reduced to 6.3%.

The main role in the regulation of inflation process plays The National Bank of Ukraine. The National Bank of Ukraine should increase the efficiency of the money transmission mechanism, and monetary policy should be conducted to suppress inflation.

Conclusion. Inflation is one of the most burning problems in today's economic development in Ukraine that is caused by a number of reasons in monetary circulation and production that requires effective measures to overcome it.

36. Use of sea buckthorn meal in the food industry

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Introduction. Worldwide, 1/3 of all food produced for human consumption is lost or wasted. Proper recycling of food waste can reduce losses and contribute to efficient waste-free production. Sea buckthorn meal, which is considered to be food waste, is a raw material that can be exploited as a source of high-value components.

Materials and methods. The issue of the value of sea buckthorn meal was of great interest of scientists of the 21st century. The analysis of the use of sea buckthorn meal in the food industry of Ukraine was carried out. The emphasis was made on the use of sea buckthorn meal in the bakery manufacturing.

Results. Sea buckthorn meal is the dry residue in the production of sea buckthorn oil. It remains after juice and pulp are squeezed from the berries. It is a source of proteins, minerals, beneficial amino acids, which have a positive influence on the human body.

The study has shown that sea buckthorn meal affects both physical and chemical properties of bakery products, changing the color of the final product to a more golden one and giving the product a delicate taste of sea buckthorn. The use of sea buckthorn meal significantly enriches flour confectionery and bakery products with dietary fiber 2.5–6 times, minerals and vitamins: calcium content increases 1.3 times; magnesium – 1.9; phosphorus – 1.2; iron – 2.3–2.5; Vitamin B1 – 1.3–2; PP – 2.6 times.

An increase in the amount of sea buckthorn meal to 20% by weight of flour helps to reduce the density of the biscuit dough by 12%, and the viscosity of the dough by 3%, which makes it possible to obtain biscuit dough and baked semi-finished products with better rheological indicators. Moreover sea buckthorn meal makes the dough more plastic, reduces the fragility of the finished product.

Use of sea buckthorn meal speeds up the fermentation process of the dough, which reduces the cost of downtime. In addition, the cells of sea buckthorn meal contain polyphenols – powerful natural antioxidants that protect cells of the human body from harmful reactions. Components of sea buckthorn meal such as cellulose and pectin can substitute the use of artificial flavors and cocoa powder in the bakery production. On the other hand, the use of sea buckthorn flour in bakery makes it possible to reduce the calorie and sugar content, which is necessary for numerous patients with type 1 or 2 diabetes, various forms of cardiovascular and gastrointestinal diseases, obesity, etc.

The bakery products have long been basic food products for human nutrition. However, shelf life of bakery products is very limited. The use of sea buckthorn meal as a supplement to flour will increase the shelf life of the product, thereby reduce the expenses of the population, as well as improve its health indicators.

Conclusions. Proper recycling of food waste allows both to reduce its amount and to improve public health. The use of sea buckthorn meal is a step towards increasing the shelf life of bakery products, which are products of mass consumption.

37. Ways to improve the financial condition of Ukrainian banks

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Introduction. The prevention of the financial crisis and the rehabilitation of individual banks depend on the general macro- and microeconomic climate in which the entire banking system operates. In such circumstances, it is important to take steps to eliminate or counteract the causes of the banking system crisis.

Materials and methods. For the study general scientific and special methods were applied: the method of analysis and synthesis and generalization. Information base of the study is the works of domestic and foreign scientists.

Results. Recently, due to the beginning of hostilities in the Donbas region, the general crisis and significant devaluation of the national currency, the financial state of the banking systems of Ukraine has worsened. Despite this, the economic situation started to improve quite quickly: inflation and output decelerated, GDP declined by just 1.4% in Q4 2015 compared to the previous quarter, much less than the Q1 2015 drop of 17, 2%. It is important to analyze the banking activities at the NBU macro level. Development of methodology for analysis of banking activities allows to determine the state of liquidity, profitability and degree of risk of individual banking operations, identify sources of own and attracted funds, structure of their placement, etc. The legal basis for the work of banking institutions in our country is the Law of Ukraine "On Banks and Banking" dated 07 December 2000 No. 2121-III, which is in force and is constantly being revised. However, one is not enough, since the document does not take into account the specific nature of the external environment of the banking system of Ukraine. It also cannot be used as a tool for developing this system. In order to eliminate the problematic phenomena in the banking system of Ukraine, to overcome their negative consequences, a program of rehabilitation of the banking system is required [1].

The following measures may be the basis for the rehabilitation program of the banking system of Ukraine: 1) introduction of an effective system of early warning measures and response to financial problems in the activity of commercial banks; 2) improvement of economic standards for determining bank capital; 3) rehabilitation of banking institutions and liquidation of viable structures; 4) improvement and clear regulation of the mechanisms of rehabilitation and bankruptcy of banking institutions; 5) promoting of the capitalization of banks by attracting additional share capital, capitalizing of their profits and reorganizing by merger or acquisition; 6) expanding of the presence of foreign capital in the banking system; 7) organization of departments of controlling in banks, which would fulfil information, planned, consulting, analytical and control functions.

The implementation of these anti-crisis measures will help to neutralize the most significant causes of the crisis of both individual banking institutions and the financial and credit system of Ukraine as a whole.

Conclusions. The problem of the financial condition of Ukrainian banks is one of the major threats not only to economic growth but also to the socio-economic development of the country, which adversely affects the quality of life of the entire society.

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38. Recent advances in nutrition science

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Introduction. In today's rapid pace of life the issue of daily nutrition is very relevant. Healthy diet is essential to prevent such diseases as type 1 or 2 diabetes, cardiovascular diseases, osteoporosis and bone fractures, dental diseases, cancer, obesity, etc. It is also number one requirement in complex treatment. This study provides the analysis of the recent advances in nutrition science developed by foreign scientists for people with diseases.

Materials and methods. Native and foreign scientist all over the world studied the problems of healthy nutrition. S.T. Bykova, E. Gubanov, G.A. Kupin, E.G. Naimushina, G.M. Zayko contributed greatly to the nutrition science. Their scientific developments were the basis for our study.

Results. Researchers from the Kuban State Technological University G.A. Kupin, E.G. Naimushina, G.M. Zayko developed fruit and vegetable puree for patients with type 1 or 2 diabetes. It contains Jerusalem artichoke puree, apple puree, mountain ash puree, walnuts, hydrated wheat bran and pectin. In addition, this product is enriched with fructose and has a balanced mineral content. The invention expands the range of products for patients with diabetes, and encourages manufacturers to create new products for therapeutic nutrition.

Diseases of stomach, such as chronic gastritis and gastric ulcer, require food products that contribute to the restoration of gastric mucosa. A number of scientists under the leadership of E. Gubanov from the St. Petersburg State Academy of Refrigeration and Food Technologies, developed a starter culture to produce fermented dairy products with medical properties. The basis of the starter culture is the microflora of *Medusomyces Gisevii* (Kombucha). It is added to pasteurized milk at a ratio of 1:30, and then fermented at a temperature of 22-24°C. This temperature condition contributes to the development of microflora, enriches fermented dairy products with healthy elements, providing the product with medical and dietary properties. In addition, the proposed sourdough is easy to make.

Many different diseases are not spread. Therefore, the range of products for people with rare disease is rather scarce. For its expansion, scientists from All-Russian Research Institute of Starch Products of the Russian Academy of Agricultural Sciences, under the guidance of S.T. Bykova, created a food menu for children with phenylketonuria. This disease is associated with violation of the metabolism of amino acids. An important component of the treatment of phenylketonuria is adherence to a low protein diet. Due to malnutrition, the body accumulates phenylalanine and its toxic products, which can lead to severe central lesion nervous system. Invented food menu allows dosing phenylalanine in children's nutrition, increases nutritional value, and has immunostimulating effect. It consists of dry chicken melange in combination with corn swelling starch, with a certain ratio of these ingredients, which keeps the balance of vitamins, minerals and lipids components.

Conclusions. Technological progress in the food industry is associated with the achievements of science, especially in nutrition science. One of the important development factors are the deterioration of the environmental situation and fierce competition in the food market. All this leads not only to the improvement of the technology for producing traditional products, but also to the creation of a new generation of products: low-calorie, healthy, with a balanced content and functional properties, with the possibility of quick cooking and long-term storage.

39. Development and placement of the food industry in Ukraine

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Introduction. The food industry is an integral part of the economics of Ukraine, which is a crucial section of the national economy. The leading role of the industry is due to the fact that it makes a decisive contribution to the creation of material and technical base of all social production, as well as most of the material values intended to meet the needs of the population. Providing the population with quality food is one of the main areas of socio-economic development of any country. Ukraine has all the objective prerequisites for creating a highly advanced food industry that is able to meet domestic food needs and generate significant foreign exchange earnings from its global market.

Materials and methods. During the study, general and specific methods were used: analysis - to study the object and object of the research; historical and logical method - to clarify the concept of "food industry"; method of generalization and scientific abstraction - in the study and refinement of the concept.

Results and discussion. List of main background factors of development and positioning of the food industry in Ukraine: 1) Natural resources factor. The area of Ukraine is characterized mainly by flat terrain, the state has a large land fund with fertile soils, plenty of heat during the growing season for all plants of the temperate zone. Also it has great land resources. Almost two-thirds of the arable land is occupied by chernozem and fertile soils close to them. The area of the black earths of Ukraine is about one quarter of their global distribution. Among the natural-resource factors, agro-climatic, soil and water resources are of major importance for the food industry. 2) Historical factor. The territory of Ukraine was the first among of Eastern, Central and Northern Europe to be drawn into the international division of labor in the mid-first millennium BC. In those days, the whole population was striving for an advanced culture, including economic-commodity grain cultivation, trade-grain specialization, and overseas trade. The main economic activity is agricultural production. 3) Socio-economic and technical factors. The socio-economic factor plays a major role in the development and placement of the food industry. In the times of the USSR, the food industry functioned under an administrative-command system, which consisted in the overall recovery.

Conclusions. In summary, we can emphasize once again the relevance of the food industry in the economic complex of Ukraine. It is the largest and most important of the industries. No one society can live without food. The main purpose of the food industry is to meet human needs for food. Under good conditions, it brings a considerable part of the state budget.

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40. IT outsourcing in Ukraine

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Introduction. Globalization and the rapid development of technology dramatically changes the behavior of companies. This means that now you need to fight for the client regardless of the location of the competitor, since his proposal is often just a click away on a mobile device or personal computer.

Materials and methods. To review and identify the features of IT outsourcing, information from [1] and online resources (articles and reports) on the subject were used. The study also looked at the prospects for outsourcing in Ukraine, the positive and negative impacts of it. Also this work contains summary report about outsourcing market in country.

Results and discussion. According to a recent study, financial institutions remain the largest customers of outsourcing services (approximately 20% of the total market). Ukrainian companies, for their part, are actively fighting for a place in the sun in this market as suppliers. Thus, the International Association of Outsourcing Specialists (IAOP) has included a number of Ukrainian IT companies (and IT companies operating in Ukraine) in the top 100 world outsourcing service providers.

Let's list the advantages of outsourcing market that Ukraine has: 1) High level of knowledge. Ukraine has been the technological center of the USSR for many decades, and because of this, in every major city there are technical universities, and more and more young people choose technical specialties. However, it cannot be said that university graduates are 100% ready and can immediately start working on complex projects. Technologies are developing very quickly, and here the industry comes to the rescue of universities that are not keeping pace with all the new products. Each large IT company in Ukraine has its own training courses for programmers, designers and managers. So they provide themselves with skilled labor. 2) Large number of it specialists. Every year, thousands of engineers leave universities, of which 16,000 are IT specialists. 3) Convenient time zone. The time zone of Ukraine is GMT + 2. It is very convenient for Europe - the working hours are the same. And even for companies from America, Ukraine is the best choice compared to the time zones of Russia, India or China. 4) Fast and cheap internet connection. In the ranking of Internet speed among the countries of the world, Ukraine takes 21st place.

Conclusions. The study identified positive trends in Ukrainian IT outsourcing over the past three years. It has been proven that IT outsourcing, especially in times of crisis, becomes a key stabilizing factor and an important strategic solution for business optimization, by reducing the costs of maintaining its own IT service. The positive developments in the domestic IT outsourcing market should be considered, first of all, increasing attention from the domestic business to IT outsourcing; increase the number of working professionals in the IT sphere; increase of the state order for the training of specialists in this field; the emergence of domestic IT companies able to compete with world leaders in the field of IT technologies for business; formation and development of IT clusters in Ukraine.

41. Bootstrap 3 and jQuery and bugs which are related with mobile version of websites

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Inroduction. Web-development is one of the most popular sphere in the world of IT. A lot of Front-End developers, who work on client`s part of websites, deal with a big amount of bugs. A lot of bugs are related with developing mobile version of websites.

Materials and methods. Programming language HTML and programming language Javascript and front-end framework Bootstrap 3 and front-end jQuery library were used to do research. IOS and Android devices were used to do this research.

Results and discussion. Front-end developers have problems very often with developing responsive design of web-pages using front-end framework Bootstrap 3 and front-end library jQuery. Seventy percent of web-sites use front-end JQuery library and very often these plug-ins don`t work correctly on mobile devices especially on Apple devices. When developers create websites using these technologies sometimes unexpected bugs appears. Some of bugs developers can notice only on real devices. To fix these bugs developers firstly have to define what the main problem is. Is this problem related with front-end framework Bootstrap 3 or with plug-ins of jQuery library? If this problem is related with Bootstrap 3 developer can try to make some changes in attributes in html or in CSS styles. If this problem is related with plug-ins of library jQuery developer can try to make some changes in plug-in settings. Developer has to be very attentive when he starts to fix bugs which are related with Bootstrap 3. Developer can try to change size of objects and try to change CSS settings. Also developers can try to find the way to fix these bugs in the Internet on the forums. Sometimes other developers leave information on the forums how to fix some issues. This way helps front-end developers very often because front-end framework Bootstrap 3 and jQuery library are very popular technologies and a lot of developers use these technologies. Apart from this, developer can change all design of web-page if other methods don`t help. Also they can find alternative components. The process of fixing these kind of bugs can take a lot of time. Because developer have to check result of changes only on Android or IOS devices. Developer has to upload changes and only then he can check result. It`s much easier to create mobile version of website without any bugs using Bootstrap and jQuery than write code on pure HTML, CSS, Javascript. Bootstrap 3 includes a lot of different instruments which developer can use to create responsive design of web-pages. Also jQuery library has plug-ins which are good to use for development responsive design. It`s incredibly big advantage because many clients need to use mobile version of their web-sites nowadays. Developers of framework Bootstrap support and improve this technology. Apart from it, developers of jQuery also update their library and improve work of some plug-ins.

Conclusions. When developers create web-sites using framework Bootstrap 3 and jQuery library they have to check how mobile version of website works. These technologies are quite powerful but sometimes mobile version of webpages doesn`t work correctly and developer have to work on it.

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42. Warehouse automation in Ukraine: Main WMS problems

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Introduction. The scientific and technological progress influences the development of the country's economy. Businesses take into account modern management practices. The most actual issue in logistics today is warehouse automation. Warehouse automation increases the efficiency of inventory management and increase the enterprise profit.

Materials and methods. Well-known scientists such as E. Krykavskyy, A. Gadzhinskiy, M. Auckland, K. Melzer made a considerable contribution to the development of methodological fundamentals in modern logistics science. These scientists focus on the studies of warehouse logistics. The problem of warehouse logistics research in Ukraine hasn't solved and requires further consideration.

Results. In today's market environment, entrepreneurs have to use and develop logistics concepts to stay competitive in the market. There are positive changes in the economy in our country. However, Ukraine faces problems in the logistics market. The absence of a systematic approach to restructuring, inefficiency of logistics system functioning, the slow pace of reforms are still of vital importance. Business development is impossible without the application of new management technologies. The most important is warehouse automation as warehousing logistics is one of the integral components of logistics chains.

The company's success is determined by their ability to create effective supply chains, cut costs and overhead expenses. It can be achieved with the help of the automated warehouse system. However, the warehouse automation in Ukraine requires further development.

The most widely-spread system nowadays is the warehouse management system (WMS). The warehouse management system is a general definition of software and hardware systems that allow you to automate, optimize warehouse operations and improve the manageability of the warehouse industry, as well as the business as a whole [1]. There is a very wide range of WMSs with different budget and functionality. The introduction of a warehouse management system makes economic content wherever storage, accountancy, and movement of any storage units are carried out. Examples of application of this system in Ukraine are 3pl-operators, post offices, and even banking institutions [2]. This system performs a large number of tasks. For example, the lack of downtime in the warehouse, increased productivity of warehouse staff, the compaction of the warehouse. Nevertheless, the system has some disadvantages. The Ukrainian market has a limited number of large logistics centers. That is, the market is dominated by small logistics companies [3]. Small logistics companies can not use this system at full blast.

Conclusions. WMS is a way to manage your warehouse effectively. During the studies, we found that the use of WMS systems is limited. Thus, the costs incurred in implementing this system at small enterprises are not justified. To increase the effectiveness, it is necessary to include such elements of modern technologies as automation. The solution to the problem of warehouse automation in Ukraine is the development of the system.

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43. Importance of the transport system in the economy of Ukraine

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Introduction The geographical location allows Ukraine to gain more benefits from globalization realizing the transport infrastructure potential. The transport sector is a significant segment as its efficient operation is a driving force of the country's development.

Materials and methods The research of the role of the transport industry in the national system of economy was made by such scientists as O. Zakharova, L. Borovitska, etc.

Results. The development of the transport system is one of the most important features of technological progress. The need for a highly developed transport system is further enhanced as it integrates into the European economy. Transport also acts as a consumer and an employer. The importance of transport as an integral component of the economy is determined by its role in the territorial division of social labor. The transport factor influences the location of production, so placing the product, the need for transportation, the mass of starting materials and finished products, their transportability, availability of transport routes should be taken into account.

Every mode of transport is important for the economy of Ukraine. Rail transport has a great impact on reducing inventories and accelerating turnover of working capital. Water transport helps to develop international connections. Road transport generally meets the needs of the national economy and the public in transportation, but the structure of the bus and truck fleet requires further improvement. Pipeline transportation is an efficient mode of transport that ensures the continuous transfer of liquid, gaseous and solids via special pressure pipes.

Under the current conditions of the national economy development, the main problems of state management of the transport industry development Ukraine are as follows:

a) the presence of territorial and structural disparities in the development of transport infrastructure; b) insufficient level of transport services accessibility for the population, labor mobility; c) insufficient quality of transport services; d) low level of export of transport services, including the use of transit potential;

Conclusions. The economic role of transport is manifested primarily in the connection of each production type. It performs continuous and mass production of all types of raw materials, fuels and products from points of production to the consumer, distributes labor and enables to place the production rationally, to explore new territories and natural resources.

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44. Financial crisis and its influence on the banking sector of Ukraine

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Introduction. Quick development of the banking sector demands more attention to the activities connected with financial and credit institutions. This is the reason why the risk management gets extra relevant for the management of any bank because except being a means of loss prevention it additionally helps to make extra profits. According to the permanently increasing influence of different risks on financial activities the problem of banking risk management is getting especially relevant.

Materials and methods. A banking system is a complex of institutions that provide different financial services for their clients. These institutions are responsible for providing and operating a payment system, providing loans, taking deposits, and helping with investing process. Different statistics characterizing state of modern banking as well as the methods of logical analysis and synthesis, comparative analysis were used.

Results and discussion. Different problems connected with formation and development of the banking sector have always been interesting for foreign researchers (this is explained by that fact that the banking sector has a considerable impact on the whole economic processes over the country). There are the internal causes of functional failure of the Ukrainian banking system:

1). Ukrainian capital banks – governmental intervention in lending policies of public banks with the main mission of solving current financial problems; the uncertainty of the state policy of overcoming the economic crisis and, consequently, the uncertainty of the role public banks play in economic processes.

2). Western capital banks – a disparity between their current presence in Ukraine and their strategic objectives; the technological disability to provide crediting; troubles with earning funds from parental banks.

3). Informal or "shadow" economy. It is very simple knowledge that the shadow economy is a complex of uncontrolled and hidden illegal economic relations between the subjects of economic activity. It is focused on such strategic directions of economic activity as industrial, commercial and financial sectors of economy.

It is generally said that the simplest ways of reducing the level of risks in the Ukrainian banking system in middle term are next:

- the diversification of bank assets and creation of new deposit programs for different groups of customers;
- the minimization of operating expenses and growth of income with bank charges;
- creation of conditions for attracting investment in the internal banking system in amounts that will not be critical in generating of banking risks.

Conclusion. Thus, the brief analysis of the Ukrainian banking sector demonstrated the following major problems: the availability of fragmented processes, a critically high level of banking risks, a significant impact of the "shadow" economy and a poor level of banking capitalization. Nevertheless, despite all bad factors, one of the simplest ways of solving the problems, mentioned above (primarily, regarding the improvement of risk management system) is the gradual transformation of traditional banks into creative banks.

45. Financial resources of the insurance company and their proper management

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Introduction. Insurance as a type of activity is based primarily on the formation and use of the insurance fund, which entails the possibility of deviations in the volume of the insurance fund formed and the need for it to pay insurance compensation.

Materials and methods. In the process of research, the following methods were used: logical generalization and scientific abstraction. The theoretical basis of the research is the scientific work of domestic and foreign scientists.

Results and discussion. The insurer's financial resources should be understood to mean centralized and decentralized funds and endowments, which are formed in the course of the insurance business and are intended to fulfill the obligations of insurance protection, maintenance of solvency and financial stability of the insurer.

There is a certain classification of financial resources where the main sources of financial resources formation are own and borrowed funds. Own include: authorized capital, depreciation, gross income and profit. Loans, units and other contributions, funds mobilized in the financial market were received by the borrowers.

Equity is formed by paying the founders' contributions to the authorized capital. Forming the size of the authorized capital of an insurance organization is of particular importance at the initial stage, when activities have not yet been started and insurance funds have not been formed. During this period, the authorized capital is the sole guarantee of the solvency of the insurer. In the future, authorized capital is also of great importance to the insurance organization.

Proper management of the financial resources of the insurance company is of great significance. Management of financial resources of an insurance company are actions of all levels of management apparatus that lead to changes in the volume, composition and structure of financial resources, and which affect the performance of business processes.

At the strategic level, the problems of formation of financial resources and their rational allocation, provision of the necessary amount of financial resources of the insurance company activity, which can significantly affect the structure and size of the balance sheet assets and liabilities and financial condition of the insurance company, should be addressed at the financial management level. At the tactical level of managing the financial resources of insurers, it is necessary to ensure the relationship between the strategic goals of the insurance company and its current activity.

An important point in managing financial resources is to plan their revenues and to develop this strategy is necessary, based on the capabilities of a specific insurance company. In developing a strategy for the formation of financial resources of an insurance company, one should be aware that their quantitative and qualitative status influences such an important financial characteristic of an insurance company as its solvency. In this case, the company can count on the founders' funds, the authorized capital and, of course, the payments of the insurers.

Conclusion. Considering the strategies of formation of financial resources, the most optimal one is to supplement the reserves formed with cash cover at the expense of authorized capital. However, it is necessary to know clearly how much authorized capital the founders can invest in the insurance organization, so that they will not be deprived of their insurance license at all.

46. Green marketing as a component of the social responsible marketing concept

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Introduction. Modern marketing is evolving and constantly improving, appear new tools and ways of influencing consumers are emerging. Entrepreneurial activity has an impact on the quality and life of society and the environment, so it is of great importance that companies adhere to the principles of green marketing.

Materials and methods. General scientific methods and special techniques were applied. In particular, the methods of logical analysis and synthesis, comparative analysis were used.

Results and discussion. The experience of advanced companies shows the efficiency and the obvious benefits of focusing entrepreneurial activity on long-term development prospects. As a result, more and more companies are becoming aware of the role and importance of adhering to the principles of socially responsible marketing. One of the important components of a multifaceted concept of social responsibility is the so-called green marketing. Green marketing involves manufacturing activities to meet the environmental needs of society with all environmental protection.

Socially responsible consumers prefer products made from environmentally friendly raw materials and support their manufacturers. Therefore, the companies that adhere to the environmental principles aim not only at altruistic goals. Green marketing is a strategically important aspect for gaining consumer commitment and long-term strengthening of competitive position in the market.

Green marketing, like any line of the concept of social responsibility, begins at the stage of product development and must be integrated into all stages of production, promotion and sale of the company's products and services.

Enterprises that are adherents of socially responsible marketing, namely its environmental component, must adhere to the following principles in their production activities:

- saving and rational use of natural resources;
- using environmentally friendly raw materials;
- greening technology and production process;
- making and using environmentally friendly packaging materials;
- implementing energy saving measures;
- informing consumers about the benefits of consuming organic products and applying special marking;
- reducing the harmful effects of transport on the environment;
- improving the processes of waste utilization.

Consequently, the green marketing practices of companies require the creation of an environmental production strategy, starting with the use of natural resources, and ending with the disposal of waste.

Conclusion. Green marketing is a marketing direction that balances the interests of producers and meets the needs of consumers in eco-friendly goods and services without a school environment. It is an important part of the concept of socially responsible marketing and following its principles is beneficial for all market participants.

47. Internet marketing bugs: victims of personalization

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Introduction. Modern problems need modern solutions. Everyone has learned this proverb long ago, but very few people follow it. The big question mark at the beginning of the new decade became the personalization of marketing. This is a cool tool for business indeed, but, thanks to "masters" - personalization has become associated with an annoying fly. That's why we need to deal with a few things here.

Resources and methods. There have been numerous studies to investigate: literature and new marketing trends were carefully studied and analyzed as well as methods of induction and deduction have been employed to conduct a research.

Results. Initially, the personalization of marketing should have solved the problem of targeting and become a win-win solution for all parts. The approach was to select the means of communication, recommendations, and promotions according to individual preferences. Targeting is the main element of this method, which became popular. But, thanks to ignoramuses, advertising campaigns turn into a flow of random information. Naturally, this phenomenon began to irritate the audience and people began to cut even high-quality targeting. Prejudices continue to take root in the minds of the population, making it difficult for professionals to work. A huge shadow is cast by unscrupulous business owners, which will make money on consumers. Big businesses may vary the cost of their services in different regions (depending on their income) or discriminate consumers by skin color and gender. Professionals of large companies are making great efforts to avoid discrimination and other aspects of tolerance, which is not easy. But, our society remembering something wrong for a long time. Research has shown that highly-paid job ads on Facebook and Google are much more likely to be shown to men by global statistical companies. As a result, Facebook was dragged into legal proceedings for Discrimination Act by allowing real estate advertisers to target users on the main grounds of discrimination, including race and gender.

Each social platform has its algorithms, which saves time and resources significantly. That's why important business decisions are made increasingly automatically, without human control. Specialists should always study information about algorithms and work carefully with user data. We must never forget about our competitors, who are waiting for a reason to destroy us.

Conclusions. What can a business do to minimize unwanted results? Given the social, technical and legal complexities associated with algorithmic fairness, it is not advisable to try to find "blind spots" and any weaknesses in the algorithms. It is critical to examine your advertising campaigns and avoid any hint of discrimination and disadvantage of different groups. It is important for companies to have not only a strong marketing specialist, but also an in-house lawyer.

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48. Problem of unemployment in Ukraine

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Introduction. Unemployment is an economic and social phenomenon when on the job the market for labour supply is greater than the demand for it; thus, there are more applicants for a job than vacancies.

Materials and methods. Scientific publications of national authors about the foreign experience of the concept of unemployment and the search for solutions to the problem, the results of my own research, processed using the analytical and comparative methods.

Results. One of the main reasons for unemployment in Ukraine is the decline in domestic production and, as a result, the reduction in the number of jobs. Another problem is the fact that the economy suffers from a cyclical downturn. The abrupt transition to the automation of technological processes of production may cause the growth of unemployment. The global financial and economic crisis has reduced the position of young people in the labour market not only in Ukraine but also in most countries of the world, worsening the pre-crisis progress in this direction. After all, youth is an important strategic resource of society. It is the youth who determines the pace of development of the socio-technical sphere determines the political, economic and social future of the country, influences the sustainable development of humanity. The unemployment rate, especially among young people, has increased very rapidly in recent years. This is due to the economic crisis, the general state of the labour market, the lack of government orders and high tax pressure from the state. Youth unemployment is more dangerous than adult because youth is a very vulnerable category of humanity. All these factors lead to isolation, which deepens the disillusionment with justice and society. The problem of unemployment and direct youth unemployment exists not only in Ukraine but also in European countries. Very high rates are observed even in comparison with Ukraine [1].

In today's Ukrainian society, youth unemployment is also one of the national problems. And this is due to the fact that youth is the future of society, and its work activity is a source of funds for social security of different categories of the population. The reasons for youth unemployment in Ukraine are not only the reluctance of employers to hire unskilled and inexperienced youth, but also the lack of incentives for employers to employ young people, significant differences between higher education programs and the needs of entrepreneurs, high corruption levels of corruption, especially in government agencies and large enterprises, and consequently low official salaries for young workers. The economic consequences are rising costs of unemployment benefits; vain spending of the state budget on the training of specialists who cannot find a job in the future; rising costs of unemployment benefits; decrease in GDP; reducing the standard of living of the population of this category [2].

Conclusion. Unemployment may be eliminated by providing additional jobs, establishing new businesses. The development of small and medium scale business, where owners create additional jobs, must be secured. To eliminate the negative effects of youth unemployment and prevent its development in the future, it is necessary to: create a system of vocational guidance, which provided opportunities for maximum development of the child's abilities and from a young age would adapt it to the conditions of the labour market, to foster a sense of responsibility for their future and future society.

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49. Financial management of the enterprise

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Introduction. With the improvement of the market mechanism, the problem of effective management of resources, including financial, becoming increasingly important for businesses. Without systematic and comprehensive information about available financial resources and obligations, the company could lose up to 20% of its assets. Many economic entities with different forms of ownership have problems with the application of financial resources including management of the low level of own working capital, insufficient level of solvency and business activity [2].

Materials and methods. During the research the following methods were used: the method of theoretical generalization (to study the definition of the concept of "financial management" of the enterprise), the method of comparative and statistical analysis, structural-logical and structural-functional methods.

Results. Deficiency of current assets compared with short-term sources of financing implies a lack of working capital. As a result of poor interaction with customers enhances the liquidity problem, slow capital turnover, and bad debt leads to direct losses. In addition, it is often found in practice, the lack not only management accounting, but also its elements, and budgeting often leads to an erroneous assessment of operating results, higher prices, loss of profits, or even losses, sometimes significant. The lack of profit, lack of it, and in the case of inefficient use of pulling the minimization and even complete loss of capital [1]. To create an objective information base for making management decisions on the management of working capital necessary to organize an effective records management working capital resources and systematic analysis of the main figures of financial-economic activity of the enterprise. A priority for the company, given the nature of the business and the external environment, is the decision problems in terms of inventory management and further development of the technological level of works of the company. As the improvement of financial management at the enterprise offers solutions based on the following activities: implementation of the logistics system inventory management; increasing productivity and reducing costs by increasing the capital-labour.

Conclusion. Thus, the financial mechanism commercial enterprises formed a set of financial methods and levers and forms of organization of financial relations between enterprises and other actors of the economy regarding effective attraction and use of financial resources in order to achieve the main goal of a commercial organization is profit earning. To ensure the effectiveness of the financial mechanism of a business enterprise, it is necessary to develop a system of indicators of analysis of financial management efficiency and systematically carry out their assessment, as well as the diagnostics of the control subsystem of the financial mechanism of the enterprise as a whole.

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50. Brand management in the era of universal uniqueness

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Introduction. Nowadays, the total amount of companies all over the world is approaching to 200 million. All of them strive to earn more money, have more consumers and clients, etc. So how can they stand out?

Materials and methods. The method of theoretical generalization of scientific articles, method of information gathering, as well as methods of comparison and analysis, were used to create this material.

Results. Let's start with naming the definitions «brand», «branding» and «brand management». The Dictionary of Brand defines a brand as “a person's perception of a product, service, experience, or organization.” This term is hard to define because it is not a logo, nor identity, nor product, it is a person's feeling [4]. Branding is about creating a comprehensive message for your company and product or service, using names, logos, slogans, copy and other collateral. Branding is actively creating the perception you hope consumers have as they come into contact with, and experience your company, product or service [3]. Brand management is a function of marketing that uses techniques to increase the perceived value of a product line or brand over time. Good brand management enables the price of products to increase and builds loyal customers through positive brand associations and images or a strong awareness of the brand [1]. In this case, it is important for the company to stand out. USP – unique selling proposition – is a key for it. The USP theory states that such campaigns made unique propositions to consumers that convinced them to switch brands. It's all about what one company can propose to customers, that others cannot. Without branding and brand management company is just one of the millions. And, on the other side, good and effective branding helps you make a powerful impact on your audience, allowing you to differentiate your products and services from competitors [5]. There are some elements of branding: logo, brand imagery, brand personality, brand guidelines, brand voice [5]. Brand voice or tone of voice is a very effective tool to create a brand identity for your company. It is much common abroad and companies in Ukraine just begin to learn how to use this tool.

Conclusions. Even now companies have to fight each other to get more money and clients, and it will be much more difficult in future. That's why it's important to define your mission as a company and carry it into the world. Also in future companies will have to find out new ways to cooperate instead of fight.

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51. Innovative technologies in personnel management at a modern enterprise

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Introduction. Enhancement of innovation activity causes the change in forms and methods of human resource management.

Materials and methods. Scientific publications of national authors about the foreign experience of introducing innovative technologies for personnel management, the results of my own research, processed using the analytical and comparative methods.

Results. Innovation management in human recourse work is a targeted work of enterprise executive management and human recourse managers to provide the adequate pace and extend of re-establishment human recourse management based on implementation of practical human recourse innovations according to current business strategy of an enterprise.

Management innovations presuppose restructuring of enterprise, which means the change of all organizational structure or its particular elements to optimize the economic activity. The crucial factor of successful implementation of innovative technologies in the activity of company is the attitude of personnel to this process. Therefore, the company management have to arrange the psychological preparation for workers to help them realize the economic and industrial necessity, personal and collective importance of innovations.

The foreign experience of implementation of innovation technologies in the system of human recourse management suggests the following methods:

1. Personnel recruiting is the selection of qualified workers by the specialized providers for profit. One of the recruiting forms is personnel leasing, which is a management technology that provides company's business processes with labor of necessary quality and quantity using the outsourcing organizations.
2. Personnel audit is the complex assessment of labor activity that provides the evaluation data on adequacy of professional, educational and specialization level of employees to their position. The audit aims to analyze organization structure and human recourse potential.
3. Coaching of personnel is the instrument for personal and professional development of employees directed to professional and qualification improvement, mobilization of inner resources and potential, in particular creative and intellectual abilities, self-consciousness, business qualities and novelty [1].
4. Assessment center is designed to discover certain qualities of workers by means of complex assessment research of their performance of typical or potential tasks for certain position.
5. Outsourcing is the delegation of non-professional functions to contractor. Suitable for outsourcing functions are those, which do not presuppose innovations that can provide the company with strategic advantages.

Conclusion. Modern methods of increase of efficiency require formation of employable team by human recourse department. It is impossible to achieve this goal without implementation of innovations in the human recourse management processes.

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52. Risks in the management of enterprise in foreign economic activities

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Introduction: Today, this problem is very relevant to every country. Every company engaged in foreign economic activity has certain risks. Therefore, the goal of many companies is to learn how to properly assess and manage risks.

Materials and methods. Analytical researches were carried out on the basis of the analysis of modern literary sources.

Results. About 80% of commercial structures have to be engaged in the implementation of the FEA and many of them have repeatedly dealt with risky situations. Risks are possible adverse events that can occur that could result in losses, property losses of the FEA participants. In order for a company to manage risks, it is necessary to first identify the main groups. There are 8 types of risks of foreign economic activity: country risk; customs risk; currency risk; risks of international marketing; risks of international transportation (transport risk); international contract risk; risks associated with a foreign counterparty; risks of the international competitive environment. Enterprises' FEA risks can be managed, that is, using different dimensions that allow to some extent predict the occurrence of a risk event and take measures to reduce or prevent risk. Risk management principles include:

1. Highlighting the risks that are of the highest priority.
2. Assessment of the probability of occurrence of risk and size of the possible loss.
3. Assessment of the transfer of risks, taking into account the ratio between the insurance premium and the sum insured. A risk loss should not be accepted if the amount of the loss is relatively large compared to the premium saved [2].

The foreign economic activity of enterprises requires special attention from the risk of management for the following reasons. The first reason is agreements and projects implemented are of a large scale. Therefore, from a financial point of view, for the organization of foreign economic activity of enterprises, the risk is often critical (which threatens to lose revenue) or catastrophic (which causes insolvency).

Conclusions. The risks of a foreign economic activity can be managed, that is, using different dimensions that allow to some degree to predict the occurrence of a risk event and take measures to reduce or prevent risk. At the heart of enterprise management risk should be a purposeful search and organization of work to reduce the degree of risk, obtain and increase income in an uncertain economic situation. In order to improve the management of foreign economic activity risks, a set of risk management tools can be offered to enterprises, used during the implementation of all stages and stages of a foreign trade agreement, which will let to operate and manage foreign economic risks.

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53. Negative impact of outdoor advertising

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Introduction. Outdoor advertising is the design of public items by advertising elements. Such advertising is an effective means of disseminating information as it appeals to a large number of people, but at the same time distracts many of them from the world around them.

Materials and methods. Materials for the study were articles in print and online media. The method of structural and logical analysis was used In this paper.

Results. Billboards can be seen on the sidelines of the avenues and in the squares of metropolitan areas: Kyiv, Dnipro, Lviv, Kharkiv, Odesa, as well as in small settlements. Structures of this type are installed along motorways. Vehicle drivers and bus passengers can see this advertisement within a few hundred meters. Looking at the image of the billboard for a while, the potential customer has time to analyze the information and think about its benefits for themselves, thus distracting from the main thing - to focus on traffic. Billboards and city lights often obscure road signs, and sometimes pedestrians, leading to accidents. Currently, Ukraine ranks fourth in the world in terms of outdoor advertising - only Moldova, Uzbekistan and Lebanon are ahead of us. Only Sonata advertising agency has a base of billboards in the Kyiv region, which has more than 7 thousand carriers and is constantly updated. In the first six months of 2016 alone, 1 417 people were killed in accidents in Ukraine, for various circumstances and reasons, but bright billboards have their place in these statistics [1]. According to the Law of Ukraine "On Advertising", for the driver to have more visibility, billboards should be located, as well as their height, at a distance of five meters from the roadway. In addition, a transverse reflective tape must be applied at the bottom of the pillar to allow the driver to see it in the dark. In Kyiv, there is a rule that advertising structures should be at least 50 meters apart and large structures at least 100 meters away. On the streets, however, they can be counted in the tens [2]. Ukraine has repeatedly tried to ban advertising along the highways. But never has the case been fully resolved. Last time is September 2015. Then on the 2nd of the day on the site of electronic petitions, there was a post about "ban on the installation of billboards (billboards) within cities and towns". However, out of the 25,000 votes needed, only 130 were got. After almost three weeks, the Verkhovna Rada Committee on Transport has endorsed a bill banning billboards along highways, but it has not gone further [3]. Sometimes the Kyiv city administration struggles with outdoor advertising.

Conclusion. The solution to the problem described may be the adoption of special rules governing the placement of outdoor advertising in the city. However, the most important issue, in this case, is the indifference of public authorities to billboard installation control and the application of penalties for certain violations.

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54. Ott-advertising – a new type in the field of commercials

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Introduction. The era of cable TV is slowly coming to an end, and it is gradually losing its market for streaming media in terms of coverage and convenience. Subsequently, traditional TV ads may offer some of their original content. Streaming is a new style of television viewing.

Materials and methods. A significant contribution to the study of recoils on the Internet has made such Ukrainian researchers as V. Komarov, L. Khavkin, T. Arkhipova, I. Penchuk and others. The study of the Internet advertising market was carried out by O. Zimin, T. Deinekin. Among foreign scientists who in their works were engaged in research and study of the Internet-advertising can be distinguished D. Ogilvy, F. Jeffkins, K. Morse, R. Zefa.

Results. Over the top (OTT) is a term used to describe content providers that distribute streaming media over the Internet. These services are destroying traditional broadcast television and encouraging a new generation of consumers to "cut the cord" from satellite and cable services. The term OTT is used in reference to any gadget or service used to optimize digital content on a TV or similar device [2].

OTT Advertising is similar to traditional television, the only difference being that it is transmitted in the media via OTT platforms. This technology is expected to make a big difference to marketers in 2019-the benefits of software and the growing reach of streaming services. Ad revenue is expected to grow to 60% from 45% over the next 10 years with OTT [1].

Marketing through these platforms offers benefits similar to those obtained from regular online advertising. Unlike traditional advertising, OTT allows marketers to use targeting, ad insertion, and advanced Analytics to create shorter, more personalized ads. This allows brands to display full-screen ads based on the viewing habits of the entire family. As already mentioned, viewers can't skip or install an ad blocker while viewing this AD on an OTT streaming device [2]. This is one of the strengths of OTT. The investor can choose topics, geographical areas, and demographics to advertise their products. This can't be achieved on traditional television, so it's undeniably an upgrade. [3].

Conclusions. The opportunities offered by OTT advertising, although still relatively limited today, will certainly continue to evolve, providing advertisers with new ways to reach their audience. Given the growing share of the technology in the advertising market in the coming years, unlocking its full potential may soon become one of the most profitable opportunities for advertisers

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55. Role of foreign investment in economic and social development of Ukraine

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Introduction. This topic is especially pertinent today because it is impossible to strengthen Ukraine's economy without investment boom, including foreign investment, without finding reliable and stable sources of capital and, ultimately, without establishing a favourable investment climate.

Materials and methods. Analytical researches were carried out on the basis of the analysis of modern literary sources. The methods of analysis and synthesis were used.

Results. Ukraine, in the context of global post-industrial transformations and the objective need for an innovative development model, requires large financial investments. And first of all, for simple and expanded reproduction, structural transformations, maximizing profits and on this basis solving social problems. In modern conditions of exit of the economy of Ukraine from a crisis condition investments are the most effective lever of this phenomenon and creation of investment attractiveness of branches becomes one of the main problems. The main positive aspects of attracting foreign investment can be highlighted: stabilization of the economic and financial situation, intensification of business activity, modernization, which results in increased and expanded exports, a competitive environment and a positive impact on the balance of payments. The current situation of the Ukrainian economy leads to the search for various sources of investment of internal processes and creation of market infrastructure. The necessity of foreign investments in the Ukrainian economy is caused by a number of reasons [1]: 1) the need to replenish the limited internal capital savings and ensure their financing; 2) the role of foreign investment in ensuring know-how; 3) the role of foreign investment in access to foreign markets. Ukraine as a potential object of investment attracts keen interest among foreign investors, representing a market of about 50 million consumers and occupying a strategically and geographically advantageous position in Europe. However, today there are political and economic instability, low privatization rates, the semi-criminal nature of many enterprises, an acute purchasing power crisis, accompanied by low wages [2].

Conclusion. Ukraine needs to improve its investment activities and policies to attract foreign investments. The system of measures should be stable, a differentiated approach, priority of branches and spheres of economy and dynamics of their development should be applied, and that will give a certain impulse for improvement of investment activity in the modern economy of Ukraine. And to improve the policy on attraction of foreign investments, the state should create an effective system of privileges for foreign investors in certain sectors and regions, stable economic and foreign trade legislation reduce the tax burden and simplify the structure of taxes.

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56. Feasibility substantiation of the investment project of technological equipment upgrade

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Introduction. Without new technologies and equipment that is relevant to the enterprise, it is impossible to carry out business effectively. Therefore, the chosen theme is crucial.

Materials and methods. The purpose of the work is to consider the theoretical aspects of investment projects and to study the importance of upgrading technological equipment in the enterprise. Research methods: theoretical, analytical.

Results. An investment project is a group of activities aimed at meeting the needs of consumers and maximizing profit. Upgrading equipment is a fundamental overhaul and a radical redesign of equipment to substantially improve key performance indicators such as cost, quality, service and speed. Development of the enterprise's innovation base is due to equipment modernization, technical re-equipment, reconstruction and expansion, new construction. [1].

An enterprise production upgrade program is a synthesis of certain solutions. It includes all innovations by their types at all stages of innovations, indicating the performers of these changes. This program is a complex decision-making process for the development of new products, updating the fleet of machines and equipment, technological, design, organizational, sociological and other changes.

Replacing outdated equipment with a new one, restructuring production requires considerable costs but has several advantages. Operating outdated, even upgraded fixed assets is not always profitable, as it entails higher costs for repair, fuel, energy, ecology, and lowers labor productivity. Therefore, in some cases, it is advisable to introduce new techniques and technologies [2].

Conclusion. As a result of the study, we can conclude that this topic is quite actual nowadays because updating the equipment at the company is always expedient and profitable for the company that wants to be number one in the world.

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57. New era of marketing: replacing traditional marketing with digital marketing

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Introduction. Nowadays, the role and functions of marketing for every company in the world is unprecedented, because marketing leads to sales number increasing and allows companies to succeed in the market in a highly competitive environment. For this reason, there is a need for in-depth study of marketing opportunities.

Materials and methods. Theoretical and methodological basis of the research is a system of general scientific and special methods, which include analysis and synthesis. There also were studied different marketing publications and reports.

Results. Today, most companies in the world face a rather difficult choice – which type of marketing is better to use. On the one hand, there is a static traditional marketing, which has been understandable and convenient for everyone for a long time. On the other hand, digital marketing has recently appeared, which can be considered as more effective in the world of innovative technologies, but, however, not everyone perceive and understand how to use it effectively and efficiently.

According to statistics gathered by various global agencies and online platforms, the use of digital marketing by most global companies is increasing every year. Survey results of 2018-2019 years show the following dynamics: ecommerce sales grew from 2.84 trillion to 3.453 trillion worldwide [3], marketers and advertisers of the leading companies contributed 51% of their budget into mobile ads [1] and mobile ads revenues represented 65.1% of total revenues [4], the average indicator on email marketing was \$38 for every \$1 spent [1]. Forecasts from these entities for 2020 have become even more favorable: ad revenue from podcasts is expected to double to 659 million by 2020 for many brands annually [3]. “Gartner” (leading research and advisory company) predicts that 85% of customer interactions will be managed by chatbots by 2020 [3], and use of personal digital assistants is predicted to double next year and reach 1.6 billion users by 2020 [2].

Conclusion. Thereby, statistical analysis and forecasts for 2020 year show that digital marketing is increasingly in demand and beneficial for most global companies. Investments in different «tools» of digital marketing are increasing, which means gradual replacement of traditional marketing with digital one. This will allow companies to build better communication with consumers, which strengthens their position in the market.

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58. Advertising wars as a marketing technology

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Introduction. Today in the business world the competition between a lot of companies is growing stronger each and every day. Comparative advertising or Advertising wars is a process when large enterprise intentionally touches on the merits or weaknesses of competitor in advertising appeal in such a way as to make its product better than his competitor. Today, these types of competitors are moving from radio and television to social networks where every successful company competitor runs its own page. For example Facebook, Twitter, Instagram.

Materials and methods. There were studied different publications and articles which refer to examples of advertising wars. There were analyzed and compared advertising activities of outstanding companies, such as BMW and Audi; Coca Cola and Pepsi; Axe and Old Spice.

Results and discussion. Business, nowadays, involves a lot of competition. And this does not go beyond the outstanding companies. Some companies have been even duking it out for decades. Coca Cola or Pepsi, Audi or BMW, Mac or PC are examples of some intense rivalries between powerful brands. If we take a look at three most popular examples of advertising wars which continue today, we will see the main trends in such unusual, but effective marketing technologies.

BMW and Audi have been known to go at each other for quite some years now[1]. Whether it's car awards shows or new car models, they keep throwing abuses. It is worth to remember the case when they placed four billboards in one place, somewhere at Santa Monica beach: Audi presented a new A4 model with the words «Your turn, BMW». The answer from the Bavarians came in a few days, with words «Checkmate». «Your pawn doesn't match our king» Audi replied. I don't know for sure how angry BMW was, but they launched zeppelin with the BMW logo and the inscription «Game Over» [1].

Coca Cola vs Pepsi. The two biggest Coke brands on planet earth – Coca-Cola and Pepsi – have been fighting for the throne for years [1]. They constantly show in advertising the sharpness of choice and the subtlety of the border between «red» and «blue». Any advertising comes down to Pepsi, or Cola is more popular than opponent. It was a long time ago, but before the new 2020 year, the Pepsi Company decided to make an advertisement using a «New Year truck», the main symbol of Coca Cola, created a long time ago.

Axe and Old Spice. After a series of Old Spice commercials in which the protagonist at the end of the video says «yes, I'm on a horse», the Axe company hangs a poster with the inscription «for man who'd rather be with woman, than on a horse».

Conclusion. «Advertising wars» or comparative advertising is an interesting, challenging and unusual way of reminder advertising but when using this strategy, you need to keep in mind that you are promoting not only your business but also your competitor's. Your company also can be defeated by competitor in this «war» by underestimating his advertising department.

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59. Clash of marketing trends: Chat bots vs email

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Introduction. Marketing has always been important in any business, but nowadays it seems more important than ever. Marketing is developing rapidly and opens up more and more new directions and trends every year. For this reason, there is a need to explore what is more reliable and effective in marketing – modern technologies or basic methods.

Materials and methods. The methodological basis of the study was theoretical method of cognition. Systematic approach consisted in general scientific methods and techniques, such as scientific generalization, analysis and comparison. A lot of articles and reports have been thoroughly explored in the process of research.

Results. Marketing plays a major role in today's business world. Many companies are trying to orient on people's tastes, which are becoming more varied, flexible, and demanding. And it should be noted that recently some companies have succeed in taking advantage of online communications and contemporary informational systems as tools to help make marketing more efficient. On the one hand, technological progress and changes in consumer habits have led to the use of interactive communication tools, which include chat bots. This type of communications has become a major part of the marketing strategy in businesses. Such new technologies also allow marketers to aim a particular group of consumers which are likely to be interested in their goods or services. **Chatbots are computer programs like virtual assistants, who can talk to an Internet user in real-time.** On the other hand, email, as old-line communication tool, remains a significant contribution to the development of company marketing and the most important communication channel. The email marketing is not expensive, but rather effective and proven tool, which could offer good returns on investments.

In accordance with statistics for the period 2017-2019 years, the use of chat bots has doubled, while the email has halved [3]. On average, email usage is only 4%, while chatbots generate up to a whopping 16% [2]. Benefits and drawbacks [3] of both methods have led to a strong understanding of using them together [1] in order to achieve high results by 2020 in the form of an increase in public interest by 80% [2].

Conclusion. This study has considered chat bots as a new technology in marketing and the great advantage of it can include not only the improvement in relations between companies and clients, but also financial savings. We can also emphasize that it's obviously better to use both methods, such as artificial intelligence and electronic marketing, to improve and complement an integrated marketing strategy.

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Section 4

Hotel and Restaurant Business and Tourism

Chairpersons:

Dr. Oleksandr Liulka

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1. Influence of ultrasound on the quality of biscuit semi-finished products

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Introduction. Flour-based confectionary products (FCPs) are increasingly popular among different age groups of consumers. The range of FCPs is diverse and has more than a hundred titles. A significant proportion of products within a given group belongs to sponge-cake dough products. The formation of a foam-like structure of a sponge cake semi-finished product is primarily affected by the properties of a base raw material, the duration of whipping process, and the mechanical impact on dough when mixing it.

In recent years, US oscillations have been wide spread in various sectors of the food industry. It appears relevant to undertake a research aimed at exploring a possibility to apply ultrasound to the technology of sponge cake semi-finished products.

Materials and methods. We examined the finished products for butter sponge cake semi-finished products, whose control sample was prepared by the cold technique. According to the conventional technology, egg yolks are separated from whites, yolks are rubbed with 50 % of granulated sugar. Egg whites are whisked, at the end of whipping the rest of sugar is added and egg-sugar mixture is mixed. Porosity of the finished products was determined at a Zhuravlev device in line with a known procedure. The organoleptic quality assessment was conducted by the method of expert assessments.

Results. The quality of biscuit semi-finished products was characterized by porosity and organoleptic evaluation. Control sample was the sponge-cake semi-finished product for which the egg-sugar mixture was whipped with the preliminary separation of whites from yolks. For examined sample 1: the whipping of egg-sugar mixture was carried out in a single stage, without preliminary separation of eggs into whites and yolks. For sample 2: mélange was whipped with sugar according to the proposed technology, in an US field.

The results of our organoleptic assessment have established that the sponge cake semi-finished products, which were made based on the egg-sugar mixture prepared in a single step (sample 1), are inferior to control sample in terms of indicators for porosity and crumb elasticity. The sponge cakes, prepared according to the proposed technology (sample 2), demonstrated a more uniform, thin-walled, elastic crumb, compared to sample 1 and to control.

Patterns in the crumb structure formation of finished sponge cake semi-finished products, dough for which was prepared according to the proposed technology, imply the increased porosity and specific volume of finished products and a more uniform distribution of pores. In this case, a porosity indicator increases by almost 7.5 % compared to the control sample, and by 11 % compared to the sample for which the egg-sugar mixture was whipped without the prior separation into whites and yolks.

It can be assumed that the increase in the porosity of the finished products was influenced by the phenomenon of acoustic cavitation, due to short-term pulses occurring in the breaking of cavitation bubbles and the emergence of microflows near them, which in turn contributes to a more uniform distribution of gases and vapors in dough.

The study results obtained allow us to assert the prospects of using US in the technology of flour-based confectionery products, in particular sponge cake semi-finished products.

Conclusions. It is expedient to implement the proposed technology under conditions of small enterprises, for example, restaurant establishments. As regards large-scale production, there is an issue of finding and selecting the US equipment capable to provide for large volumes of FCPs.

2. Rehabilitation services for special children at a family hotel

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Introduction. Statistics show that in recent years in Ukraine and in the world the number of cases of autism has increased. So, every year, more and more children have this disorder. Such prevalence raises the question of providing comfortable conditions for the rest and rehabilitation of special children.

Materials and methods. Analytical review of domestic and foreign works in the sphere of inclusion. The methodology includes statistics of the State Statistics Service of Ukraine and others, which reflects the prevalence of psychophysical diseases and their number. Methods of systematic analysis and synthesis were used to process, present and summarize the obtained data.

Results. In Ukraine families with autistic children also seek for rest, and instead are forced to enjoy standard service packages that do not provide for the care of special children. But most of the time, they do not stop at hotels at all, so as not to attract unnecessary attention. It is necessary to change this trend and make rest for parents and rehabilitation for children with autism a promising direction for the development of family rest.

To address this, we suggest developing and implementing special rehabilitation services for special children in family-run hotels. Everything will be directed to the comfort and development of the child and the parents' rest: group and individual developmental classes, services of a psychologist, a massage therapist, a rehab room, special planning and features of the interior of rooms, healthy food, various packages of services and more.

In a family-run hotel, autistic services for children will be presented with the following items: a specially designed gluten-free and casein-free menu; a tea card with Carpathian wellness teas will help to improve immunity; a relaxation device in each room; training with a defectologist; playroom services with specially trained caregivers will include leisure activities for some time and group sessions with a speech therapist and psychologist; room for adaptive physical rehabilitation classes; massage parlor services to improve circulation, lymph circulation, and metabolic processes in the muscles, joints and tissues that surround them; magnetotherapy services, effectively reducing the emotional tension and trophic tissue, normalizes sleep; an art room for creative work in which children and specialists will be engaged in art therapy, drawing, music therapy, rhythmic training.

The services presented above are basic but not the only possible. In addition to these services, the services of a nutritionist will be provided, which based on the results of the analyzes, will select the optimal diet. The interior of the rooms is as eco-friendly as possible, with ergonomic furniture without sharp corners. Bed linen should be treated with natural odorless agents.

Conclusions. As experience in the world shows, autism-friendly hotels that provide services or packages for children with autism are popular, as the choice of such hotels is limited as demand grows. Thus, the introduction of specialized rehabilitation services for children with autism in family-run hotels is an important and promising step in the development of the hospitality industry in Ukraine and in the world.

3. Coworking hotel as the newest trend in the hospitality industry

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Introduction. Over the past years, a new coworking trend is increasingly popular on the base of hospitality industry. Hotel lobby is becoming attractive location as an adaptability workplace, and hospitality businesses are remodelling their meeting and conference facilities into shared work environment.

Materials and methods. Systematic review method was used to combine and summarize the results of several research studies. The thesis deals with the combining hotel facilities and coworking spaces in coworking hotels. The main characteristics of the products and services of coworking hotels are described.

Results. According to research by Horwath HTL [1], coworking hotel is the newest trend in the hospitality industry. This type of hotel provides comfortable and safe accommodation for such hotel guests as business travellers, “classic” office users, freelancers, start-up entrepreneurs and mobile coworkers. Coworking hotels are oriented on the new type of guests as digital nomads who combine travel with work in community atmosphere using digital technologies. Hotel facilities are incorporated with coworking areas, where hotel guests and non-residents can meet and/or work. It is recommended to design coworking hotels in such modern ways that coworkers and residents are not worrying each other, and work can be mixed with social activities, networking, etc.

There are three variations of combining hotel and coworking spaces: coworking area is integrated in the lobby with lounge zones for leisure or to have a drink; coworking area is integrated in the same building as the hotel, where both share their facilities and services; hotel brand has its own fully realised coworking brand in the same or separate building with facilities and services [1]. The central business districts with good transport hubs are beneficial for realisation the coworking hotel concept, and it is more convenient for business and city hotels to include coworking spaces. Coworking hotels introduce open work areas with flexible “hot desks” and/or dedicated “fixed” desks, internet access with free and well-working Wi-Fi, printing services, mail services, skype room, catering, and spaces for collaboration and communication. Occasionally special event venues are included: small, medium and larger-sized meeting rooms, private offices for one or many employees, conference rooms. The variety of coworking areas can be designed on the first floor, and privet offices, meeting and conference rooms can be found on the upper floors. The key task for coworking hotel residents is to work, so the rooms should have an appropriate workplace that is loaded up with handy gadgets.

Food and beverage facilities of coworking hotels should be expanded. As hotel guests need all three meals, breakfast, lunch and dinner, it is necessary to provide complete meals and drinks for immediate consumption. Coworking hotels should provide leisure facilities for active relaxation and entertainment like lounge, fitness gym, swimming pool, library, game room, etc. The open collaborative and private areas with automated control of lighting, temperature, air quality with effective ventilation and good acoustics are offered.

Conclusions. Coworking hotels provide hospitable services, which allow the guests to fulfil their basic and social needs in one place, combining working, leisure and hotel facilities. The trend of combining coworking and hotels facilities for current and new work styles continues to develop.

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4. Features and improvement of tourist services marketing

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Introduction. Tourism marketing is the activity of planning and developing tourism goods and services, selling, promoting goods and services, stimulating demand for them and pricing. Tourism marketing has its special features.

Materials and methods. Methods of analysis, comparison and description were used in this study. Used materials from domestic and foreign publications, the application of foreign experience.

Results and discussion. The aim of this paper is to consider the special features of tourism marketing and what distinguishes it from marketing in a different sphere. Firstly, the tourism product is intangible. Therefore it should be compensated as much as possible. The second feature of the tourism industry is the heterogeneity of the product. When buying a material thing, a person knows what characteristics it possesses and what it will get when it buys. And when he buys a tour, he never knows what will happen during the trip. The third feature is fragility. This feature should be put in the forefront in marketing and offer a flexible pricing system, given this particular factor. And another important feature is the integrity. The person who bought the ticket has an impression of the product, based on communication with managers, cabin crew, and hotel administrators. That is why in the tourism sector the issue of staff training is of great importance.

Nowadays the time of content marketing and high-quality unique content is the main tool that will sell, if we talk about sales on the Internet. In order to qualitatively create interesting content for potential customers, it is necessary to work with a map of the client's information needs. Having a portrait of a potential client, we can identify what topics he may be interested in and which can be covered in his posts on social networks or on his website.

Conclusion. Thus, marketing is a very effective tool to improve the quality of tourism services, and their competitiveness in the market. For its improvement it is necessary to conduct a survey of consumers, create a map of for potential customers' needs.

5. Popularization of doom tourism

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Introduction. Doom tourism involves travel to places that are potentially endangered, or “doomed” towards extinction, due to natural and/or man-made causes.

Materials and methods. The research was conducted by looking at recent trends in tourism and nature statistics. The method of analysis was used.

Results. Why did this trend of visiting “doomed” places became popular? Also known as «last chance tourism», it stems from the fear of never seeing the beauties of our nature, animals and some heritage sites because of climate change and pollution. This type of travel raises awareness about the state of our nature and can change the mindset of tourists to be more environmentally conscious.

For Ukrainians this trend isn’t something new. The haunting and mysterious city of Chernobyl for many years has been a popular place for adrenaline-loving tourists. In 2019 we have seen a spike in the number of people that have visited the place after the success of a TV show based on our tragic history “Chernobyl”. The city was abandoned after a nuclear disaster and is left uninhabitable because of radiation. It’s a painful reminder of mankind’s mistakes on our planets environment.

By looking at research it has been estimated that one-third of corals, freshwater mollusks, sharks, and rays, one-fourth of all mammals, one-fifth of all reptiles, and one-sixth of all birds are heading towards extinction. And it’s all because of human activity. Because of this many people want to visit the endangered species before it’s too late.

Some of the most popular places that people visit to experience doom tourism are the city of Venice and its rising water level, the Great Barrier Reef with the half of it being gone in the last 27 years and some natural parks all over the world with dying ecosystems.

What these travelers are chasing may be a modern-day version of an old human impulse- to behold an untrammelled frontier. Except this time around, instead of being the first to climb a mountain or behold a glacier-fed lake, voyagers are eager to be the ones to see things last.

Among other places of thought of tourism - dozens of objects around the world: Maldives (the most vulnerable to the rise in sea levels caused by climate change), Majuli Island, The Dead Sea (in the last 40 years, it has shrunk by a third and sunk 80 feet, due to diversion of water from River Jordan, its only source of fresh water), Mount Kilimanjaro (Over the last century, its glaciers have shrunk by more than 80 percent and are likely to disappear completely in the next few decades) and The Arctic.

Conclusion. The doom tourism industry is unfortunately rising. And by predictions it will only grow in the future with more and more places to visit.

6. Non-financial motivation of employees at the tourist enterprises

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Introduction. Every employee certainly appreciates more money, but money does not buy happiness, nor does it buy engagement and loyalty. Non-financial incentives inspire and engage employees in ways that money is incapable of doing.

Materials and methods. The study of the concept of non-financial employees' motivation in a tourist enterprise was based on such general scientific and special methods as opinion poll, expert assessments, scientific articles and open databases of tourist enterprises.

Results. Non-financial incentives are the types of rewards that are not a part of an employee's pay. Typically, they cost the company little or no money, yet carry significant weight. Incentives of this nature are particularly effective for workers who are comfortable with their salaries or have been in the position for a long time.

As companies continue to make cuts to employee compensation, non-financial incentives for employees are more crucial than ever.

Very often employees believe that the main goal and task of managers is to get profit from the work of the company. The passion for its work, involvement in the collective life, caring about the atmosphere in it are factors that not included in the field of management activities. It is not surprising that the money motivation loses force in such companies very quickly: employees begin to expect new bonuses, but productivity remains at the same level.

Motivated employees are one of the most important presumptions of successful business. Therefore, management needs to know how to motivate employees not only to do their job, but also to use as much as possible of their potentials at work place in order to contribute to greater individual and organization success. The solution of this task implies monitoring and analyzing the needs, wishes and expectations of employees and forming the adequate motivation system accordingly.

There are some examples of non-financial motivation methods:

- Flex-time schedules
- Upgraded office or work space
- Gym membership discounts
- Casual Friday
- Opportunity to lead projects or task force
- Educational and training opportunities
- Work opportunities in multiple locations
- Company parties, trips or team-building events
- Discounts on company services or products. Let small, but "their own for their own" – this affects well the loyalty of staff.

Conclusions. Wages can play a critical role, but this is more true for individual workers who, for reasons of circumstance or personal reasons, are forced to work solely for money. However, for the majority, the collective, workplace atmosphere and performed duties are all the most important. In other words, an employee is ready to work with pleasure and diligence, if he is comfortable in the team and if he likes what he does at work. An important factor is also the satisfaction that he receives from his activities.

7. Phenomenon of labor motivation in a tourist enterprise

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Introduction. In today's rapidly globalizing economy and eternal competition, it is extremely important to be able to manage human resources wisely at the enterprise. Motivated and highly qualified employees are considered the driving force of any enterprise. Therefore, staff motivation is one of the most important places in the personnel management system.

Materials and methods. The study of the concept of labor motivation in a tourist enterprise was based on such general scientific and special methods as system analysis, expert assessments, scientific articles and open databases of tourist enterprises.

Results. The constant competition between tourism companies forces managers to try to be ahead every time and perform various tasks to win market competitions.

The driving forces of any enterprise, as known, are motivated and highly qualified employees. The way the staff treats their responsibilities depends on whether the organization will achieve its goals, get the favor of customers, be able to implement a competitive product and achieve the desired result. As each company has its own development strategy, so each employee has their own desires, motives, and behaviors that are reflected in the work process.

Both material and non-material methods of motivation are currently used by tourism companies to stimulate the motivation of their performers. However, there is no complete picture of the ratio of individual aspects in the motivational sphere of the workers and the most effective methods of managing them today. Therefore, it is worth remembering that the process of motivation of each individual person is unique and not one hundred percent predictable, due to different motivational structures and different degrees of influence of the same motives on different people. Thus, the process of motivation is very complex and ambiguous.

A well-planned system of motivation allows you to significantly increase the efficiency of staff, increase sales, improve the production process and customer service, without particularly large material costs on the part of the company. After all, when an employee performs their duties with full dedication and his goals of self-development include the development of the enterprise as a whole, then the coefficient of efficiency increases several times.

Not motivated motivation policy in the sphere of tourist, ignorance of motivation precepts assessment systems staff can lead to such unobtrusive apparitions, like a lap side disruption of labor and work discipline, high stage of conflict, unsatisfactory social and psychological climate, low productivity and productivity, zests toy, appease the effective idealist enterprises. Motivational policy at a glance with a system pay prizing transformations in deposits are formed on the basis situations, deliveries of unavailable zavdan.

Conclusions. Motivation of the staff on the tourist enterprise as the most important link and its driving force is a very important issue among the heads of competing enterprises. Each manager should know how to interest his subordinates in the implementation of the set tasks and goals, which will lead to an overall improvement in the efficiency of the staff and ultimately significantly improve the production process of the enterprise.

8. Sustainable hospitality – modern trends

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Introduction. Sustainability – not only popular theoretical global topic about environment. Sustainability has become a key concept for many industries across the Earth and the hospitality is no exception.

Materials and methods. Such methods as analysis and synthesis of collected information were used. Comparison and extrapolation also were used to identify current trends in all the industry.

Results. Nowadays we can ascertain many sustainable trends in hotel industry:

- Cost efficiency;
- Sustainability in hotels architecture and design;
- Eco-Friendly materials;
- Local produce (local food);
- Energy reduction (conserving energy);
- SMART Hotels system;
- Waste reduction;
- Cutting down on food waste;
- Creating a paperless hotel;
- Regulatory affairs;
- Minimizing water usage and water reduction;
- Economic incentives;
- Brand image;
- Corporate brand image;
- Eliminating plastic;
- Better guest experience
- Educating guests (in sustainability and ecology)
- City farming (urban beekeeping, micro green growing, etc.).
- In general, sustainable hospitality implies the rational use of all resources and energies types, processing and restoration. At the same time, the comfort of the guests should be on the first place.

Conclusions. Sustainable development in hotel industry with high standards of service maintaining and normal prices for business and economy class is not an easy task. Nevertheless, the main trends in the development of sustainable hospitality are defined and should be used by hotels around the world.

9. Stimulation of labor productivity in hotels

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Introduction. To date, almost all people's work is focused on making a profit. Therefore, for each enterprise, one of the priorities is to improve productivity. Hotel enterprises are not exception, that is why approaches to staff incentives are extremely important.

At the current stage of economic development, one of the important areas in personnel management is the creative, productive, intellectual attitude of the employee, which is aimed at achieving high performance of the enterprise.

Results. Incentive work formulates the conditions in which the work of the employee gives economical results, and becomes a condition by which a person has the ability to meet their needs, and forms a motive for work.

There are the following methods of stimulating work: tangible (monetary, non-monetary) and intangible (organizational, social and psychological).

The most important role in the motivation of the employee has the monetary incentives, which include wages, bonuses and salary allowances. Intangible organizational methods control work through orders, orders, management instructions, and more.

Material non-monetary methods are aimed to improve the professional quality of workers. The employer pays for training, courses, trips, tours, and more.

Intangible social and psychological incentives mean creating the conditions for increasing productivity. For example, the opportunity to get career growth, make an extra day off, or earn credibility with management and colleagues.

There are also non-standard methods of motivation. One of them is becoming popular - the method of group psychological training. The purpose of this training is for the psychologist to encourage the team to support each other and help in the form of play.

Corporates are also popular. They can be held in the office, on site (sports games, visiting restaurants and bars).

The rating method or the public praise method is an effective method. They affect the audience in the same way, but different in the way they are embodied. The method of public praise publicizes the achievements of some workers before others. For example, the title "Best Employee of the Month, Week, or Other Period" is created and awards or certificates are awarded at the end of the period. The rating method has a similar principle: the performance of employees is presented, but workers see the achievement of all people, so there is a stratification of employees, there are "leaders" and "outsiders".

The company can hire a psychologist, provided they have sufficient funding for it. The psychologist will find an individual approach to each employee and will begin to develop a plan for an incentive system for that particular enterprise. Such a system will help to reflect the control of labor productivity. Such an investment can quickly justify itself. The psychological climate ranks last in labor productivity. A calm and friendly atmosphere will also create a positive image of the company. For such psychological climate, collective action is needed so that workers can communicate with their colleagues outside of work.

Conclusion. So, analyzing the information, we can conclude that the methods for stimulating work in hotel enterprises are diverse. Which system to use in a particular business depends on how big the hotel is and what funding can be allocated for it. But by far, productivity issues should be an important part of the hotel management for rising of the competitiveness

10. Development of environmental hotels in Ukraine

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Introduction. In Ukraine, the organic movement is becoming increasingly popular. Businessmen quickly pick up this trend and bring hotels with natural materials, and rooms are called by the names of colors. The presence of an environmental certificate or the prefix “eco” in the name of the hotel can increase the attendance of the hotel. First of all, it’s about objects located in ecologically clean places - not far from a river or lake, away from highways. The buildings themselves, as a rule, are built from environmentally friendly materials, and guests are fed with products from their garden or farm. Energy-efficient appliances are installed everywhere, breakfast is served with useful natural food, bathrooms have organic soaps and shampoos. According to the president of the Association of Small Hotels and Apartments of Ukraine, “green” tourism began to develop in Ukraine about ten years ago and since then its popularity has only grown.

Results. Ecological hotel is an environmentally certified housing that can improve the environment by minimizing its own negative impact on the environment.

The program "ecology in a hotel" does not always require radical decisions - any little things are important: automatic plumbing on infrared rays, electric soap dishes. At the same time, the “environmental program” will not achieve its goal unless a written “upbringing” of guests is organized. For example, a call to customers “not to throw a towel on the floor if it will still be used” helps to save not only water and electricity, but also a third of towels that are washed daily, extending their “life”. The environmental activity of the hotel is based on 12 basic criteria developed by an international committee. Also, national criteria are added to the international assessment system by the national representative in each country, taking into account local characteristics, but should not contradict international standards. The main indicators characterizing the environmental friendliness of the hotel industry include: - water consumption; - power consumption; - atmospheric emissions caused by energy consumption; - use of natural resources (environmental impact caused by the amount of paper consumed, stationery, detergents, equipment and other materials; structure of the use of renewable / non-renewable resources, the use of raw materials); - the impact of chemicals on the environment and health; - emissions into the atmosphere; - emissions into water; - volume of waste; - fires, accidents and other emergency situations; - the impact of transport on the environment. Green Key is an international environmental certification of hotels and tourist facilities, which marks their responsible and respectful attitude to the environment and active participation in social life. In order to receive the Green Key, the hotel must comply with a number of requirements on environmental management, monitoring and reducing the use of electricity, economical consumption of water resources, sorting, processing and disposal of waste, participation in the social life of the city.

Conclusion. That is, we can conclude that today the greening of the hotel industry is rapidly developing in Ukraine. More and more hotels are trying to use environmentally friendly materials in the interior and equipment, apply "non-waste" technologies, environmentally friendly products and drinks in the restaurant. For some hotels, the ecology has become a concept of their activities, the positive consequences of which are reducing the cost of hotel services, increasing the tourist attractiveness of the hotel, provides competitive advantages in the tourism market, hotel enterprises in Ukraine are approaching the European level.

11. Blogging as a tool for modern advancement for hospitality businesses

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Introduction. Today, there are many competitors in the hospitality industry. Every new and fresh way of promoting and popularization them with further involvement of potential guests is very valuable and necessary.

Materials and methods. In the course of the work, the experience of communication between bloggers and hoteliers was studied and systematized, the methods of system analysis, observation and comparison were used.

Results. The success of a marketing company depends on many factors. Collaborating with bloggers on social networks is one of the modern ways of disseminating information that has been reviewed and researched. As a result, a list of important issues has been identified and formulated that underlies the successful work of the blogger and the hotel.

Customer's choice can be targeted at bloggers of various sizes - from micro-influencers to celebrities. Common ideological interests are needed, especially with regard to bloggers with a limited number of readers but with clearly defined priorities. Instead, reviews of a hotel from celebrity pages may be lost among many other information, but allow the hotel to say that the corresponding celebrant stopped there. Formation of the terms of reference and its fixing in the contract guarantee the clarity of the relations between the two parties. Such information may include: the type of content and its quantity, size, timing of publication, required media (accounts, hashtags, links) that must accompany advertising.

A guest is an ordinary person who sees and feels paid and untrue advertising. It is important to engage both parties actively, to have ability to listen and trust to the advice of a hired blogger regarding the process of working with readers.

The hotel has the right to grant the right to the blogger or bloggers to make an audit independently and to develop a special program. Such a program may include the following: involvement of transport or tour companies; preparation of handouts: booklets, magazines, photos, souvenirs; developing a plan for the entertainment program; accommodation in rooms; tasting of dishes, drinks [1].

In addition to the issues discussed above, what matters is the choice of a blogger with a real audience. In the process of studying this issue, it was proved that the customer in the search process should check the engagement and activity of the readers of the person to whom he is going to entrust his reputation. It is established that if the average number of active actions under the posts of the author ranges from 8% and more than the total number of subscribers, then such audience is considered alive.

Understanding the ultimate purpose of advertising is important. Among the main tasks that a hotel can set to itself are: raising brand awareness in general, attracting the attention of a certain contingent of guests and making the image of the hotel.

Conclusions. Therefore, in today's context, a well-formed, multilateral communication marketing strategy is able to provide the hospitality industry with decent competitiveness.

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12. Problem of domestic tourism in Ukraine

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Introduction. In our century Ukrainians prefer to have a rest abroad more than to stay at weekends in native country. It's not only the economic problem, also it's a way to degradation of country status.

Materials and methods. During the last five years, holidays at Ukrainian resorts cost more for tourists than in the past. Compared vacationers in Odesa and Egypt, to our tourist is more profitable to choose the overseas. It is not easy for our tourists to relax in the staff's environment of negativity. To increase the tourist flow in Ukraine, we need to learn how to use the resources of nature properly, to study consumer psychology and to find influential sponsors.

Results and discussion. Ukrainian experts in tourism sphere believe that the service in the Ukrainian tourism industry is gradually improving. That all businesses are developing and infrastructure is improving, but it is not enough. In fact, its dynamics is far from being fast.

Holidays in the Carpathians have their own difficulties. It may be a problem to get to this region, because it's not easy to buy a train ticket. Some tourists go there by their own cars, but so far, not all roads have been renovated there. There are many prestigious recreation centers in the Carpathians, but more than half of the Ukrainian population will not be able to afford it.

As Vitaly Perederko, head of the tourism department of Ivano-Frankivsk Regional Public Administration, testifies that according to the statistic reports of travel companies, internal tourism grows promptly, for example in 2014 a tourist tax reached 946 thousand UAH when in 2018 - 3.7 million UAH [1]. However official statistics has also shortcomings because of imperfect equipment it does not consider many visitors.

To have a rest in the main Black Sea resort of Ukraine – Odesa is expensive. Accommodation does not correspond to the price, comfort, cleanliness or safety. Ukrainian businessmen are looking for ways to enrich themselves only.

In an interview with the president of the National Tourist Organization of Ukraine Ivan Liptuga, it was noted, that the innovative jump in the sphere of tourism for the sake of increase in tourists is necessary, namely to place emphasis on gastronomic tourism [2].

To spend holidays in Lviv, Ukraine's tourist capital is actual nowadays. People, especially from the central and eastern regions of Ukraine, those, who do not have time to visit Europe, identify Lviv with an exemplary European city. Perhaps it is the only resort in Ukraine that is suitable for many people in price and quality of services.

Conclusion. The price should match the quality of the services provided. Rather than compete on price, the service must compete on quality if it hopes to gain the customer. Service personnel should be re-qualified and private enterprises reviewed at the state level.

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